

PennDOT Daily Safety Talk Book

Dear PennDOT Employee,

On the following pages you will find a revised version of PUB 247, PennDOT's Daily Safety Talk Book. There is a compilation of over 400 safety talks designed to be relevant to your daily work activities. Please give a safety talk every day to remind yourself and your co-workers of the importance of being safe, acting safe and working safe with the ultimate goal of being able to go home at the end of the day in the same condition in which you came to work.

The Daily Safety Talk Book is meant to be a reference to inform all employees of the possible risks of work activities and in many cases how to mitigate those risks by taking simple steps, paying attention and not taking unnecessary risks while on the job.

The Daily Safety Talk Book can now be used on your tablet or smartphone through the BOMO Docs app and can be searched and accessed three ways.

You can search by:

- Safety Talk Section
- Safety Talk Name
- Assembly Number

Relevant safety talks have been pre-populated in all the assembly numbers so all you have to do is click on the assembly number for the job you're doing today and the safety talks that are most relevant to your tasks will be at your fingertips.

Of course, if you can't find what you're looking for in an assembly number, you can go to the Table of Contents and search through a section or simply by name.

It is our sincerest hope that by having more and updated safety talks at your fingertips that you will find it easier to give a safety talk every day.

Please remember, safety is everyone's job. Let's all do our part!

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Section 1 - Backing

1-1 Backing Best Practices

1-2 Backing Safety

1-3 Proper Vehicle Backing

1-4 Using a Spotter

1-1 Backing Best Practices

According to the National Safety Council, one out of every four vehicle incidents can be blamed on poor backing techniques. In the past 12 months there have been 120 PennDOT backing incidents that were reported.

Although backing incidents are common, they are also preventable by focusing on these simple and easy behaviors that can prevent a future backing incident.

Get to know the vehicle's blind spots. Depending on the vehicle/equipment, blind spots can extend from 16 to 160 feet behind the vehicle.

- Adjust mirrors to decrease potential blind spots.
- Perform a complete circle of safety, particularly noting backing equipment;
 - Backup lights. In addition to providing illumination in the dark, they act as a warning to others that the vehicle/equipment is moving in reverse.
 - Alarms (if equipped) are functioning properly and clearly heard.
- Backup only when it is absolutely necessary.
 - Proper planning of routes and proper positioning of the vehicle/equipment can reduce the amount of backing required.
- Think, operating controls are reversed when backing.
- Always backup slowly to enable quicker stops.
- Roll down a window and turn off the radio so co-worker warnings can be clearly heard.
- Have another employee act as a spotter to help while backing.
 - The driver/operator and spotter should agree on hand signals instead of verbal commands to eliminate confusion.
 - Drivers/operators should instruct spotters to always maintain visual contact with the driver/operator while the vehicle is backing.
 - If sight or communication is lost between the driver/operator and the spotter, immediately stop.
 - Utilizing a spotter does not relieve the driver's/operator's responsibility to backup safely.



Additional information can be found in PUB-445M Manual for Employee Safety & Health, Protocol 13

1-2 Backing Safety

Operating heavy equipment or a motor vehicle is inherently a hazardous task, however backing up creates more risk for incidents to occur. According to the National Safety Council, backing accidents cause an average of 500 deaths and 15,000 injuries per year. All too often unnecessary backing is responsible for injuries or property damage incidents. It is necessary to consider the hazards of backing and what can be done to prevent these hazards.

Hazards of Backing

With increased blind spots, backing leaves drivers and operators at more risk for error resulting in damage or injury. The most serious incident occurring due to backing is fatalities of ground personnel. OSHA states that dump trucks followed by semi-trucks and ordinary pickups are responsible for the majority of back over incidents in the past 10 years on the job. Outside of struck-by incidents involving ground personnel, there are many other hazards to consider.

A few hazards include:

- Less visibility/ more blind spots
- Fixed Objects
- Moving equipment or vehicles
- Uneven terrain (construction sites)

Best Practices and Safeguards to Avoid the Hazards of Backing

- The single best way to prevent backing-related incidents is to eliminate backing as much as possible. Most work areas and tasks can be setup in such a way that backing-up is not necessary. Preplanning of movements is another way to eliminate unnecessary backing.
- Look for pull through parking before choosing to park where your first move is backing up. Always try to position yourself so that you can easily pull forward out of a parking spot.
- If you need to back up after being in a fixed position, complete a walk around of your vehicle. This allows you to be aware of what is in your blind spots prior to making a move.
- Use a spotter! If backing is necessary and there are hazards such as other ground personnel or fixed objects in the area, then a spotter is necessary.
- Mark fixed objects so they are more visible to those operating a motor vehicle or heavy equipment in a work area.

1-3 Proper Vehicle Backing

On July 2, 2013 an accident occurred causing a serious injury to a PennDOT employee. A crew cab was backing up in a work-zone, picking up cones. The operator of the crew cab backed over an employee, trapping him under the truck. He was pinned between the differential and the fuel tank. Emergency crew had to lift the crew cab to be able to free the employee. He was transported by helicopter to a local hospital. Fortunately, his injuries were non-life threatening.

Ask yourself how you would feel if you backed over a buddy.

This story had a happy ending, but many do not. Most people who are run over by a vehicle of any size often die. To ensure that EVERYONE goes home safely at the end of the day, please follow the guidelines below when you are operating a department vehicle or your personal vehicle.

According to the National Safety Council, one out of every four vehicle accidents can be blamed on poor backing techniques. BACKING ACCIDENTS ARE ALWAYS PREVENTABLE – AND ARE ALWAYS A SAFETY VIOLATION.

How to Avoid Backing Accidents:

- Know and understand your vehicles blind spots.
- Avoid parking where backing will be necessary.
- Complete a circle of safety before every trip.
- When backing is necessary, back slowly.
- Make sure your back-up alarm is functioning properly.
- Use a spotter! (Remember, the use of a spotter does not relieve a driver's responsibility to back- up safely)
 - ✓ Agree on hand signals.
 - ✓ Keep spotter in your sight and out of the travel path.
 - ✓ If you lose sight of your spotter – stop immediately.

How to keep workers on foot safe in a work zone

- Always face oncoming traffic.
- Be aware of moving equipment.
- Listen for back-up alarms.
- Know/plan your escape route.
- Always wear your PPE – you want to be as visible as possible.

1-4 Using a Spotter

Most likely, everyone is aware of the dangers of backing. Not only is there a possibility of injuring someone because you didn't see them but there is also a very real danger of causing significant property damage. Below is a review of safety measures every driver should take to avoid backing accidents.

Use a Spotter

The first requirement for safe backing is to have a proper spotter. This person directs the driver so they don't hit something. A spotter is necessary when the driver/operator does not have a full view of the backing path. This holds true for ANY vehicle or piece of equipment from dump truck to sedan. All drivers/operators need to remember this important rule. **Don't back-up unless you have a spotter directing your movement.** This is an easy rule to remember, the key is to remember to follow it.

Spotters Responsibilities

If you're a spotter, you have a lot of responsibility! A spotter must watch out for others, him/herself and make sure the vehicle they are watching doesn't damage any property. This may seem easy – right? After all, it seems like a spotter only has to direct a vehicle to back-up with the path is clear of people and objects, but there are dangers involved.

When a spotter directs a driver, he/she must stand at the rear of the vehicle on the driver's side of the vehicle. This gives you an unobstructed view of the entire backing path and the driver can see you clearly. It's important that the driver understands your signals – so agree on them prior to moving any vehicle. Always be sure to use the same signals for the same moves. Hand signals are better than vocal signals. Because of the amount of noise in a work-zone, a shouted signal may not be heard or could be misunderstood.

Spotters and Drivers Working Together

Spotters and Drivers must work together to keep everyone safe. Doing this will eliminate backing accidents and prevent injuries.

Use a spotter whenever possible, avoid backing whenever possible, ALWAYS be safe when backing.

Section 2 - Chemical Hazards

- 2-1 Care and Handling of Barrels and Drums
- 2-2 Chemical Hazards and Toxic Substances
- 2-3 Federal Motor Carrier Safety Regulations for Hazardous Materials Transportation
- 2-4 Right to Know
- 2-5 SEMP/SAFETY TALK Right To Know Labeling
- 2-6 Working Safely with Corrosives
- 2-7 Working with Chemicals

2-1 Care and Handling of Barrels and Drums

Working with filled barrels and drums can be very dangerous. A filled 55-gallon drum can weigh as much as 800 pounds. Always use special equipment when available to lift barrels and drums.

When you're working with barrels and drums always wear the proper PPE. Use safety gloves, boots with good tread and safety glasses.

Barrels and drums should be stored in a non-hazardous area out of the direct traffic stream. Check the GHS labels on containers before stacking or storing because different materials and chemicals can interact with one another. Be sure of what you're putting next to one another. Check to make sure that the barrel or drum you're stacking should be stored separately or can be stored with other chemicals or materials.

Check barrels and drums for jagged metal bands and slivers before handling. Do not attempt to make repairs on any damaged drums, especially filled drums. Only drum owners or manufacturing plants should make repairs on empty drums. Do not smoke when filling, handling, testing or emptying drums.

Never put water or other liquids foreign to the original contents in a drum. Products spilled on the outside of the drum should be flushed with water. After contents have been removed, drums should be completely drained, and the closure securely replaced. When stacking empty barrels and drums, make sure the ends of the bottom row are blocked to prevent shifting or rolling.

Electrically ground barrels and drums when transferring hazardous or combustible materials to another container.

2-2 Chemical Hazards and Toxic Substances

OSHA's Hazard Communication Standard (HCS) defines a hazardous chemical as "any chemical which can cause a physical or a health hazard". With so many employees regularly exposed to or using hazardous substances at work, knowing how to identify them and protect yourself becomes paramount. Employers with hazardous substances are legally obliged to include warning labels and Safety Data Sheets (SDS) with their products as chemical hazards and toxic substances can present a wide range of short- and long-term health issues, including poisoning, skin rashes, and disorders of the lung, kidney, and liver.

All chemicals exist in one of three states: solid, liquid or gas:

- Solids have a definitive shape and form, whether it's a dust particle or a steel pipe.
- Liquids are a formless fluid that take the shape of their container. Solvents and oils are examples of liquid chemicals.
- Gases, usually invisible but sometimes detectable by taste or smell, are formless substances that expand to occupy all the space of their container. Oxygen and carbon monoxide are examples of gaseous chemicals.

Knowing the physical states of hazardous chemicals is an important factor in understanding their health effects as their physical state determines how it may enter the body. For example, a gas may enter the body by inhalation, whereas liquids may be absorbed by the skin. Some commonly used workplace chemical hazards include:

- Acids
- Caustic substances
- Cleaning products such as toilet cleaners, disinfectants, mildew remover and chlorine bleach
- Glues
- Heavy metals, including mercury, lead, cadmium, and aluminum
- Paint
- Pesticides
- Petroleum products
- Solvents
- Photocopier toner

Protect yourself! Read the SDS sheets for the chemicals you use, make sure all hazardous substances are labelled, use the proper storage recommendations and wear the proper PPE.

2-3 Federal Motor Carrier Safety Regulations for Hazardous Materials Transportation

Every motor vehicle transporting hazardous materials must be driven and parked in compliance with the laws, ordinances, and regulations of the State or jurisdiction in which it is being operated unless the Department of Transportation requires a more stringent obligation or restraint. A vehicle transporting hazardous materials of any kind cannot be operated near an open fire unless the driver has first taken precautions to ascertain that the vehicle can pass safely without stopping. A vehicle transporting hazardous materials cannot be parked within 300 feet of an open fire. No person may smoke or carry a lighted cigarette within 25 feet of a motor vehicle containing flammable or explosive materials. When a vehicle transporting hazardous materials is being fueled, its engine must be turned off and a person must be in control of the fueling process while the fuel tank is filled.

A driver transporting hazardous materials must examine the tires at the beginning of the trip and each time the vehicle is parked. If a tire is flat, leaking or improperly inflated, the driver must cause the tire to be repaired, replaced or properly inflated before the vehicle is driven, except the vehicle may be driven to the nearest safe place. If a tire is found to be overheated, the driver shall immediately remove the overheated tire and discontinue operation of the vehicle until the cause of the overheating is corrected.

A motor carrier that transports hazardous materials must provide its drivers with instructions concerning the federal regulations governing hazardous materials and procedures to be followed in the event of an accident or delay. States may designate certain routes for the transportation of non-radioactive hazardous material (NRHM) and carriers shall comply with the State designations in transporting NRHM loads.

A vehicle transporting explosive hazardous material must be attended by its driver or a qualified representative at all times unless the vehicle is located on the property of the carrier, shipper or consignee. The vehicle may not be parked (1) within 5 feet of a traveled portion of a public street or highway, (2) on private property without the knowledge and consent of the person in charge of the property and who is aware of the hazardous nature of the materials, or (3) within 300 feet of a bridge, tunnel, dwelling or place where people work, congregate or assemble except for brief periods when the necessities of operation require the vehicle to be parked in such a manner.

A vehicle containing hazardous materials other than explosive materials must be attended by its driver while located on a public street, highway or shoulder of a public highway. The motor vehicle is considered to be attended if the person in charge of the vehicle is awake on the vehicle or within 100 feet of the vehicle with an unobstructed view. The vehicle cannot be parked within 5 feet of the travel portion of a public street or highway except for brief periods when the necessities of operation require the vehicle to be parked in such a manner.

2-4 Right To Know

The Pennsylvania Worker and Community Right to Know Act requires that information about hazardous substances in the workplace and in the environment is available to public sector employees and to all persons living or working in the state. The following information is taken from the Right To Know Employee Workplace Notice that is posted in the garage. You may read the notice itself for complete information.

Training: Public sector employers must provide an annual education and training program to employees exposed to hazardous substances.

Hazardous Substance Survey Form: The Hazardous Substance Survey Form (HSSF) provides an inventory of the hazardous substances found in the workplace during the prior calendar year. All employers must complete a workplace HSSF annually, post it in the workplace, and provide it to any employee upon request.

Work Area List: The Work Area List names the hazardous substances used or produced in a specific work area. Public sector employers must update a Work Area List at least annually, provide a copy to any employee of the work area upon request, and offer a copy to any employee newly assigned to that work area.

Safety Data Sheet: The Safety Data Sheet (SDS) provides detailed information about a hazardous substance. In public sector workplaces. An SDS must be accessible in the work area where the hazardous substance it describes is used and readily available to employees.

Labeling: All containers and parts of pipelines of hazardous and non-hazardous substances in public sector workplaces must be properly labeled. Employers must ensure that each label, sign, placard or other operating instruction is prominently affixed and displayed on the container or part of a pipeline system so that employees can easily identify the contents.

Health and Exposure Records: Public sector employers must maintain and allow employee access to records of employee chemical exposure.

2-5 SEMP/SAFETY TALK - Right To Know - Labeling

- Secondary containers must be properly Right-to-Know labeled; and stored in approved containers. The label to the right is blank. A properly completed label shows chemical name and hazard numbering.
 - Example - Right to Know in approved container:
 - * Gasoline (for mowers/chain saws) must be stored in a Fire Marshal approved container and have a proper right to know tag; visibly displaying hazard numbering and content.
 - Other Examples:
 - * Window cleaner placed into spray bottles.
- No dual labeling – remove old label; add proper Right to Know label.

Storage of Secondary Containers - Spill Containment

- All secondary containers must be properly stored on spill containment when not in use.
- Sheds storing containers must have spill pallets.
- Containment –
 - Products must be stored on proper sized spill pallets.
 - No double stacking of materials.
 - Product containers must not hang over the edge of the spill pallet.

Regulatory Reference: (for County Equipment Manager) OSHA 1910.1200 Hazardous Communications:

In-plant containers of hazardous chemicals must be labeled, tagged, or marked with the identity of the material and appropriate hazard warnings. Chemical manufacturers, importers, and distributors must ensure that every container of hazardous chemicals they ship is appropriately labeled with such information and with the name and address of the producer or other responsible party. Employers purchasing chemicals can rely on the labels provided by their suppliers. If the material is subsequently transferred by the employer from a labeled container to another container, the employer will have to label that container, unless it is subject to the portable container exemption. See paragraph (f) for specific labeling requirements.

2-6 Working Safely With Corrosives

Last year, PennDOT employees reported 18 injuries as a result of contact with chemicals. Over half of those were eye injuries. PennDOT employees may come across acetic acid, hydrochloric acid, phosphoric acid and sulfuric acid just to name a few. Please keep the information below in mind when working with corrosives.

Know the Hazards:

- Eye Damage – Mists and splashes can cause irritation, scarring and blindness.
- Skin Contact – Can cause dermatitis, burns, or eat away tissue.
- Ingestion – Can burn or destroy mouth tissue, throat, esophagus or stomach.
- Inhalation – Can cause bronchitis or lung damage.

Know the Safety Precautions to Follow:

- Read the Safety Data Sheets (SDS) before working with corrosives.
- Store corrosives separately in properly labeled containers.
- Work in properly ventilated area or use respiratory protection.
- Wear all required protective clothing, including eye, face and body protection, gloves and chemical resistant footwear.

Know the Proper Action in Case of Exposure: (Refer to the SDS for further information)

- Eye Contact – Rinse immediately for at least 15 minutes. Get medical help right away.
- Skin Contact – Use the safety shower immediately. Seek medical treatment.

- Ingestion – DO NOT induce vomiting. Have the victim drink water to dilute the corrosive substance. Seek medical treatment immediately.
- Inhalation – Evacuate the area immediately. Seek treatment immediately.

Know the Proper Emergency Response for a leak or Spill:

- Read the SDS before handling corrosives.
- Know what substances will trigger a fire or explosion with the chemical you're using.
- Have specialized spill kits on hand.

2-7 Working with Chemicals

Are you aware of precautions to protect yourself from chemicals used in the workplace? What about first aid measures in the event you or a co-worker becomes exposed to a chemical? When proper precautions are taken, chemicals do not pose harm.

- Read container labels, Safety Data Sheet (SDS) and safe work instructions thoroughly before handling chemicals.
- Use specified personal protective equipment (PPE) that may include appropriate eye protection, a respirator, safety gloves, apron, etc. Ensure that the PPE fits properly, has been inspected and you are trained in its use.
- Know the location of safety showers and eyewash stations and how to use them before working with chemicals, if applicable.
- Wash hands before eating or drinking; especially after handling chemicals.

All chemicals are accompanied with a SDS supplied by the manufacturer or distributor. The SDS is composed of 16 sections related to the chemical:

Important Reminders:

- Hazardous Substance Coordinators and managers that oversee facilities have until April 1st, 2019 to post the annual Hazardous Substance Survey Form (HSFF).
- Additional information can be found in PUB 445 Safety Policy Handbook and PUB 445M Manual for Employee Safety & Health.

1. Product and company identification	9. Physical and chemical properties
2. Hazard identification	10. Chemical stability and reactivity information
3. Composition/information on ingredients	11. Toxicological information
4. First aid measures	12. Ecological information
5. Firefighting measures	13. Disposal considerations
6. Accidental release measures	14. Transportation information
7. Handling and storage	15. Regulatory information
8. Exposure controls/personal protection	16. Other information

- Managers and foremen of work areas utilizing hazardous materials must ensure that all containers are properly labeled according to the Globally Harmonized System (GHS).
- SDS's outline labeling details such as the product name, designated GHS pictogram, hazard statement and PPE.



Section 3 - Communication

3-1 Communication and Safety

3-2 How to Give an Effective Safety Talk

3-1 Communication and Safety

Proper communication is crucial for a job to run safely and efficiently. When communication is lacking or missing totally there can be many negative consequences for employees. Recognizing the communication tools for work tasks and the work environment is important to ensure everyone's safety.

When someone says communication, the first thing you may think about is speaking to another person or sending an email. These are just two ways to communicate, but there are many more. Some other examples of communication include posters, labels, warnings, bulletins, pictograms, JSAs, SOPs, body language, etc. Depending on any number of factors, each of these tools of communication, or a combination of them, can be very critical to working safe. You as foreman can point out and use these tools with your crews.

Proper communication and safety go hand in hand. If there is no communication for a given work task, then safety is also missing. Tools for communicating a safety message include:

- JSAs are important tools to communicate the steps of a job task, the associated hazards of each step, and the mitigation actions to be able to work safely.
- Safety talks discussing work tasks and the associated hazards of the work are very important for work crews. They get everyone focused and on the same page.
- Labels are found on almost every piece of equipment, tool, and chemical in the workplace. Manufacturers put these labels on for a reason. They often relay some of the most important information regarding the hazards and safeguards of that product.

Never forget that verbal communication is very important. When you see a situation where someone could be hurt or there could be property loss you should always speak up. Have a conversation with the individuals involved in the task to voice your concerns. Involve them in correcting the behavior or finding a solution before an injury occurs.

Take the time and use the resources available to develop and improve your communication and to keep you working safely and efficiently.

3-2 How To Give An Effective Safety Talk

Engaging your employees about safety is a challenge! That's why safety talks are essential to before the start of the work day to get everyone thinking about doing the job safely. The purpose of safety talks is to provide relevant information. A talk five to ten minutes each morning before the start of work will get everyone focused and in the game. Some Districts do an additional talk after lunch, to bring everyone back in after the break.

There are many ideas for safety talks, but most of all they should pertain to a relevant safety issue of the day. The environment, the work being done, past accidents in similar circumstances, and potential hazards are just a few points foremen can focus on.

Here are some ways you can deliver a successful, meaningful safety talk:

1. Have a goal: think about the job and direct your discussion to that area. Don't do winter weather when it's 90 degrees.
2. Correct an issue...maybe something happened yesterday that needs to be addressed.
3. Give positive feedback about safety done right.
4. Make your talks interactive. Ask questions.
5. No vague or general talks Telling your crew to wear their hardhat is not an effective safety talk. Tell them about the hazards, relay actual stories.
6. Point out hazards and show them how to avoid them...overhead lines are a perfect example.
7. Record your talks...time and date and who was present.
8. Talk with the workers, not to them. Ask them what their concerns are.
9. BE POSITIVE. Don't minimize safety. ("I'm only doing this because I have to...").

Complacency is the biggest factor to having accidents. Daily Safety Talks are a great way to combat the complacency. As a foreman, this is your opportunity to provide leadership. Don't waste it!

Section 4 - Drugs & Alcohol

- 4-1 Alcohol Abuse
- 4-2 Drug Free Workplace
- 4-3 Opioid Pain Killers – What You Need to Know
- 4-4 Too Impaired to Work

4-1 Alcohol Abuse

Having a beer after work with your buddies is a rite of passage. It's a great way to unwind and laugh about your day. But did you know that impairment starts with the first drink. Alcohol begins to affect individuals prior to reaching the legally intoxicated BAC (Blood Alcohol Content) of .08% or .04% for CDL drivers.

Impairment

According to the Pennsylvania DUI Association, if a 150 pound person consumes one drink equal to twelve ounces of beer (5 percent alcohol), five ounces of wine (12 percent alcohol) or one-and-a-half ounces of hard liquor (40 percent alcohol), all would contain about the same amount of alcohol and would raise the person's BAC about .02%. It takes the liver about an hour to oxidize or metabolize one drink.

Alcohol is primarily absorbed through the stomach and small intestines. It's considered a food because it has calories but doesn't need to be digested and proceeds directly into the body through the digestive system. After ingestion, it's carried through the blood stream and crosses the brain-blood barrier, at which time impairment begins.

DUI

You might think you can handle your alcohol and that no one will know if you have a drink or two and then hop in the car to go home. Consider this for a moment. The majority of alcohol is eliminated by the liver. It takes the average person an hour to metabolize one can of beer, one glass of wine or one shot of whiskey. If you are arrested for a DUI, tell your supervisor immediately.

SEAP

The State Employees Assistance Program (SEAP) is a free assessment and referral service that is designed to assist Commonwealth employees and their family members in resolving a wide variety of personal problems that may lead to deteriorating employee job performance. SEAP offers service related to substance abuse, mental health issues, family issues, financial issues, legal issues and mediation. Employees may call SEAP 24 hours a day – 7 days a week, 365 days a year at 1-800-692-7459 or by visiting www.liveandworkwell.com. The service is 100 percent free and confidential.

4-2 Drug Free Workplace

In 1988, Congress passed a series of laws to eliminate the use of drugs and alcohol in the workplace. These laws became necessary due to numerous incidents and reports indicating that drug and alcohol use is responsible for serious accidents, poor product quality and reduced productivity.

As an employee of the Department of Transportation and potentially a CDL holder, a drug free workplace becomes even more important. Driving while under the influence of drugs or alcohol is not only dangerous to you, but also to the other drivers on the roadway. While under the influence of drugs or alcohol, your ability to drive safely diminishes drastically. Combine that drastic inability with a loaded truck that weighs around 58-thousand pounds and you suddenly have a recipe for disaster.

As a CDL holder, you will be subject to drug and alcohol testing. This is a requirement of the Federal Motor Carrier Safety Administration (FMCSA). There are six types of tests that employees will take in the course of their employment.

Pre-employment

Any new employee must submit to a pre-employment drug test prior to consideration for employment. In addition, any employee who has been off work 30 or more days will also need to take a pre-employment drug test prior to being permitted to return to duty.

Random

CDL employees are subject to random, unannounced drug or alcohol testing. Once an employee has been notified to report for a random drug or alcohol test they must do so immediately. A delayed arrival may be considered a refusal which is the equivalent to testing positive.

Post-Accident

A drug and alcohol test may be requested by the police if a driver has been involved in a serious traffic accident that resulted in a fatality of any person. The alcohol test must occur within 8- hours and a drug test must occur within 32-hours. If the police request a test, the employee MUST NOT be escorted by the employer. The employee will NOT be given a Federal Cover Sheet or Federal Drug testing Custody and Control Form. Test results will be sent to the requesting police agency.

Reasonable Suspicion

PennDOT Supervisors have been trained to spot signs of drug and alcohol use. If a supervisor observes an employee that they believe is taking drugs or are suspicious of someone coming to work intoxicated in any way they can order a reasonable suspicion test for that employee.

Observations are based on appearance, behavior, speech and smell.

Return to Duty

If an employee has tested positive for drugs or alcohol, before they can come back to work, they must take a return to duty drug and alcohol test. This test is an observed test by a same gender provider. An employee must pass the return to duty test before they will be permitted to come back to work.

Follow-up

Once an employee has passed the return to duty test, they will have to continue with a series of follow-up drug and alcohol tests. These tests will be prescribed by a Substance Abuse Professional (SAP) who will sign the return to duty report. Follow-up tests consist of a minimum of six unannounced, direct observation tests during the first 12 months after treatment. The SAP can prescribe follow-up testing for up to five years for anyone who has tested positive or refused to test.

SEAP

The State Employees Assistance Program (SEAP) is a free assessment and referral service that is designed to assist Commonwealth employees and their family members in resolving a wide variety of personal problems that may lead to deteriorating employee job performance. SEAP offers service related to substance abuse, mental health issues, family issues, financial issues, legal issues and mediation. Employees may call SEAP 24 hours a day – 7 days a week, 365 days a year at 1-800-692-7459 or by visiting www.liveandworkwell.com. The service is 100 percent free and confidential.

4-3 Opioid Pain Killers – What You Need to Know

Opioids are powerful painkillers that are prescribed after surgery, for various types of pain and even for the flu or a bad cough. While very effective, these medications can cause reactions, addictions and in some cases death if not monitored.

Commercial Driver's License

Everyone needs to be aware of the effect's opioids have on themselves, but if you have a CDL then these effects can cost you your license. Opioids can make you:

- Sleepy
- Dizzy
- Confused
- Sick to your stomach

The reactions can happen suddenly and while taking the usual dose. You could take your dosage yesterday and be fine and then take the same amount today and have a reaction.

Ask yourself what would happen if you had that reaction while driving? For this reason, CDL holders with the Commonwealth are required to have their physician fill out an STD-708 form indicating the types of reactions that can occur with certain medications. If the medication that you have been prescribed causes drowsiness, dizziness or confusion then you most likely will not be permitted to drive or hold a safety sensitive position until you are no longer taking the medication. You are highly encouraged to tell your physician that you hold a CDL and ask for a different type of medication that would not have the same type of effects.

Common Opioids

Some of the common opioids are:

- Morphine – also known as: MSIR or Roxanol.
- Oxycodone – also known as: OxyIR, Oxyfast, and Endocodone.
- Oxycodone with Acetaminophen – Also known as: Roxilox, Percocet, Endocet and Tylox.
- Hydrocodone with Acetaminophen – Also known as: Vicodin, Lorcet, Norco, or Lortab.

These medications are very effective for pain management, but highly addictive and will prohibit your ability to drive safely. Be sure to tell your doctor that you hold a CDL prior to getting a prescription for an Opioid. If you get an opioid prescription – tell your supervisor immediately.

4-4 Too Impaired to Work

In every industry, employees need to be healthy and focused to stay safe at work. Impairment is a major roadblock to workplace safety and the effects are more common than you think.

Impairment risks

The more you know about the risks of impairment and how they can arise, the better you can judge your ability to work safely.

- Missing just a few hours of sleep can hamper your driving abilities. Even if you only drive to and from work, this can be a serious risk.
- If you regularly have trouble sleeping, talk to your doctor about getting screened for sleep disorders.
- Many prescription drugs, including opioids and others, can impair your ability to work and drive.
- Before starting a new prescription, ask your doctor about any potential side effects and how it might impact your ability to work or drive.
- Cannabis taken in any form and at any dose can have varying effects for different amounts of time. Even if cannabis is legal for recreational purposes in your state, educate yourself on its impairing effects and your employer's policies to stay safe.
- Impairment begins with the first drink. Just because you have experienced feelings of impairment from alcohol before does not mean you can overcome them or work through them.
- Emotional impairment is another serious risk. If something is causing you stress or anxiety, whether on the job or back home, it can affect your focus at work and potentially make you less safe.
- Do not take chances. Nothing – not a doctor's prescription or past experience with an impairing substance – is an excuse to work unsafely.



Cannabis: a growing concern

As cannabis is increasingly decriminalized and legalized for recreational and medicinal use across the U.S., it raises new safety concerns in the workplace and at home.

- For all workers who drive on the job or just to and from work, there is no "safe" level of THC for driving or operating heavy machinery.
- There are many unknowns associated with cannabis. Do not assume that consuming it one way is less impairing or safer than another way; there is no way to know.
- Cannabis can be consumed in a number of ways, but whether taken orally through food, drinks or pills, or inhaled through smoking or vaping, it can put you and others at risk in the workplace.
- Everyone experiences the effects of cannabis differently and for different amounts of time. Factors like the food and drink you've consumed throughout the day and any medications you take can change how cannabis affects you from one day to another.
- When cannabis is used to manage pain, treat it as a medical substance, not a recreational one. Talk with your doctor about your options before considering it a solution to any health problems.



Section 5 - Electrical Safety

- 5-1 Buried Utility Lines
- 5-2 Call Before You Dig
- 5-3 Don't Get Shocked
- 5-4 Downed Overhead Wires
- 5-5 Electrical Safety Facts
- 5-6 Gas Line Safety
- 5-7 Overhead Electrical Dangers
- 5-8 Overhead Wires
- 5-9 How to React if a Power Line Falls on Your Vehicle
- 5-10 Respect Electricity

5-1 Buried Utility Lines

No matter where you're digging, you're probably going to find an underground transmission line of some sort. Regardless if you're excavating in the middle of the downtown or on a country road, hitting a buried utility will cause a disruption of services to the public and more importantly, depending on what you hit could result in yourself or someone on your crew being seriously injured or killed.

First Things First – Call 8-1-1

You've heard the slogan, Call Before you Dig. Never dig until all the underground utilities have been marked. You need to allow at least two to three working days to have all the utilities marked. A good rule of thumb is to call them at least five days in advance so your lines are marked, and you don't need to delay your work waiting for them to come. Remember, you also need to confirm that the utilities have been marked before you can begin excavation.

Tolerance Zone

Once the buried lines have been marked, you will be given a tolerance zone which is an area along each side of the existing utility. This tolerance zone is usually between 18 and 24 inches on either side of the buried line. Unfortunately, if your excavation needs to be within this tolerance zone, you'll need to hand dig to uncover the lines. When you've finally found them, go slow. You want to avoid cutting into any of these transmission lines, so you don't damage them or you.

Once You Find the Wires

When you've uncovered the buried utilities, you'll need to support them, so they don't collapse under their own weight. You can place a heavy timber or pipe across the top of the trench and then tie the utilities to the support.

Damage to a Buried Line

Regardless of how careful you are, sometimes we cut into and damage a buried utility. If this happens, stop work immediately! Call your supervisor and report the damage to the utility. Regardless of how minor the damage. This also holds true if you discover that the lines were damaged previously. This is especially true, so you don't get in trouble for someone else's mistake.

Back-Filling

When it's time to fill the hole, go slow. Dumping a large, heavy bucket load of dirt onto an un-supported utility line can cause it to break. So back-fill the area below the line and pack it firmly to give the line support, then continue compacting soil over top.

5-2 Call Before You Dig

The mystery of underground utilities and their locations have baffled excavators forever. An inch here or an inch there could be the difference of digging into a gas or water line or taking out electricity to the block. But there is a solution... PA One Call – 811!

If you plan to disturb the ground, you need to call 8-1-1 first. When you do this, the system will generate a call to all the local utilities who will come to your dig site and mark on the ground with paint where the utility is and depending on the paint color, you'll know what is buried there.



Temporary Survey Markings



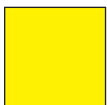
Potable Water



Electric Power Lines, Cables, Conduit and Lighting Cables



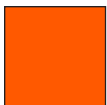
Reclaimed Water, Irrigation and Slurry Lines



Gas, Oil, Steam, Petroleum or Gaseous Materials



Sewers and Drains



Communication, Alarm or Signal Lines, Cables or Conduit and Traffic Loops

Give the utility company a day or two to respond, so this means you should call 8-1-1 at least five days advance of your job. Once the utilities are marked, you'll see the paint lines on the ground. If there are no utilities, you'll know that too because they are required to mark CLEAR (usually in white) where it's okay to dig.

5-3 Don't Get Shocked

Working around electricity is usually very safe. As long as electricity is flowing inside a circuit, through a conductor to a tool, lights or equipment, it's fine. But when your body becomes the conductor, electricity can cause death.

If someone is shocked at your job site or stockpile what do you do? You'll want to give the person aid, but should you touch him or her? Is the person still electrified? It will be a very confusing and you'll want to act quickly to save the person's life, but not at the risk of putting yourself in danger. To avoid getting hurt and to keep the injured alive follow these guidelines established by OSHA.

- Ensure your own safety, by making sure the scene is safe.
- If possible, and safe to do so, shut off the source of electricity.
- Call 9-1-1 (or have another worker call) with an explicit address and inform them of the source of electricity. They may also ask if there could be room nearby for a helicopter landing zone.
- Do not hang up with the 9-1-1 operator until you're told to do so.
- If you cannot shut off the source of electricity, attempt to move the source away from both you and the injured person using a dry, non-conductive object made of cardboard, plastic or (dry) wood; all without placing yourself at risk of electrocution.
- Begin CPR and use an AED if the person shows no signs of circulation such as breathing, coughing or movement until EMS arrives.
- Cover the injured person with blankets to prevent going into shock.

Remember the best way not to become injured is to not get shocked in the first place. Inspect all electrical sources for damage. Inspect extension cords for damage before every use, if it's damaged in anyway, remove it and use a new cord. Never use electrical tools in or around water and always lock-out, tag-out electrical sources when they are being repaired.

5-4 Downed Overhead Wires

Working around overhead utilities can be dangerous, especially if a line is pulled down because of weather conditions. If an overhead utility line does come down, keep the following in mind:

- Do NOT assume a downed line is safe simply because it is on the ground or is not sparking. Consider all lines energized until proven otherwise.
- Do NOT assume all coated, weather-proof or insulated wire is just telephone, television or fiber- optic cable.
- Never go near a downed or fallen electric power line. Touching it could be fatal.
- Electricity can spread outward through the ground in a circular shape from the point of contact. As you move away from the center, large differences in voltages can be created.
- Low-hanging wires still have voltage potential even if they are not touching the ground; therefore, do not touch them.
- Never drive over downed power lines.
- If a downed overhead utility is observed, maintain a safe distance and contact your supervisor immediately. Wait for further instruction to secure/contact the appropriate authorities.
- If contact is made with an energized power line while you are in a vehicle:
 - Remain calm and do NOT get out unless the vehicle is on fire.
 - If you must exit your vehicle because of a fire, try to jump completely clear, making sure that you do not touch the vehicle and the ground at the same time.
 - Land with both feet together and shuffle away in small steps to minimize the path of electric current and avoid electrical shock. Be careful to maintain your balance.
 - Report the incident immediately to your supervisor.



5-5 Electrical Safety Facts

The following safety talk and attached fact sheets provide additional safety tips for both on and off the job.

The Electrical Safety Foundation International (ESFI) uses the U.S. Bureau of Labor Statistics' (BLS) Census of Fatal Occupational Injuries (CFOI) and Survey of Occupational Injuries and Illness (SOII) to distill information specifically pertaining to fatal and nonfatal occupational electrical injuries.

- The 154 electrical fatalities that occurred during 2016 represent a 15% increase over the 2015 total.
- Exposure to electric current increased one place to sixth on the list of occupational fatalities.
- Electrocutions constituted the vast majority of electrical fatalities while electrical burns were responsible for four fatalities.
- 98% of fatal electrical injuries occurred in the Private sector and 2% in the Government sector.
- In 2016, 53% of all fatal electrical injuries occurred in the Construction industry, down from 60% in the preceding year.
- The self-employed constituted 26% of all workers suffering a fatal electrical injury 2016, up from 20% in 2015.

Electric Shock Drowning (ESD) severely injures and kills people every year. ESD occurs when faulty wiring sends electric current into water, which passes through the body and causes paralysis, which could ultimately result in drowning.

How to Avoid Electric Shock Drowning

- Locate and label all power switches to pool, hot tub, spa equipment, and lighting.
- Make sure all pools, hot tubs, and spas are at least 25 feet from powerlines.
- All wiring and repairs should be performed by a qualified electrician.
- Have a qualified electrician inspect your pool, spa, or hot tub annually.
- Install GFCIs, which can prevent electrocution, on all receptacles within 20 feet of water's edge.

What to do if you see Electric Shock Drowning

- Do not enter the water
- Turn off source of power
- Call 911
- Use an insulated device (such as fiberglass rescue crook) to attempt to remove victim from water

In 2016, 53% of all fatal electrical injuries occurred in the Construction industry. The Construction industry remained the leading source of fatal electrical injuries with 81, more than four times the contribution of the second-highest source, Professional and Business Services. Learn how to work safely near power lines with these simple steps:

1. Locate all overhead power lines.
2. Keep self and equipment 10 feet away from all overhead power lines.
3. Do not touch anything that is in contact with the power line.
4. Beware of fencing near power lines.
5. Carry ladders and other equipment horizontally.
6. Lower equipment apparatus before driving.
7. Never spray water near power lines.
8. Stay at least 35 feet away from fallen power lines.

National Electrical Manufacturers Association estimates that 60-80% of surges originate from internal sources (within a home or business). Keep your valuable electronics safe by protecting them from the surges that can damage or destroy them.

What is a power surge?

A power surge is a sudden and unwanted increase in voltage that can damage, degrade, or destroy electronic equipment. Surges can occur when large appliances, such as air conditioners, turn on and off. Surges can also originate from electric utilities or lightning.

Levels of Surge Protection:

1. **Good:** Point-of-Use Surge Protection
 - Easy to use – just plug in.
 - Only protects electronics plugged into the device.
 - Must be replaced over time or after a major surge event.
2. **Best:** Whole Home Surge Protection
 - Must be installed by a qualified electrician.
 - Provides protection for your entire electrical system at home including large appliances, outlets, and light switch.
 - Protects against larger surges and provide longer lasting surge protection than point-of-use devices.
 - No surge protection can handle a direct lightning strike. Disconnect sensitive electronics if you suspect a surge is coming.
 - Remember power strips and surge protectors are not the same. Not all power strips offer surge protection.

5-6 Gas Line Safety

Damaging any underground utility is bad. Underground electricity transmission lines will cause outages and can injure or kill members of your crew but hitting a natural gas line or a pipeline can result in a major disaster that could kill many, many more, including you and your crew.

If you hit a gas line, you must remember the two most important things to do are protect life and property, you can do this through prevention by calling 8-1-1 prior to digging, but if it's too late for that then you need to react quickly.

If a gas or pipeline line has been hit, you should:

- Stop all digging immediately and leave the equipment in place.
- Evacuate the work area and adjacent structures.
- Remain upwind at a safe distance of at least 500 feet.
- Once safely away, call your supervisor, 9-1-1 and the gas company or pipeline owner.
- Eliminate potential ignition sources such as open flames, lit cigarettes, starting up a motor or engine, cellphones, radios, flashlights or other types of electric switches.
- Do not try to extinguish a natural gas fire unless there is a direct threat to life.
- Do not operate ANY pipeline valves.
- Secure the area and keep people from entering. You must have at least a 500-foot radius.
- Do not attempt to stop the gas by covering it with dirt.

Remember: By law, any damage to a gas or pipeline must be reported to the facility owner.

Important Note: If you hit a gas line and there is no apparent damage, you still need to call the gas or pipeline owner. Reporting all damages, even minor nicks, scrapes and gouges are required by Pennsylvania Law.

5-7 Overhead Electrical Dangers

Scenario: You are driving a dump truck full of blacktop. It's finally your turn to back into the paver, you start to raise your bed and the next thing you know people start screaming, telling you to stop. You look in your side mirrors and see nothing, then you see sparks and realize you've just put your bed into a cluster of overhead wires.

Look up and Live

Overhead transmission lines are a way of life, especially on the back roads of Pennsylvania. These wires can be something docile like a cable wire or they can be something deadly like a power line. Usually, the cable and phone wires are on the bottom of the cluster and the power lines are clear at the top, but not always. Sometimes, these wires get tangled so when you hit one, you hit them all and that's where the danger comes in.

Most power lines over streets are to be a minimum of 18 feet above the roadway. Communication lines are to be a minimum of 15 and a half feet above the roadway, but sometimes wires become old and they sag, or poles fall and pull the wires to a lower point.

Prevention

The best way to keep from getting electrocuted is to avoid the wires. Before a paving, chipping, widening, grading or other type of job that requires you to put your bed in the air, foremen should spend some time marking where all the overhead wires are. The simple use of a fluorescent pink or lime green flag will sufficiently mark the overhead dangers so drivers who are pre-occupied trying to hit the mark will still be able to see them. When the ground guide sees the flag, they can motion to the driver to put the bed down until the wires are cleared.

Stay 30-feet away

Remember, electricity can kill! Stay at least 30 feet away from all power lines. A little extra time at the beginning of the job could very well save your life and the lives of your crew.

5-8 Overhead Wires

Electrical hazards are all around us and they can cause burns, shocks and death through electrocution. We encounter electricity everywhere. Extension cords, underground utilities and overhead power lines can all be hazardous if not handled properly.

Overhead Lines

You should assume that ALL overhead lines are energized at deadly voltages. Overhead lines are particularly dangerous when the truck bed is in the air during paving jobs, mill-n-fill jobs or any other time that you must lift the bed of your truck. Never assume that a wire is safe to touch with your truck bed or your hand, even if it appears to be insulated.

If you catch an overhead power line with your truck, stop immediately and try to back away without damaging the line. If you pull it down, stop immediately and DO NOT get out of your truck. Call 9-1-1 and the power company.

Other members of the crew should stay at least 10 feet away from the downed power line and tell them to NOT touch your vehicle. If the downed power line has caught on fire and you are at risk if being burned, stand with both feet together, and attempt to jump at least ten feet away from your truck. When you land, try to land with both feet together. DO NOT break the plane, or you could be electrocuted. Shuffle your feet without bringing either foot off the ground until you have gotten at least ten feet away from the downed power line. If there is no danger of fire, stay in your vehicle until help arrives.

Mark the lines

Before you start work that requires you to lift your bed under power lines, you should spend some time prior to the start of work marking where the overhead lines are. One way to mark them for drivers is by placing pink flags in the ground on the shoulder indicating to a driver that an overhead obstacle exists. This way a driver can see the pink flag and know to drop the bed.

You can also designate an employee to warn the driver of the power line. Because it is difficult to judge distances, it is important that this worker focus solely on this task.

Other Equipment at Risk

Dump trucks aren't the only piece of equipment at risk for running into a power line. Some others are:

- Backhoes
- Loaders
- Cranes
- Excavators
- Graders
- Boom trucks
- Concrete Pumps

When you treat the power lines with the respect they deserve, you'll minimize the chances for a disaster at your work site.



5-9 How to React if a Power Line Falls on Your Vehicle

Recently District 3-0 had a fleet accident involving a dump truck and a downed “energized” high voltage powerline. This safety talk is to provide basic safety guidance for all employees, especially field personnel on the safety procedures and dangers of downed power lines. Having a power line fall on your vehicle can be one of the most dangerous situations you could ever face while driving. If an active power line falls onto your vehicle, it can charge the vehicle with electricity, meaning that you have to act with extreme caution to avoid getting electrocuted. If your vehicle isn't on fire, call 911 and stay put in your vehicle, being careful not to touch the vehicle's frame. If your vehicle is on fire, exit the vehicle by jumping free of the vehicle without making contact with the metal inside of the vehicle. **Always assume a downed wire is an active “energized” line until cleared by the authorities and Power Company.**

Acting After the Line Falls

- 1) **Stay inside the vehicle if possible.** Unless your vehicle is on fire, it's very important to stay inside your vehicle once a power line falls. When a power line falls on your vehicle, it often charges the metal parts of the vehicle with electrical current, meaning that if you attempt to exit as you normally do, you will be electrocuted.
 - After the line falls, look around the inside of your vehicle and out the windows. If you don't see flames or smoke, you aren't in any immediate danger. The safest thing you can do is to stay inside.
 - If you see flames and smoke, refer to Method 2 for instructions on safely evacuating the vehicle.
 - If there are other passengers in the vehicle, communicate with them that the safest thing to do is to stay inside the vehicle. Even one person exiting the vehicle incorrectly could put you all in danger of electrocution.
- 2) **Don't touch the inside of the vehicle.** Sit still in your vehicle with your hands in your lap. Take extra care not to touch the frame of your vehicle, which is very possibly charged with electrical current.
 - As long as you stay still and don't touch the frame of your vehicle, you are safe inside your vehicle.
- 3) **Call 911.** Use your cell phone to call 911. Give them your address and tell that that a power line fell on your vehicle. They will likely give you some advice such as staying inside the vehicle, but if they give you specific pieces of advice make sure to follow them.
- 4) **Warn people not to touch the vehicle or power line.** If you notice vehicles coming behind you or approaching the power line from the opposite lane, honk your horn to signal to them that they should not get near the line.
 - If anyone gets out of their vehicle to investigate or try to help you, shout over to them that they should not touch your vehicle or get anywhere near the fallen power line.
 - If you don't have your cell phone on you and weren't able to dial 911, ask anyone who approaches if they will call 911 for you. Do not have them hand you the phone; instead, tell them to call 911, explain the situation, and provide the address of the downed line.
- 5) **Follow the police's directions.** Once the first responders and police arrive to the scene, they will approach the vehicle and possibly ask questions or give you instructions. Follow whatever advice they give you, as they will be able to assess your individual situation. Only exit the vehicle after they tell you that the power to the line is out and grounded, and it is safe to get out of your vehicle.



Safely Evacuating a Flaming Vehicle

- 1) **Make absolutely sure the vehicle is on fire.** Evacuating your vehicle is risky, so you want to be 100% sure that your vehicle is on fire before exiting. If you see smoke but no flames, watch the smoke to make sure that it isn't exhaust coming from your vehicle. Smoke is thick and won't dissipate quickly, whereas exhaust will fade into the air. If you see flames, your vehicle is definitely on fire and you should evacuate as quickly and carefully as you can.



2) Open the door. Once you see that your vehicle is on fire, it's important to exit as quickly as you can.

- Open the latch of the door and push it open, being careful to only touch the plastic latch and not the frame of the door or vehicle.
- The metal frame of the vehicle is likely charged with electricity by the power line, so it's important to have as little contact with your vehicle as possible in order to avoid getting electrocuted.



3) Bring your legs together and cross your arms. After you open the door to the vehicle, don't step out as you normally would.

- Instead, hold your legs together and bring them slightly inward towards your body.
- Rotate your body, making sure to not let your feet or any other part of your body touch the frame of the vehicle, so that you are angled to jump out of the vehicle.
- Cross your arms over your body to make yourself as small and compact as possible.



4) Jump out of the vehicle. Still keeping your legs together, jump carefully out of the vehicle and land on both of your feet at the same time.

- Keeping your legs together so that your feet touch the ground at the same time greatly reduces your chances of getting shocked.
- Jump, don't slide, out of the vehicle. Your body should be in the air, not sitting in the vehicle, when your feet touch the ground.

5) Shuffle or hop away from your vehicle. After you jump out of your vehicle, get away from the flaming vehicle as fast as you can. Instead of walking and lifting one foot at a time, shuffle from the vehicle, keeping both your feet on the ground at all times about 6 inches (15 cm) apart. Alternatively, you could also hop away from your vehicle.

- You may feel silly, but shuffling or hopping may save you from getting shocked.
- If you choose to hop from the vehicle, make sure that both of your feet hit the ground at the same time.



6) Call 911 when you are 50 feet (15.2 m) away. Keep shuffling or hopping until you are at least 50 feet (15.2 m) from your vehicle. Then take out your phone and call 911. Tell them your exact location and let them know that a power line has fallen onto your vehicle and that your vehicle has caught fire.

- When the first responders and police arrive, tell them what is going on and follow their safety advice.
- Warn other approaching vehicles what has happened and tell them not to approach or touch the vehicle or the power line. Shout over to them if they are within 50 feet (15.2 m) of the power line or vehicle.

Taking Action as a Bystander

1) Do not approach the power line or vehicle. If you are a bystander to a power line falling on someone else's vehicle or come back to see that a power line has fallen on your vehicle, do not approach within 50 feet (15.2) of the power line. Getting close to the scene is extremely dangerous, and there are ways that you can help without getting hurt.

2) Yell over to the person in the vehicle. If you witness a power line fall on someone else's vehicle, instead of approaching the vehicle, yell to the person in the vehicle. Ask them if they are okay and tell them to avoid touching the frame or interior of the vehicle.

- Say something like, "Hello, are you okay?" When they respond, and if their vehicle isn't on fire, yell over, "I know what to do in this situation. Stay in your vehicle and try not to touch the frame of the vehicle or any metal parts of your vehicle, since they can be charged with electricity. I'm calling 911 right now, so help will be here soon. As long as you stay in your vehicle, you'll be fine!"



- If their vehicle is on fire, say, "Your vehicle is on fire, so you need to get out quickly and carefully! Turn slowly toward the door of your vehicle without touching the frame of the vehicle. Open the door handle without touching any other part of the door. Swing it open, then jump out so that you land on both feet. Shuffle away from the vehicle and keep both feet on the ground at all times. I'm calling 911 right now, so just focus on getting out of the vehicle carefully!"
 - Be reassuring and let them know that you know what to do. Let them know that as long as they follow your instructions, they will be safe and unhurt.
 - Also let any approaching vehicles or pedestrians know what has happened and warn them not to get within 50 feet of the line.
- 3) Call 911.** If you haven't already, yell over to the person in the vehicle that you are calling 911. If they want you to call for them or are unresponsive, dial 911 and tell the respondents the situation and location. If you come back to your vehicle to see that a power line has fallen on it, call 911 so that they can deactivate the line and make your vehicle safe to drive again.
- 4) Stay until the first responders and police arrive.** Stay at the scene until the first responders and police arrive. If you have just witnessed a power line fall on someone's vehicle, it will make the occupant of the vehicle feel better to know that they have someone outside who is handling the situation. Once the first responders and police arrive, explain the situation to them again. If the power line fell on your vehicle, follow their instructions until the vehicle is safe to approach again.
- If the power line fell on your vehicle, you likely will have to call a towing company or mechanic to get your vehicle taken away and fixed unless it is only superficially damaged.

Source: <http://www.wikihow.com/React-if-a-Power-Line-Falls-on-Your-Car>

5-10 Respect Electricity

It's easy to understand that a thick wire over your head is dangerous, but what about the one you have a heater plugged into or your truck plugged into. Have you checked it lately? Are all the wires still coated or has that cord become brittle, or is the end burned? If you answered yes to any of these then it's time to unplug that cord and replace it.

Electricity is the most common hazard that any of us use. We use electricity all the time and in fact, many of us wouldn't know what to do without it. Factories would be shut down and many of the PennDOT operations would be halted because we need electricity for our daily routines.

We have all become very complacent to the dangers of electricity. Because most of the time, it's safe but it only takes one faulty cord or plug to make it unsafe. There are some things we can do to ensure that electricity continues to be our partner versus our nemesis.

Ground Fault Circuit Interrupters

GFCI's are fast acting devices that sense a small current leakage to ground. Within 1/40 of a second the GFCI will shut down the electrical current and interrupt it, preventing serious injury. Most commercial buildings and garages are required to have GFCI's.

Extension Cords

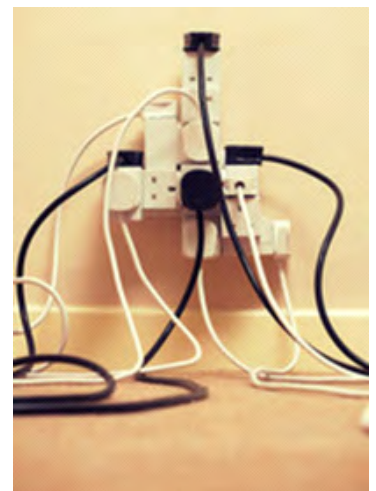
Extension cords are great ways to extend our use of electricity. Extension cords have basically made electricity portable. However, they are often misused. It's important to remember that extension cords are for temporary use.

- Inspect extension cords often for physical damage.
- Check to make sure the extension cord is rated for your tool.
- Do not use an extension cord with a lower rating.
- DO NOT plug one extension cord into another.

Electrical Fires

Electrical fires occur when you have something plugged in and it overloads the power source. If you experience this, unplug the tool or power cord if you can do it safely. When you unplug, this usually extinguishes the fire. If it does not, then you need to grab your fire extinguisher. A Class C or multi-purpose fire extinguisher will extinguish the fire. Remember the PASS rules for fire extinguisher use.

PASS = Pull – Aim – Spray – Sweep.



Section 6 - Ergonomics

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- 6-3 Computer Eye Strain
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- 6-6 Tips for Eliminating Computer Eye Strain

6-1 11 Tips for Eliminating Computer Eye Strain

Do your eyes feel tired, irritated or dry after spending too much time on your computer? If you spend more than two hours a day on a computer, you may have a condition called Computer Vision Syndrome (CVS). CVS affects up to 90% of all office workers and while it does not cause permanent eye damage, it can be an unpleasant side effect of too much screen time. CVS symptoms include eye strain, redness, irritation or dryness. You may also experience burning eyes, double or blurred vision, headaches and neck or shoulder pain. If this sounds all too familiar, here are some guidelines and computer eye strain tips to help alleviate these nagging symptoms.

1. Take a break - Use the 20-20-20 rule: every 20 minutes, take a 20-second break and look at something 20 feet away.
2. Blink frequently - Do not forget to blink periodically. Staring at computer screens can dry our eyes and cause redness and irritation.
3. Consider computer glasses - Computer glasses are prescription eyewear that are specifically designed for computer work. They allow you to focus your eyes on the distance of a computer screen, which is generally farther away than reading material. Computer glasses optimize your eyesight when you're looking at digital screens and help to reduce glare.
4. Keep your monitor bright - This reduces the flicker rate of the computer and reduces fatigue. Flickering can lead to eyestrain and headaches. Also, a bright monitor causes your pupil to constrict, which results in a greater range of focus. This reduces the need for your eye to accommodate and enables you to work longer and with more comfort.
5. Use proper lighting - Use incandescent lighting and avoid high-intensity lamps, which cast shadows and create glare. Place a dim light on either side of your workstation to create equal brightness without dark, shadowed areas.
6. Check your monitor's position - The position of your computer monitor can add to your eyestrain. It is important that it be positioned at the proper distance away from your eyes. Optimally, your computer screen should be 15 to 20 degrees below eye level (about 4 or 5 inches) as measured from the center of the screen and 20 to 28 inches from the eyes.
7. Adjust your screen resolution - Make sure your monitor has a high-resolution display. A higher resolution produces sharper type and crisper images, reducing eye strain.
8. Minimize glare - Clean your monitor regularly to remove dust and consider installing an anti- glare screen. It also helps to keep shades drawn to prevent glare from outside sources.
9. Try massage or eye cupping - Massaging the area around the eyes will help relax the muscles and can be very comforting. Rub your hands together to create friction and warmth, then gently cup your palms over your closed eyes and rest them.
10. Take your vitamins - Getting the proper number of vitamins and minerals is important for overall eye health. Opt for vitamins that contain antioxidants and ingredients that help improve the health of the eye and reduce eyestrain, such as vitamins A, C and E with a B complex and Zinc.
11. Schedule a comprehensive eye exam - Almost 71% of people reporting symptoms of CVS wear eyeglasses or contact lenses, so make sure your prescription is correct! The National Institute of Occupational Safety and Health (NIOSH) recommends that all computer users have an eye exam yearly. Lastly, be sure to tell your eye doctor about your workstation setup and the number of hours each day you spend on electronic devices.

6-2 Common Office Injuries

Most office injuries are due to falls and overexertion, which are strains and sprains. Falls account for the greatest number of disabling injuries among office workers. Overexertion injuries come in second. Both can lead to painful injuries that can take a long time to heal.

Falls

A fall occurs when you lose your balance and footing. Tripping over an open desk or file drawer, falling out of an unstable chair while bending to pick up papers from the floor, tripping over electrical cords or wires, slipping on wet floors or falling from a chair or stack of boxes in place of a ladder are all potentially disabling. Loose carpeting, objects stored in halls or walkways, and inadequate lighting are other hazards that invite accidental falls. Fortunately, these fall hazards are preventable. The following checklist can help stop a fall before it happens.

- Be sure the pathway is clear before you walk.
- Close drawers completely after every use.
- Avoid excessive bending, twisting, and leaning backward while seated.
- Secure electrical cords and wires away from walkways.

- Always use a stepladder for overhead reaching. Chairs should never be used as ladders.
- Clean up or report spills immediately.
- Pick up objects co-workers may have left on the floor.
- Report loose carpeting or damaged flooring.
- Never carry anything that obscures your vision.
- Wear stable shoes with non-slip soles.

If you find yourself heading for a fall, remember to roll, don't reach. By letting your body crumple and roll, you are more likely to absorb the impact and momentum of a fall without injury. Reaching out an arm or leg to break your fall may result in a broken limb instead.

Overexertion

Overexertion injuries occur when a person's body is pushed past its physical limits. These types of injuries are usually caused by lifting and repetitive motion.

Although a typical office job may not involve lifting large or especially heavy objects, it's always important to follow the principles of safe lifting. Small, light loads (i.e., stacks of files, boxes of computer paper, books) can wreak havoc on your back, neck, and shoulders if you use your body incorrectly when you lift them. Backs are especially vulnerable; most back injuries result from improper lifting. Before you pick up a carton or load, ask yourself these questions:

- Is this too heavy for me to lift and carry alone?
- How high do I have to lift it?
- How far do I have to carry it?
- Am I trying to impress anyone by lifting this?

If you feel that the lift is beyond your ability, contact your supervisor or ask another employee to assist you.

As for **repetitive motion**, follow the advice below to avoid this type of injury:

- When using your computer, get up and walk around every hour or so. Get a drink of water, stretch your muscles, and look out the window at a far off object to rest your eyes.
- Use good posture. If you can't hold good posture, it probably means it's time for you to take a break from typing.
- Adjust your workstation or chair to reduce strain on your body.
- Only use the computer as much as you need to. Don't email people when you could walk down the hall or pick up the phone and talk to them.
- Don't stretch for the hard-to-reach keys. Instead, move your entire hand so that you may press the desired key with ease.
- Let your hands float above the keyboard when you type and move your entire arm when moving your mouse or typing hard-to-reach keys, keeping the wrist joint straight.
- When writing, avoid gripping the writing utensil tightly.

Employees may feel safe in the comfort of their cubicle or office, but the danger of injury is there just as it is in more labor-intensive work. Poor ergonomics and organization can lead to disabling falls and overexertion injuries. Follow best practices to avoid these injuries and make the office a safe workspace.

6-3 Computer Eye Strain

It seems everyone is staring at a computer screen, phone or other digital device these days. It's causing a serious problem called digital eye strain. Symptoms of computer vision syndrome include: eye fatigue and discomfort, dry eyes, headaches, blurred vision, eye twitching and red eyes. Computer screens don't damage vision, but you might still experience eyestrain. Fortunately, rearranging your computer workstation, taking more frequent rest breaks, or getting proper glasses can often relieve these symptoms.

To pinpoint the cause of discomfort, first get an eye exam by your ophthalmologist, who can rule out the possibility of eye disease as the cause of your symptoms. You may find you need glasses when working at a computer, or that your prescription needs updating.

Next, look at your computer workstation:

- Make sure your computer screen is about 25 inches, or an arm's length, away from your face. The center of the screen should be about 10-15 degrees below eye level.

- Cut glare by using a matte screen filter. You can find them for all types of computers, phones, and tablets. Raise the contrast on your screen.
- Make text larger.
- Raise the contrast on your screen.
- Change the brightness of the screen. It shouldn't be lighter or darker than your surroundings.
- Lower the color temperature of your screen. That means it will give off less blue light, which is linked to more eyestrain.
- Raise the device's refresh rate. That will cause less flickering of the screen.

Finally, try the following tips to prevent or control eye strain:

- Follow the 20-20-20 rule: every 20 minutes, look at an object at least 20 feet away for at least 20 seconds.
- Use artificial tears to refresh your eyes when they feel dry.
- Try putting a humidifier in the room where you most often use a computer or other device.
- Make sure the lighting in the room you're in is bright enough. You don't want your device to be brighter than the surroundings.
- If you wear contact lenses, give your eyes a break by wearing your glasses.

6-4 Eye Strain

If part of your job includes sitting in front of your computer for more than a couple hours a day, then you have probably experienced eye strain.

As we become more and more dependent on technology, and our screens continue to become smaller, you could find yourself rubbing your eyes more, squinting to see clearly and having difficulty focusing.

There are a few things you can do to reduce eye strain. Try rearranging your desk and computer work station, take more frequent breaks and you might even try making an appointment with the optometrist to relieve the symptoms.

As eyes get older, they sometimes have difficulty focusing. You may find that wearing glasses when you're working on your computer will bring everything into focus.

Next, take a look at your work station.

Is your screen too close or too far away? Do you have to tilt your head to see the screen?

- **Screen Distance:** You should try to sit about 20 inches from your screens or monitors. This is just a bit farther than reading distance. The top of the screen should be at or below eye level.
- **Equipment:** Most screens or monitors tilt and swivel. Adjust the screens appropriately for the lighting in the room.
- **Furniture:** Although it seems odd to talk about a chair having anything to do with eye strain, but adjusting your chair may be the easiest way to avoid eye strain. Remember, the top of the monitor should be at eye level – so it may be easier to move your chair to reach the optimum viewing level.
- **Frequent Breaks:** Take periodic breaks throughout the day. About every 20 minutes, take a 20 second break. Close your eyes, open them and then focus on something away from the computer screen – about 20 feet away. Move your eyes up and down and side to side.

Doing these few simple tasks will help to keep your eyes healthy and cut down on fatigue.

6-5 Office Ergonomics

A comfortable work space can help you feel your best. Give your sitting work area a makeover with this guide to office ergonomics from the Mayo Clinic.

If you sit behind a desk for hours at a time, you're not doomed to a career of neck and back pain or sore wrists and fingers. Proper office ergonomics — including correct chair height, adequate equipment spacing and good desk posture — can help you and your joints stay comfortable at work.

Chair: Choose a chair that supports your spinal curves. Adjust the height of your chair so that your feet rest flat on the floor or on a footrest and your thighs are parallel to the floor. Adjust armrests so your arms gently rest on them with your shoulders relaxed.

Key objects: Keep key objects — such as your telephone, stapler or printed materials — close to your body to minimize reaching. Stand up to reach anything that can't be comfortably reached while sitting.

Keyboard and mouse: Place your mouse within easy reach and on the same surface as your keyboard. While typing or using your mouse, keep your wrists straight, your upper arms close to your body, and your hands at or slightly below the level of your elbows. Use keyboard shortcuts to reduce extended mouse use. If possible, adjust the sensitivity of the mouse so you can use a light touch to operate it. Alternate the hand you use to operate the mouse by moving the mouse to the other side of your keyboard.

Telephone: If you frequently talk on the phone and type or write at the same time, place your phone on speaker or use a headset rather than cradling the phone between your head and neck.

Footrest: If your chair is too high for you to rest your feet flat on the floor — or the height of your desk requires you to raise the height of your chair — use a footrest. If a footrest is not available, try using a small stool or a stack of sturdy books instead.

Desk: Under the desk, make sure there's clearance for your knees, thighs and feet. If the desk is too low and can't be adjusted, place sturdy boards or blocks under the desk legs. If the desk is too high and can't be adjusted, raise your chair. Use a footrest to support your feet as needed.

If your desk has a hard edge, pad the edge or use a wrist rest. Don't store items under your desk.

Monitor: Place the monitor directly in front of you, about an arm's length away. The top of the screen should be at or slightly below eye level. The monitor should be directly behind your keyboard. If you wear bifocals, lower the monitor an additional 1 to 2 inches for more comfortable viewing. Place your monitor so that the brightest light source is to the side.

6-6 Tips for Eliminating Computer Eye Strain

We're all hearing about screen time these days. Your phone even sends you a reminder explaining how much screen time you've had all week. Add to that all the screen time you have at work and suddenly you have eye strain.

After you've spent eight hours in front of your computer at work, do you go home and play on your phone, tablet or home computer??? All this screen time is not good for your eyes and will cause symptoms of redness, eye strain and irritation or dryness.

Some people also experience burning eyes, double or blurred vision, headaches and neck or shoulder pain. If you have one or more of these symptoms, you're probably spending more than 2 hours a day on front of a computer screen.

Below are some guidelines to help alleviate some if not all of the symptoms.

- Take a break – Use the 20-20-20 rules. Every 20 minutes, take a 20 second break and look at something 20 feet away.
- Blink frequently. Staring at a computer screen can dry your eyes – the best way to keep them irrigated is to blink.
- Keep your monitor bright – This reduces the flicker rate of the computer screen and reduces fatigue. Flickering can lead to eye strain and headaches. Also, a bright monitor causes your pupil to constrict which results in a greater range of focus. This reduces the need for your eye to accommodate and enables you to work longer in more comfort.
- Use proper lighting – use incandescent lighting and avoid high intensity lamps. Place a dim light on either side of your workstation to create equal brightness without dark shadowed areas.
- Check your monitors position – the position of your computer monitor can add to your eye strain. It's important that the monitor be positioned at the proper distance away from your eyes. The monitor should be 4-5 inches below eye level as measured from the center of the screen and about 20 – 28 inches from your eyes.
- Adjust your screen resolution – make sure your monitor has a high-resolution display. A higher resolution produces sharper images reducing eye strain.

Section 7 - Fall Prevention

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7-1 Six Guidelines to Prevent Workplace Slips, Trips and Falls

It's probably happened to most of us. That momentary lapse of inattention thinking about a personal problem or distracted by an activity that ends in a slip, trip or fall. A stumble down a stairway. A trip over an uneven surface. Slipping on the ice. It can lead to a variety of regrettable events ranging from a simple bruised shin to an extremely serious injury. It's just one of a variety of conditions and situations that set the stage for slips, trips and falls in the workplace.

According to the U.S. Department of Labor, slips, trips and falls make up the majority of general industry accidents, which account for:

15 percent of all accidental deaths per year, the second-leading cause behind motor vehicles About 25 percent of all reported injury claims per fiscal year.

More than 95 million lost work-days per year – about 65 percent of all work days lost.

In general, slips and trips occur due to a loss of traction between the shoe and the walking surface or an inadvertent contact with a fixed or moveable object which may lead to a fall. There are a variety of situations that may cause slips, trips and falls.

- Wet or greasy floors
- Dry floors with wood dust or powder
- Uneven walking surfaces
- Polished or freshly waxed floors
- Loose flooring, carpeting or mats
- Transition from one floor type to another
- Missing or uneven floor tiles and bricks
- Damaged or irregular steps; no handrails
- Sloped walking surfaces
- Shoes with wet, muddy, greasy or oily soles
- Clutter
- Electrical cords or cables
- Open desk or file cabinet drawers
- Damaged ladder steps
- Ramps and gang planks without skid-resistant surfaces
- Metal surfaces – dock plates, construction plates
- Weather hazards – rain, sleet, ice, snow, hail, frost
- Wet leaves or pine needles

Here are six guidelines to help you create a safer working environment for you and your employees.

Create Good Housekeeping Practices

Good housekeeping is critical. Safety and housekeeping go together. If your facility's housekeeping habits are poor, the result may be a higher incidence of employee injuries, ever-increasing insurance costs and regulatory citations. If an organization's facilities are noticeably clean and well organized, it is a good indication that its overall safety program is effective as well.

Proper housekeeping is a routine. It is an ongoing procedure that is simply done as a part of each worker's daily performance. To create an effective housekeeping program, there are three simple steps to get you started:

- Plan ahead– Know what needs to be done, who's going to do it and what the particular work area should look like when you are done.
- Assign responsibilities– It may be necessary to assign a specific person or group of workers to clean up, although personal responsibility for cleaning up after himself/herself is preferred.
- Implement a program– Establish housekeeping procedures as a part of the daily routine.

Reduce Wet or Slippery Surfaces

Walking surfaces account for a significant portion of injuries reported by state agencies. The most frequently reported types of surfaces where these injuries occur include:

- Parking lots
- Sidewalks (or lack of)
- Food preparation areas
- Shower stalls in residential dorms
- Floors in general

Traction on outdoor surfaces can change considerably when weather conditions change. Those conditions can then affect indoor surfaces as moisture is tracked in by pedestrian traffic. Traction control procedures should be constantly monitored for their effectiveness.

- Keep parking lots and sidewalks clean and in good repair condition.
- When snow and ice are present, remove or treat these elements. In some extreme cases, it may be necessary to suspend use of the area.
- Use adhesive striping material or anti-skid paint whenever possible.
- Indoor control measures can help reduce the incidence of slips and falls.
- Use moisture-absorbent mats with beveled edges in entrance areas. Make sure they have backing material that will not slide on the floor.
- Display "Wet Floor" signs as needed.
- Use anti-skid adhesive tape in troublesome areas.
- Clean up spills immediately. Create a procedure for taking the appropriate action when someone causes or comes across a food or drink spill.
- Use proper area rugs or mats for food preparation areas.
- Avoid creating obstacles in aisle and walkways.

Injuries can also result in from trips caused by obstacles, clutter, materials and equipment in aisles, corridors, entranceways and stairwells. Proper housekeeping in work and traffic areas is still the most effective control measure in avoiding the proliferation of these types of hazards. This means having policies or procedures in place and allowing time for cleaning the area, especially where scrap material or waste is a by-product of the work operation.

- Keep all work areas, passageways, storerooms and service areas clean and orderly.
- Avoid stringing cords, cables or air hoses across hallways or in any designated aisle.
- In office areas, avoid leaving boxes, files or briefcases in the aisles.
- Encourage safe work practices such as closing file cabinet drawers after use and picking up loose items from the floor.
- Conduct periodic inspections for slip and trip hazards.
- Create and maintain proper lighting.
- Poor lighting in the workplace is associated with an increase in accidents.
- Use proper illumination in walkways, staircases, ramps, hallways, basements, construction areas and dock areas.
- Keep work areas well-lit and clean.
- Upon entering a darkened room, always turn on the light first.
- Keep poorly lit walkways clear of clutter and obstructions.
- Keep areas around light switches clear and accessible.
- Repair fixtures, switches and cords immediately if they malfunction.

Wear Proper Shoes

The shoes we wear can play a big part in preventing falls. The slickness of the soles and the type of heels worn need to be evaluated to avoid slips, trips and falls. Shoelaces need to be tied correctly. Whenever a fall-related injury is investigated, the footwear needs to be evaluated to see if it contributed to the incident. Employees are expected to wear footwear appropriate for the duties of their work task and as outlined in PUB 445.

Control Individual Behavior

This condition is the toughest to control. It is human nature to let our guard down for two seconds and be distracted by random thoughts or doing multiple activities. Being in a hurry will result in walking too fast or running which increases the chances of a slip,

trip or fall. Taking shortcuts, not watching where one is going, using a cell phone, carrying materials which obstructs the vision, wearing sunglasses in low-light areas, not using designated walkways and speed are common elements in many on-the-job injuries. It's ultimately up to each individual to plan, stay alert and pay attention.

General Safety

1. To avoid serious injury or death, do not modify equipment.
2. Never defeat a safety device to make a task easier.
3. Never deface or remove factory-installed safety labels. If a label ever becomes lost, damaged, or illegible, report this condition to a supervisor.
4. Always wear proper apparel when operating equipment; safety glasses, face shield or goggles, ear protection, and dust mask.
5. Never operate equipment with covers or guards removed. Rotating parts can cause severe injury.
6. Keep hands, feet, hair, jewelry and clothing away from all moving parts.
7. Understand the operation of hydraulic and pneumatic controls.
8. Understand which adjustments are operator and which are maintenance adjustments.
9. Always shut OFF equipment when left unattended.
10. Never operate or work around equipment if under the influence of Alcohol, drugs or medications.

Required Operator Training

ALWAYS review the provide manual and any needed safety training before operation. The Operator **Must** Understand:

- How to operate all controls
- The functions of all controls
- How to STOP in an Emergency
- Speed Ranges

Work Area

1. ALWAYS check overhead and side clearances carefully before operation.
2. ALWAYS be aware of traffic when operating along streets and curbs.
3. Keep area of operation clear.
4. Stay alert for hidden hazards.
5. DO NOT run engine in an enclosed area.
6. Abnormal vibrations are a warning of trouble and striking a foreign object can damage unit. If these occur: Stop unit and engine, wait for all moving parts to stop then inspect unit and make any necessary repairs before restarting.
7. Protect eyes, face, and head from objects that may be thrown from unit.
8. Wear appropriate hearing protection.
9. Avoid sharp edges. Sharp edges can cause serious injury.
10. Wear gloves to service unit when handling sharp edges.
11. ALWAYS keep hands and feet away from all moving parts during operation. Moving parts can cause serious injury or death.
12. Be aware of the surroundings. Look for blind spots from which pedestrians or vehicles may suddenly appear.
13. Locate the emergency stop on the vehicle.
14. Do not operate in crowded pedestrian areas.
15. Never clean, lubricate, or adjust equipment while it is moving, has the potential to move or when engine is running.
16. Always release pressure from pressurized systems before disassembling.

Maintenance Safety

1. Do not remove guards while operating. After maintenance work, be sure all guards and other safety devices are installed and in proper working order.
2. Never clean, lubricate, or adjust equipment while it is moving, has the potential to move or when engine is running.

3. Always release pressure from pressurized systems before disassembling.
4. Allow ample time for heated components to cool before working on or working close to them. Use temperature sticks or other appropriate devices to test temperatures.
5. ALWAYS maintain unit in safe operating condition.
6. Check the conditions of the unit at the end of each day and repair any damage or defects.
7. Keep all fasteners properly torqued and in safe operating condition.
8. Before maintenance, adjustments, or service (except where specifically recommended), shut off engine, and secure from moving.



7-2 Fall Protection

According to OSHA, falling from a height of six feet or more is one of the leading causes of death and serious injury for construction workers nationwide. PennDOT's protocol 15 – Fall Protection says: Appropriate fall protection methods and procedures must be established, implemented and monitored by a competent person for operations that will expose employees to unprotected edges six-feet or more above a lower level. The best way to protect an employee from a fall is to eliminate the fall hazard, if you can't do that, then you must wear fall protection.

Who wear's Fall Protection?

You may think that your job will never require you to wear a harness, it may not, but if you are ever called on to be in an aerial lift or work on a bridge project, then fall protection may be required. Other jobs at PennDOT that require fall protection are bridge inspectors, surveyors, MR 2's and various construction projects.

Personal Fall Arrest Systems (PFA's)

When you put on a harness, you need to know it has many components that work together to save your life. Because they are all so important, they must all be in good working order. There are four components of the Personal Fall Arrest System:

- **Anchorage Point** – This is a fixed and secured point of attachment for a lifeline, lanyard or deceleration device capable of supporting 5,000 pounds. A good example of an anchorage point is a structural member of a bridge. A bad example of an anchorage point is a vehicle, a vent or pipe or electrical system.
- **Body Harness** – Most people believe that the harness is the only part of the fall arrest system that matters. It consists of straps that are secured to the body in a manner that will distribute fall forces over the thighs, pelvis, waist, chest and shoulders. It must have a way to attach to the other components of the PFA. Be sure that your harness fits snugly. There should be no wiggle room, because if you fall, you could wiggle right out of the harness.
- **Connectors** – These are devices are used to couple or connect parts of the PFA's and positioning systems together. Connectors are D-Rings sewn into the body of the harness, a carabiner, buckle or a locking snap hook.
- **Deceleration Device** – This is any device that slows you down and catches you when you fall. It can be in the form of a rope grab, rip-stitch lanyard, specially woven lanyard, automatic self-retracting lanyard, or a deforming/tearing lanyard. These serve to dissipate the fall forces on your body when you stop at the end of the fall.

Your personal fall arrest system is inspected annually by a competent person in your district. Even though it's inspected every year, it is your responsibility to inspect before every use. Look for torn stitches, loose buckles or deformed D-rings. You want all the components of your PFA to be perfect so if you fall, it won't fail.

7-3 Falls, Struck by, and Caught by Injuries

Most office injuries are caused by falls and being struck by or caught by an object. Many of these injuries could be prevented if workers or supervisors recognize the risks and implement solutions to help reduce them. Here are some steps you can take to reduce the risk of falls, struck-by and caught-by injuries among your office staff.

Stay clutter-free

Boxes, files and items piled in walkways can create a tripping hazard. Safely store all materials in their proper location to prevent clutter in walkways. Further, in addition to posing an electrical hazard, stretching cords across walkways or under rugs creates a tripping hazard. Ensure all cords are properly secured and covered.

Step on up

Standing on chairs, particularly rolling office chairs, is a major fall hazard. Workers who need to reach something at an elevated height should use a stepladder. They must be fully opened and placed on level, firm ground. Workers should never climb higher than the step indicated as the highest safe standing level.

Maintain a clear line of vision

Workers can collide when making turns in the hallways and around blind corners or cubicle walls. Install convex mirrors at intersections to help reduce collisions. If workers can see someone coming around the corner, collisions are less likely to occur.

Get a grip

Carpeting and other skid-resistant surfaces can reduce falls. Marble or tile can become very slippery – particularly when wet. Placing carpets can be especially helpful at entranceways, where workers are likely to be coming in with shoes wet from rain or snow.

Shut the drawer

File cabinets with too many fully extended drawers could tip over if they are not secured. Additionally, open drawers on desks and file cabinets pose a tripping hazard, so be sure to always completely close drawers when not in use.

Safe stacking

Large stacks of materials and heavy equipment can cause major injuries if they are knocked over. Store heavy objects close to the floor, and never exceed the load capacity of shelves or storage units.

7-4 Falls

Falls are one of the most common work-related accidents and account for the greatest number of disabling injuries. A fall occurs when a person loses their balance and footing. One of the most common causes of falls is tripping or slipping. Tripping can occur when items have been left out in the open in an aisle or a walkway. Inadequate lighting can also cause a tripping hazard. Tripping can happen in an office or in the field.

The other common cause for falls is slipping. Slipping can be caused by wet or ice coated surfaces. A person can slip when they have inadequate soles on the bottoms of their footwear. Slipping can happen while climbing a ladder or walking across the parking area.

Most falls are preventable by following a few easy steps.

- Make sure your pathway is clear of debris and clutter before you walk.
- Secure electrical wires/cords away from walk ways.
- Clean-up and immediately report spills.
- Always use a step-ladder for overhead reaching – you should never use a chair as a ladder.
- Check your footwear for good soles – if your soles are smooth and soft replace your shoes or boots.
- Pick-up objects your co-workers have left on the floor.
- Put salt or anti-skid material on icy spots.
- Never carry anything that obscures your vision.
- Fix holes or depression in floors and parking areas.

If you take preventative measures to eliminate fall hazards, your chances of falling will be greatly reduced, but if you do find yourself falling remember to roll and not reach. By allowing your body to crumble and roll, you are more likely to absorb the impact and momentum of a fall without major injury. However, when you try to break your fall by reaching out an arm or a leg, the only thing that may be broken is your limb.

7-5 Getting On and Off Equipment

Getting on and off equipment is one of the leading causes of injury at PennDOT. Slipping when climbing in or getting out of a dump truck, loader or any other vehicle that requires climbing can lead to accidents ranging from sprains, cuts, bruises, fractures, head injuries and even death.

Here is an Example

Joe Operator was an operator of a front-end loader. He went to climb down from the cab and lost his footing on the steps. Joe fell to the ground and sprained his ankle requiring him to be taken to a panel physician. He was out of work for five days.

1. How could this accident have been avoided?
2. Have you ever experienced an accident like this at your worksite?

There are some easy procedures you need to remember to avoid being injured while climbing in or out of vehicles and equipment.

- Face the equipment when climbing in or getting out.
- Always maintain three-points of contact.
- Be sure your boots have good tread to provide traction.
- Set the parking brake to prevent the equipment from moving.
- Keep areas clean and free of debris.
- Inspect the steps for mud or other conditions that will make the footing slippery.

What will we do here at the worksite today to prevent injuries while getting on and off equipment?



7-6 Harness and Lanyard Inspection Guide

Personal fall protection systems such as harnesses connected to lanyards can be a lifesaver for those who continually or occasionally work at heights. However, if your harness isn't in good shape, you could be putting your life in a risky situation. It is important to inspect your fall protection gear prior to every use.

Always follow the recommendations of the manufacturer of your gear for inspections and maintenance requirements. Here are some things to look for:



Harness Inspection

- Begin by holding the harness up by the D-ring. Bend the straps in an inverted "U." Watch for frayed edges, broken fibers, pulled stitches, cuts or chemical damage. Check D-rings and D-ring metal wear pads for distortions, cracks, and breaks.
- Hold the D-ring bar at a 90-degree angle with the long axis of the belt this should pivot freely.
- Attachments of buckles and D-rings should be given special attention. Note any rough or sharp edges, unusual wear, frayed or cut fibers, or distortion of the buckles. Rivets should be tight and unmovable with fingers. Body side rivet base and outside rivets should be flat against the material. Bent rivets will fail under stress.
- Inspect frayed or broken strands. Broken webbing strands generally appear as tufts on the webbing surface. Any broken, cut or burnt stitches will be readily seen.

- **Tongue Buckle:** Buckle tongues should be free of distortion in shape and motion. They should overlap the buckle frame and move freely back and forth in their socket. Rollers should turn freely on the frame. Check for distortion or sharp edges.
- **Friction Buckle:** Inspect the buckle for distortion. The outer bar or center bars must be straight. Pay special attention to corners and attachment points of the center bar.

Lanyard Inspection

When inspecting lanyards, begin at one end and work to the opposite end. Slowly rotate the lanyard so that the entire circumference is checked. Spliced ends require attention.

- **Snap hooks:** Inspect closely for hook and eye distortion, cracks, corrosion, or pitted surfaces. The keeper, or latch, should seat into the nose without binding and should not be distorted or obstructed. The keeper spring should exert sufficient force to firmly close the keeper. Keeper rocks must provide the keeper from opening when the keeper closes.
- The closing/locking mechanism should move freely without sticking or jamming. While bending webbing over a piece of pipe, observe each side of the locking mechanism to be sure it doesn't bend under pressure.
- The outer portion of the shock-absorbing pack should be examined for burn holes and tears. Stitching on areas where the pack is sewn to the D-ring, belt or lanyard should be examined for loose strands, rips and deterioration.

Harnesses and lanyards are good for five years from the In-service date, per manufacturer's recommendations. Be sure to look at the in-service tag that is on each harness and lanyard. Pay special attention to the last time it was inspected by a competent person. If it is more than five years old, do not use it.

7-7 Preventing Falls

Have you ever fallen? Of course, you have. When you were first learning to walk, you fell all the time, but as you got older, the farther you fell, the more you hurt. Falling is not fun! Falling from any distance can lead to life changing injuries that some never recover from. Yet, falls are the leading cause of injury at PennDOT throughout the state. We aren't alone, according to OSHA, workplace falls are the leading cause of death, killing on average 1,200 people a year.

Gravity is a downer!

Gravity shouldn't take all the blame for falls. It actually requires three forces of nature in perfect combination to allow you to fall. Gravity needs its friends Friction and Momentum to cause a fall. For instance, if you're walking on mud or oil, the bottoms of your feet lose necessary friction to keep you upright. Add a little speed to your walk and suddenly gravity takes over and you fall.

Avoid Falls

There are lots of ways to avoid falls, let's look at a few:

- Don't jump or rush; controlled motion can prevent and eliminate falls.
- Avoid walking in the dark. Check the lighting and make sure it's bright enough so you see where you're going.
- Repair and replace stairs, stair-rails and guardrails that are loose or broken.
- Don't lean over stair-rails or guardrails. These are meant to keep you in place.
- Keep passageways clear and free of clutter.
- Use caution on new floors, or green concrete. This can be very slippery.
- Also use caution on wet floors and surfaces, or muddy or oil slicked floors and surfaces.
- ALWAYS use three points of contact.

Remember, falls happen when you've moved too far off your center of balance. Being in control of your motion is your best defense against falling. So slow down, use three points of contact and don't take unnecessary risks.

7-8 Preventing Slips, Trips and Falls

Slips, trips, and falls are one of the leading causes of injuries and fatalities in the workplace. Per OSHA, slip, trip, and fall incidents cause 15% of all accidental deaths and are second only to motor vehicle incidents as a cause of fatalities on the job. The annual direct cost of disabling occupational injuries due to slips, trips and falls is estimated to exceed \$11 billion.

Common Slip, Trip, and Fall Incidents

Falls from elevation are often deadly or result in serious injury and may include falls from ladders, falls off mobile equipment, falls from roofs or other elevated structures, etc. Slip incidents on slippery surfaces such as snow and ice are common in colder geographical areas in the U.S. Wet floors due to moisture or chemicals are common causes of slip incidents at work. Trips can be caused by a multitude of reasons including poor housekeeping, changes in elevation, improper footwear.

Mitigations for Slip, Trip, and Fall incidents

- Always use fall prevention or protection for work over 4ft in general industry work and 6ft in the construction industry. Protect workers by using proper guarding of any holes or open windows and use guardrails to prevent falls. Where guardrails are not feasible, use proper fall protection. An example of proper fall protection is a full body harness and a self-retracting lanyard.
- Proper housekeeping is very important in preventing slips, trips, and falls incidents. Objects on the ground create a hazard for anyone walking or working in the area. Maintain clearly defined paths for walking in the work area. Have lay down yards for tools and equipment out of the way of employee foot traffic.
- Address any wet, slippery, or icy walking surfaces in your work area. Post signs of any hazardous surfaces until the situation is taken care of completely.
- When climbing up or down a portable or fixed ladder ensure that you use proper techniques such as using three points of contact and keeping your belt buckle within the sides of the ladder. Do not lean to reach objects- this can throw off your balance and you could fall.

Discussion points:

- Are there trip hazards due to improperly placed objects in your work area?
- Has anyone or a close family member of yours experienced a severe fall? How has it affected you/ them?
- What are other ways we can protect ourselves from slips, trips, and falls here at our site?

7-9 Protecting Workers from Slips, Trips and Falls During Disaster Response

Responding to natural and man-made disasters puts emergency response workers at risk of injury or death from slips, trips and falls.

Steps employers must take to keep workers safe:

- Conduct pre-incident disaster response planning and ensure that emergency workers know the plan.
- Assess the workplace to determine if hazards are present or are likely to be present.
- Provide protective equipment to prevent slips, trips and falls including: Slip-resistant footwear (e.g. Rubber soles).
 - o Gloves so workers can grip railings/ladders safely to steady themselves.
 - o Head protection
 - o Personal fall protection
 - o Train workers to identify hazards, including those that require protective equipment, and how to prevent injury.

Ways to prevent slips, trips and falls:

- Where possible, avoid walking on wet/slippery surfaces; wipe off the bottom of wet footwear.
- Use flashlights or helmet lights to stay clear of holes or floor openings, wet or slippery surfaces, and debris or equipment.
- Do not step on any surface until you have visually inspected it to ensure there are no holes or weak spots and that it can support workers and their equipment.
- Never carry equipment or loads in your hands when climbing ladders.
- Wear backpacks and tool belts to hold equipment and keep both hands free.
- Use fall protection when walking or performing emergency response activities near unprotected edges of elevated surfaces.
- Use communication devices, particularly hands-free devices, for contacting employers/incident commanders and other workers about slip trip and fall hazards.

Remember- When in doubt about the safety of an activity, stop and notify a supervisor.

7-10 Protecting Yourself From Slips, Trips and Falls

Slips, Trips and Falls are the number one cause of injury in the United States, in Pennsylvania and at PennDOT. Protecting yourself from Slips, trips and falls needs to be an important part of your everyday activity.

Ways to Prevent Slips, Trips and Falls

- When possible, avoid walking on slippery or wet surfaces.
- If you have walked in snow or on ice, wipe off the bottom of your feet prior to walking into a building. It's not just polite, but it will keep you from slipping when you change surfaces under your feet.
- At night, use a flashlight to avoid holes or floor openings, debris, slippery surfaces or equipment.
- Always use three points of contact when climbing in or out of your truck.
- Never carry equipment, tools or loads when climbing a ladder.
- Always have good tread on your boots.
- Treat the parking lots with salt and anti-skid in the winter.

Advance Planning to Prevent Slips, Trips and Falls

- Assess your workplace to identify and eliminate tripping or slipping hazards.
- Clean up and put away any hazards that could be lying on the ground or on the floor.
- Fix any holes in parking areas that could cause someone to fall or gather water and turn to ice.
- Train workers to identify slipping or tripping hazards and then report those hazards to a supervisor.

Remember: If you're in doubt about the safety of an activity, stop and notify your supervisor.

7-11 Slip, Trip and Fall Prevention

Slips, Trips and Falls remain one of the leading causes of injury at PennDOT. Protocol 12 of the Manual for Employee Safety and Health (MESH) addresses prevention methods to reduce injuries caused by slips, trips and falls and to help eliminate the hazard that causes fall injuries.

Prevention Methods

- **Use proper housekeeping in offices and stockpile staging buildings**
 - o Place trash in proper receptacles immediately.
 - o Keep walkways clear.
 - o Clean up spills promptly and immediately place warning devices (signs or cones) when appropriate.
 - o Never allow desk or files drawers to remain open when unattended.
 - o Use rugs and mats at entrances.
- **Use proper housekeeping in garages and field offices**
 - o Store all tools and materials in their proper place.
 - o Never block fire extinguishers, first aid kits, or other emergency items with tools and materials.
 - o Keep work areas clear of debris that cause a tripping hazard.
 - o Clean up spills promptly and immediately place warning devices (signs or cones) when appropriate.
 - o Use drip trays to catch leaks from equipment or vehicles.
 - o Ensure materials are stored correctly; use shelving to provide additional walking/workspace.
- **Safe Practices**
 - o Paint floors to indicate permanent elevation changes.
 - o Place drums or cones on temporary elevation changes.
 - o Place mats or rugs in high traffic areas.
 - o Implement a schedule to eliminate buildup of snow and ice on walkways and parking areas.

- o Maintain three points of contact when climbing in and out of vehicles or on ladders.
- o Do not jump off a vehicle or equipment.
- o Always wear proper footwear. Above the ankle boots with good tread for field work or in garages.

7-12 Slips, Trips and Falls – Winter Safety

PennDOT workers spend a lot of time outside in all kinds of weather. This is especially true in the winter. No matter how bad the weather, you have to get to work, walk across a parking area that may or may not have been plowed or salted and then climb into your truck so you can keep everyone else safe. This is a noble cause you champion, but not without risk. Many of the slip, trip and fall injuries that employees experience, occur before they ever get across the parking lot at their stockpile. Many of these can be avoided by following a few simple tips.

- Plan in advance and give yourself sufficient time. If you're walking fast on ice or snow, you run a greater risk of falling. Give yourself plenty of time to get where you're going.
- When walking on steps, always use the hand railings and plant your feet firmly on each step.
- When walking on an icy or snow-covered walkway, roadways or parking area, take short steps and walk at a slower pace so you can react quickly to a change in traction.
- Bending your knees and taking little steps increases traction and can greatly reduce your chances of falling. It also helps to stop occasionally to break momentum.
- Pavement that has been cleared of snow and ice should still be approached with caution.
- Look out for "black ice." Dew, fog or water vapor can freeze on cold surfaces and form an extra-thin, nearly invisible layer of ice that can look like a wet spot on the pavement. It often shows up early in the morning or in areas that are shaded from the sun.
- Carrying heavy items can challenge your sense of balance. Try not to carry too much you need to leave your hands and arms free to better balance yourself.
- Be prepared to fall and try to avoid using your arms to break your fall. If you fall backward, make a conscious effort to tuck your chin so your head doesn't strike the ground with a full force.
- When entering building, remove as much snow and water from your boots as you can. Take notice that floors and stairs may be wet and slippery walk carefully.
- Use special care when entering and exiting vehicles use the vehicle for support.
- Always use three points of contact. Two hands and a foot or two feet and a hand.

7-13 Slips, Trips and Falls at the Stockpile

January and February are traditionally the busiest months for slip, trip and fall injuries. Nearly 50% of the injuries caused by slips, trips and falls in those winter months occurred at the stockpiles. Nearly all of these resulted from snow, ice or freezing rain and fog.

Listed below are most of the activities associated with these injuries at the stockpiles:

- In transit on foot
- Getting on/off vehicles and equipment
- Loading and unloading vehicles and equipment
- Plowing snow
- Spreading anti-skid

It is important for all of us to recognize the hazards of walking surfaces due to snow and ice. Don't expect to walk at your normal pace during these conditions. Any layers of snow will make taking steps more difficult. More than likely, you will encounter patches of ice that are easy to slip on.

Here are some tips to help us avoid slips, trips and falls while working at the stockpiles:

- Where appropriate, clear walking surfaces of snow and ice and use salt or its equivalent.
- Implement a schedule or assign individuals to routinely remove snow and ice from the walking areas of the stockpile yard to prevent accumulation.

- Proper footwear is essential – work boots with good tread are a must for walking during inclement weather to help prevent slips, trips or falls.
- When walking on snow or ice, slow down, take short steps and point your toes slightly to the side.
- Store all tools and materials in their proper place so you don't trip over them or fall onto them.
- Keep all work areas clean and free of debris that could cause tripping hazards.
- Clean spills promptly using the approved method and immediately place warning devices (signs or cones) where appropriate.
- Do not carry or move cumbersome objects that prevent clear sight of the walking surface and get help if you must move these objects.
- Always maintain three points of contact when getting on/off vehicles and equipment, as well as when ascending and descending ladders and stairs.
- Do not try to climb while carrying tools, materials, drinks, etc.

Take some time to discuss the slip, trip and fall hazards you may encounter while working at the stockpiles. Determine how changes can be made to reduce your risk of injury.

7-14 Slips, Trips and Falls

After reviewing last fiscal year's accidents, one thing was clear. Slips, trips, and falls are by far the most frequent cause of injuries to our employees. Last fiscal year, 197 slips/trips/falls accounted for 28% of the Department's total injuries. The severity of these injuries and frequency of these accidents can be reduced by recognizing hazards, anticipating risks and avoiding or protecting yourself from them.

Slips

- These are more likely to occur when you hurry or run, wear inappropriate shoes for walking surfaces, or do not pay attention to walking surfaces.
- When walking across slippery surfaces is unavoidable, walk slowly, avoid sudden changes in direction, and take short steps. Position yourself directly above the foot supporting you, so that your weight is pressing straight down on the walking surface.
- Remember that moisture, such as dew, spilled liquids, and any type of precipitation will make climbing and walking surfaces slippery.

Trips

- Beware of common indoor hazards, such as extension cords, tools, hardware, boxes, steps, debris, open drawers, etc. Keep designated walkways free of these objects and debris.
- Beware of common outdoor hazards, such as abrupt changes in terrain, roots, rocks, holes, tools, equipment, materials, debris piles, etc.
- Inattention or walking with an obstructed view of your walking surfaces makes you vulnerable to unsafe conditions.

Falls

A leading cause of injury to equipment operators is simply getting in and out of the truck.

- Hands and shoes should be free of mud or slippery material before you climb and shoe treads should not be excessively worn.
- Hand grips and steps are strategically positioned on vehicles and equipment for you to be able to maintain three points of contact. You should not attempt to climb on areas where hand grips and steps are lacking or nonexistent.
- Always climb facing the vehicle or equipment. Make sure you have a firm grip and good footing while climbing. Maintain three points of contact while climbing on or off the equipment, so that you have two limbs to support you should one unexpectedly give way.

7-15 Stair Safety

An estimated 12,000 people die from falling down steps each year. Following motor vehicle accidents, falls are the second leading cause of accidental injuries in the home and workplace, and stairs present numerous opportunities for people to hurt themselves.

The majority of stairway accidents are caused by a loss of balance. This may happen when we are rushing, trip over a stationary

object on the ground, carrying a heavy load, or are distracted and not watching our footing. Because our perception of risk is so low, we often fail to use handrails, which are designed to help mitigate falling, tripping or slipping dangers.

When using stairs:

- Never run up or down.
- Never read papers.
- Focus on the stairs, not conversations or other distractions.
- Always look straight ahead.
- Take one step at a time.
- Get help if you must carry something.
- Ensure you always have at least one hand free.
- On outside steps, be extremely careful in rain or snow.

Even some of life's basic tasks, such as using stairs, can have deadly consequences. That's why it's important to keep your eyes and mind on-task in everything you do. In addition, be sure to report wet spots, spills, loose carpet and eroded treads so they can be repaired quickly. Also report all light bulbs that are out or broken to ensure the stairs remain well illuminated.

7-16 Maintaining 3-Points of Contact

Did you know that last year PennDOT had nearly 100 injuries associated with falls from vehicles and equipment? Even though getting in or out of your large truck or piece of equipment seems like a simple task, it remains one of the largest causes of injury with one of the easiest ways of prevention...3 points of contact.

The Three Point rule always requires you to have three or even four points of contact when entering or exiting a vehicle. One hand and two feet or two hands and one foot. Or you can use both hands and both feet.

No matter what type of access system your vehicle has, the three point rule will significantly reduce your chance of a slip or fall because it allows you to maintain maximum stability and support when exiting or entering the equipment or vehicle.

Ideas to keep you safe when entering or exiting your truck or equipment.

- Always use the three-point rule.
- Only break your three-points of contact when you have reached the ground or the seat.
- Don't use the doorframe or door edge as a handhold.
- Wear footwear with good support and are slip resistant.
- Never attempt to climb or descend with anything in your hands.
- Always look to the ground before stepping down.
- Ascend or descend slowly to avoid straining a muscle.
- Be extra careful when working in bad weather.
- Exit and enter FACING the cab.
- Never jump! You may land on an uneven surface, off balance or onto something. Even jumping from the bottom step will cause your body to exert 12-times your body weight on your ankles, knees, hips and lower back.

7-17 Use Three Points of Contact

Falling while getting into or out of a truck or piece of equipment causes serious injury.

Three points of contact means that three of your four limbs are always in contact with the vehicle.

Two hands, and one foot; or two feet and one hand...this reduces the chances of slips and falls from your truck.

In addition to maintaining three points of contact, here are some other ways to stay safe and keep yourself from falling when entering or exiting the truck.



- Wear boots with good tread and support.
- Exit and enter facing the cab.
- Take your time, all the time...especially in snow and ice...the steps will be dangerous.
- Look for obstacles on the ground before exiting...surface problems, tools, etc.
- Never climb out with anything in your hands.
- Descend slowly, this will also prevent pulling muscles after sitting for long periods.
- Never JUMP OUT!

7-18 Working Over or Near Water

PennDOT performs many important jobs to keep Pennsylvania roadways safe, one of the most important is bridge repair and bridge inspection. Although many of the bridges in the state are over land masses or railroads, many others are over water. Maintenance and construction employees and inspectors face a double hazard when working on these structures both from falling and from drowning.

- Bridge Inspectors should never work alone. A minimum of two inspectors are required for all bridge inspections.
- All bridge inspection equipment must be inspected prior to use.
- Personal Fall Arrest Systems must be inspected annually by a competent person and before each use.
- A Personal Fall Arrest System must be worn by an inspector while using the snooper crane, an aerial lift, or free climbing a bridge.

OSHA Standard 29 CFR 1926, Subpart E (personal Protective and Life Saving Equipment) Working over or Near Water states: Employees working over or near water, where the danger of drowning exists, shall be provided with U.S. Coastguard approved life jackets or buoyant work vests. Prior to or after each use, the buoyant work vests or life preservers shall be inspected for defects which would alter their strength and buoyancy.

OSHA has also determined that when a Fall Arrest System is worn, this protection will eliminate any drowning hazard eliminating the need for an employee to wear both.

7-19 Safely Getting On and Off Equipment

Slips, trips and falls are one the most common causes of injury at PennDOT. Getting in and out of equipment is one of the leading causes of slips, trips and falls. In an effort to reduce these types of injuries employees should check all surfaces such as step boards, grab handles, and floors of the cab areas to make sure these areas are kept clean, dry, and in good condition. This is necessary to reduce obstacles and increase available surface area with good contact point friction.

Crew Cabs: For employees who are expected to board and dismount the rear of a crew cab maintain an open, clean access zone directly in front of and behind the tailgate area. Keep tools and fluid containers away from this area. Never allow oil, grease or other fluids to spill or remain in this key access area. Hand holds and foot holds must be stable. Wooden panels used as the top part of the tailgate should be in good condition and of a proper fit, so the panels do not move when grabbed. If the tailgate design is especially awkward to negotiate, arrange to purchase supplemental drop-steps; or contact the District Equipment Manager with any unaddressed concerns.

Safety Boots: Periodically check the condition of your boots, especially the soles. They do not last forever and will eventually wear smooth to the point where traction is compromised.

Remember, the only thing keeping your feet (and your body) from slipping on a surface is a sure grip from a clean, unworn sole able to stay in contact with that surface. Laces should also be checked periodically to be certain they have not come loose. Safety boots must be of a high ankle design.

Body Control: Securing tools or equipment items from the bed of a crew cab can be awkward. Employees must climb in or over the tailgate area without the benefit of the usual grab handles and running boards. Even though this is not an ideal scenario, the basics still apply. Be certain your feet are squarely secured on a clean, stable surface and 3-points of contact is utilized. Avoid twisting your back when turning. Pivoting on one foot is easier and safer as long as adequate footing surface is available, and you grab hold of a firm object. Push off with your hands and shoulders. This effectively transfers weight to the more substantial muscular areas of your body, reducing pressure on your knees and back. Never jump off the tailgate area of a crew cab or truck or attempt to board or dismount moving equipment! Doing this greatly increases both injury potential and severity of any resulting injury that occurs.

Clothes: Clothing must not be excessively bulky, loose fitting, or torn. Prevent snagging by always fastening your vest and not allowing it to bunch up. Zip jackets and tuck away loose areas of clothing prior to exiting or boarding trucks and equipment. Gloves may help gain more security when reaching for the grab handle and other objects, especially during the fall and winter season with more adverse weather conditions.

7-20 Construction Hazards

The Leading causes of fatalities on a Construction Site are: Falls, Struck by an object, caught in or between and electrocutions. The following are some ways to prevent yourself from being hurt or killed.

Prevent Falls

- Wear and use a personal fall arrest system.
- Install and maintain perimeter protection.
- Cover and secure floor openings and label floor opening covers.
- Use ladders and scaffolds safely – know and use the protocols.

Prevent Struck-By Accidents

- Never position yourself between moving and fixed objects.
- Wear high-visibility clothes near equipment or other vehicles.

Prevent Caught-In/Between

- Never enter an unprotected trench or excavation 5-feet or deeper without an adequate protective system in place.
- Some trenches under 5-feet may also need such a system.
- Make sure the trench or excavation is protected either by sloping, shoring, benching or a trench/shield system.

Prevent Electrocutions

- Locate and identify utilities before starting work.
- Look for and identify overhead power lines when operating equipment.
- Maintain a safe distance away from power lines.
- Learn the safe distance requirements.
- Do not operate portable electric tools unless they are grounded or double insulated.
- Use ground-fault circuit interrupters for protection.
- Be alert to electrical hazards when working on ladders, scaffolds or other platforms.



Section 8 - Fire Hazards

- 8-1 Carbon Monoxide Poisoning
- 8-2 Compressed Gas Cylinder Safety
- 8-3 Fire Extinguisher Inspection and Use
- 8-4 Fire Prevention at Work
- 8-5 Fire Prevention
- 8-6 Fire Safety
- 8-7 Flammable Liquids
- 8-8 Safety Around Gasoline
- 8-9 Outside Fire Hazard Control
- 8-10 Staying Safe at the Pump

8-1 Carbon Monoxide Poisoning

Carbon Monoxide is a colorless and odorless gas that often goes undetected until it's too late. For this reason, it's referred to as the invisible killer. According to the Centers for Disease Control and Prevention (CDC) more than 400 people die in the United States every year because of carbon monoxide poisoning.

Carbon Monoxide is produced by burning fuel in vehicles, small stoves, generators, small engines, lanterns, grills and furnaces. When the gas builds-up in an enclosed space it removes all the oxygen from the air causing people (and animals) who breathe it to be poisoned. **IMPORTANT:** Ventilation does not guarantee safety.

Anyone can be at risk and winter can be a prime time for carbon monoxide poisoning but it can happen anytime of the year.

Symptoms of Carbon Monoxide Poisoning

- Headache
- Dizziness
- Weakness
- Nausea
- Vomiting
- Chest pain
- Confusion

Unfortunately, carbon monoxide poisoning can difficult to diagnose because most of the symptoms mimic other health conditions.

Prevention

- Never use a generator indoors. Opening windows and doors can help to prevent CO build-up.
- Do not use a generator outdoors if it is placed near windows or doors which could allow CO to enter a building.
- Never run a car or truck inside a garage unless exhaust can be ventilated through another means such as a vehicle ventilation system.
- Never use a torpedo heater inside a building (including a garage).

8-2 Compress Gas Cylinder Safety

Most of us know what the various compressed gas cylinders are used for on the job, but how many of us realize that the gases stored in those cylinders are under pressure of from 250 psi to 2200 psi?

These pressures make the cylinders not only dangerous in a fire but if not handled and stored properly, they can turn into a bomb or a rocket. Following the safety rules below will help keep you and the crew safe when using any type of compressed gas cylinder.

- Always store compressed gas cylinders in a secure upright position.
- Always store with caps over the valves.
- Never store two different types of gases closely together.
- Never tamper with any safety devices on the valve or cylinder.
- Always open valves slowly.
- Avoid storing cylinders in areas of high temperatures (shade works).
- Never use cylinders for rollers or sawhorses.
- Never attempt to repair valves or regulators.
- Separate full cylinders from empty ones.
- Do not try to transfer gases from one cylinder to another.
- Keep fire extinguisher nearby when handling or working with compressed gas cylinders.
- When in use, keep cylinders secured to a cart designed for that use.
- Always crank the cylinder shut after use.
- Remove empty cylinders from the work area.
- Never expose gases to oil or grease.

Remember: The improper use of compressed gas cylinders is a common safety violation. Most people think the cylinders are safe but only when treated properly.

8-3 Fire Extinguisher Inspection and Use

Fire extinguishers can be an important tool in preventing a small fire from growing larger. However, they should not be used to combat large or rapidly spreading fires. The most important thing to do during a fire situation is to get yourself to safety and call the proper authorities to combat the fire. A building and the property inside are not worth putting yourself or anyone at risk trying to put it out with a fire extinguisher. It is important to understand how to use a fire extinguisher and the limitations they have.

P.A.S.S. Method

The easiest way to remember how to use a fire extinguisher is to follow the P.A.S.S. method. The PASS acronym was developed to allow people to remember the basic four steps to properly using a fire extinguisher.

- P** - Pull. Pull the pin. Hold the extinguisher away and release the locking mechanism.
- A** - Aim. Aim the stream towards the base of the fire. Spraying the flames will not put the fire out.
- S** - Squeeze. Squeeze the lever slowly and evenly. Pulling the lever too fast may shoot the stream from your target wasting the valuable firefighting agent.
- S** - Sweep. Sweep the nozzle side to side to combat the fire.

Fire Extinguisher Limitations

A dry chemical fire extinguisher such as the common red "ABC" extinguishers will reach a distance between 5 and 20 feet. It is important to be familiar with the models used onsite and the effective distance they can be used for.

A 10 lbs. to 20 lbs. dry chemical fire extinguisher will last anywhere from 10 to 25 seconds. Again, this depends on the model and weight you are using.

Fire extinguishers are only designed to fight small fires. A rule of thumb a lot of professionals' use is the size of the fire should not be any larger than the size of a small trash can.

Fire Extinguisher Inspection Tips

- Extinguishers should be periodically checked every 30 days. There should be a formal check of all fire extinguishers onsite annually. This inspection should be documented.
- Ensure the pressure is okay when inspecting a fire extinguisher. There is a gauge that has an arrow that should be in the green portion of the gauge. If the arrow is in the red the fire extinguisher needs to be tagged out of service until recharged.
- Check to make sure the pin is still in place. Often the pin is bumped out of place leaving the chance of accidental discharge occurring.
- Look for rust on the container and ensure that the label is in good readable condition.

Summary

It is important to know more than just where the fire extinguishers are in your work area. Make sure you know how to properly use them in case the time comes where you need to extinguish a fire. Always make sure the fire extinguishers in your work area are in good condition through thorough Fire Extinguisher Inspection and Use.

Never block access to the fire extinguishers

8-4 Fire Prevention at Work

Have you ever had a fire at your workplace? Fire at work, in this day and age, are rare because of the multitude of safeguards that are in place to prevent a fire, but occasionally a fire does happen, usually because those safeguards have been overlooked. To help prevent a fire from happening at your workplace, OSHA recommends the following safety tips.

- Dispense flammable liquids in areas free from sparks, flames and other sources of ignition.
- Keep all containers of flammable liquids closed or covered when not in use and be sure to return them to their designated storage area when your finished using them.
- When you dispense flammable liquids from one container to another be sure to ground one of the containers. This helps the build-up of static electricity which could create a spark.
- Discard all oily rags and waste materials in a self-closing metal container. (It should be colored red). Empty these containers into designated receptacles at the end of your shift daily.

- Keep all combustible paper products (cardboard, wastepaper) cleaned up and placed in designated waste receptacles. If you let these items accumulate on the floor, you are creating an unnecessary fire hazard.
- When you're using a welder, torch, grinder or another spark producing piece of equipment be sure to use it in a designated area.
- You are not permitted to smoke inside ANY PennDOT building including County Maintenance Garages. There are designated smoking areas at every PennDOT facility. Always put your used cigarette butts in designated receptacles.
- Make sure you are not stacking materials, boxes etc. in front of fire extinguishers or high enough to impede sprinkler heads. Doing this will affect your ability to grab a fire extinguisher quickly and will limit the effectiveness of the sprinkler. You need to leave at least 18 inches of space from materials to the sprinkler head for it to remain effective.
- Make sure fire extinguishers are fully charged, inspected, and accessible at all times.

8-5 Fire Prevention

Fire can start easily and spread quickly causing extensive property damage and loss of life. You must obey all rules, regulations and sign for fire safety. Signs restricting smoking, open flames and other sources of ignition and those controlling the storage, handling and use of flammable liquids or other hazardous materials are displayed for your protection.

- To keep fuel from combining with oxygen and heat, keep covers closed on flammable liquid containers, especially those containing gasoline and alcohol.
- To keep heat from combining with fuel and oxygen, be sure no source of ignition is near exposed flammable liquids or solids.
- Empty gasoline containers shall be drained, steam cleaned and dried before being stored in a building.
- All emergency delivery cans shall be an approved safety type and labeled correctly to indicate their content.
- Never store, transport or deliver flammable liquids, gasoline, kerosene or alcohol in open or glass containers.
- Report, clean-up and remove spills immediately.
- Waste rags should be disposed of in covered, metal containers.
- Never drain a vehicle's gasoline tank inside of a building.
- Good housekeeping will prevent accumulation of material which often constitutes a serious fire hazard. Keep all buildings and work areas neat and unobstructed.
- Keep access to fire extinguishers open.
- Do not clean your clothing with gasoline, solvents or other flammable agents. A spark can ignite your clothing and cause serious injury.
- Smoke only in designated smoking areas and always use proper disposal containers.

8-6 Fire Safety

Would you know what to do if your office caught fire? How about if you were in a staging building and the electrical circuit overloaded and caught the building on fire? The best way to respond to a fire is to prevent it from happening.

Fire Prevention Steps

- Don't overload electrical circuits or use damaged cords or extension cords.
- Do Not place hot equipment near combustibles. Example: Space heater near paper.
- Properly store all chemicals and be aware of their flash point. Keep the SDS and Hazardous Substance Survey Forms up to date for the storage area, so you know how to fight a fire if it should break out.
- Keep gas and all solvents away from any ignition point, ground large tanks and clean up spills immediately.
- Obey No Smoking signs, smoke only in designated areas and dispose of used cigarettes and matches in marked disposal cans.
- Use non-flammable cleaners whenever possible.

Fire Safety Guidelines

- If a fire is detected call 9-1-1.
- Activate the fire alarm at your facility.
- Keep fire extinguishers and fire hoses clear and ready to use immediately.
- Keep fire exits clear of debris and easily accessible.
- Participate in all fire drills and take them seriously.
- Know your evacuation route and know where to meet once outside the building.
- Know who your building evacuation staff are.
- Never use elevators during a fire.

Fires can be deadly. Usually, it's the smoke that kills a person before the fire reaches them. If you are in a building that is on fire, drop to the ground and crawl to safety. Remember, heat rises as does smoke. Your best chance of finding breathable air is on the floor.

8-7 Flammable Liquids

Flammable liquids like oil, gas, kerosene, and many solvents present unique fire hazards. They give off invisible vapors that can travel long distances and catch fire quickly or explode when ignited by something as small as a static discharge.

There are some obvious safety rules you can observe while refueling a vehicle or other piece of equipment at work or at home to keep you safe. But there are also some rules that are not so obvious. Here is an overview of some of the precautions that you should keep in mind anytime you are refueling a vehicle or piece of equipment at work or at home.

- **NO SMOKING!** The burning cigarette can ignite flammable vapors that are emitted from the liquid fuel, causing a flash fire or explosion to occur. Also, make certain there are no other potential sources of ignition, such as open flames or spark-producing equipment operating in the area, as they too can ignite a fire or explosion.
- Only use safety cans or other approved portable fuel containers, such as those marked a D.O.T. approved for transporting and transferring fuels, to refuel vehicles and equipment. Unapproved containers can easily leak, spill fuel, or even rupture, leading to a potentially dangerous situation.
- Always kill the engine of the vehicle or equipment before you refuel. Also, be certain to let portable equipment such as lawn mowers, generators, chain saws, blowers, trimmers, or anything else with a fuel-powered engine cool down before you add fuel to the tank. Spilling liquid fuel on a hot motor instantly creates a cloud of highly flammable vapor, which can easily catch fire or explode.
- Before dispensing fuel into your car or truck, be sure to touch a metal part away from the fuel tank on your vehicle or equipment with your bare hand. This helps dissipate any static build-up on your body created when you slid out of your vehicle. Also, touch the gas dispenser nozzle or hose to the fill tube on the gas tank before you start to add fuel to the tank, and keep it in contact throughout the entire refueling process. This step helps prevent hazardous static electricity from building up and causing a spark in the vapor area as you refuel.
- Never dispense fuel into a can or other portable container while it is sitting in your vehicle or truck bed. Doing so allows hazardous static electricity to build up. Instead, sit the container on the ground and then add the fuel.

8-8 Safety Around Gasoline

Gasoline, when harnessed properly serves as a vital source of energy. Treated carelessly, it can become an explosive monster. Many people are killed or seriously injured each year because they did not treat gasoline as a potential killer.

Gasoline Facts

- Gasoline doesn't burn. It's the gas vapors that burn.
- Gas vapors are heavier than air. Thus, they collect in low areas.
- Any type of spark can ignite gas vapors.
- Gasoline should never be allowed to contact your skin.
- If you get gasoline on your skin, immediately clean the area contacted.
- Don't use gasoline as a solvent for cleaning tools or parts.

Storage

- Always store in an approved gasoline storage can, Ensure the can has the proper labeling (i.e. flammable, plus the type of fuel).
- Always mark the storage can "GASOLINE - NO SMOKING".
- Remember, an empty can is more dangerous than a full one (because of the gas vapors).
- Always flush out empty cans.
- Keep all containers tightly closed.

Transferring Gasoline

- Never transfer gasoline from one container to another in an area where there is any chance of ignition.
- Clean up any spills immediately. It is a safety, health and environmental hazard.
- Be wary of static electricity. Always use grounding straps when fueling from an above ground tank.

8-9 Outside Fire Hazard Control

Like all accidents, fire can't be predicted. They don't happen all that frequently, which is why when they do happen it comes as a bit of a surprise. This is the reason facilities practice fire drills, because when a fire does break out you really only have minutes to get out safely.

If you're already outside, like on a Construction project or doing a Maintenance repair, you're probably thinking you're in the clear. Believe it or not, you're in just as much danger as people inside a building. Outside job sites run the risk of debris and equipment catching on fire. Fire can be started from sparks from a welding torch, re-fueling a hot piece of equipment or a faulty electrical cord.

There are some simple rules to follow to avoid having a fire at your outside job site.

Welding Fires

- Keep all torch work like guiderail cutting away from flammable materials like saw dust, other wooden debris, paper, oily rags, dry leaves and brush. These items and others can catch fire from a welding spark or a piece of slag that drops from a guiderail being cut or other torch work being done.
- Do not weld or cut while refueling equipment. Vapors and gases can catch fire and cause very powerful explosions. Vapors, when ignited will also travel back to their source, causing additional damage.
- Make sure all tanks or pipe that contained a flammable liquid are emptied and cleaned prior to welding them. An added precaution would be to fill the tank with water up to a few inches of the welding area.

Refueling Equipment

- No Smoking! A burning cigarette can ignite flammable vapors that are emitted during the transfer of fuel. If these vapors ignite, it could cause a flash fire or explosion.
- Only use approved safety cans or other approved portable fuel containers. Make sure the can is marked with the fuel you want to use (you don't want to put gas into a diesel motor). Remember, unapproved containers can leak, spill fuel or rupture leading to a fire.
- Before refueling, kill the engine of the vehicle being refueled. This includes generators, mowers, chain saws, blowers, trimmers or anything that requires fuel. Allow the engine to cool down prior to refueling. Spilling fuel on a hot motor can result in an explosion.

Electrical Fires

- Never use staples, nails or similar devices to fasten electrical cords to a wall. These items can break through the insulation of a wire and can potentially cause a fire.
- Never run an extension cord through a doorway or window. If the door or window is closed, it could pinch the cord and break the insulation or a wire which will cause a short and could potentially spark.
- Only use electrical cords rated for outdoor use. Extension cords intended for indoor use will not withstand extreme cold or hot conditions or extended periods of sun exposure. These conditions will weaken a cord and cause deterioration which will lead to sparks or excessive heat build-up.
- Do not overload an extension cord. Each cord is rated for a certain amount of electricity. Trying to push more than it can handle will cause it to get hot and potentially cause a fire. Check the tag on the cord or the packaging that came with it to determine the maximum amperage for which the cord is rated.

- Do NOT leave unsafe cords in service. If you find a cord with a burned end or sliced insulation, take it out of service. Do not tape it and keep using it. Replace it with a new cord and do not continue to use it. This will cause a fire.

Be safe with fire. Like all other accidents, taking a few simple precautions will keep you safe. Be aware that a fire can break out at any time, be aware, don't take chances and stay safe.

8-10 Staying Safe at the Pump

Gasoline and other fuels are highly flammable, toxic substances. Incidents while refueling a vehicle can be serious and occur when proper precautions are not taken. The National Fire Protection Association (NFPA) and the American Petroleum Institute (API) recommend these safety precautions when working with fuel:

- Turn off the vehicle's engine when refueling.
- Don't smoke, light matches or use lighters while refueling.
- Stop the use of electronic devices when refueling.
- Use the refueling latch on the dispenser nozzle, if there is one. Do not jam the latch with an object to hold it open.
- Stay outside the vehicle while refueling. Static electricity can develop on the body as a result of getting in and out of the vehicle which can result in a spark when reaching for the pump.
- Discharge any static electric charge by touching a metal part outside the vehicle, away from the filling point, if it is necessary to reenter the vehicle during refueling.
- Avoid spills by not overfilling or topping off the vehicle.
- Leave the nozzle in the vehicle if a fire starts, leave the area immediately and call for help, do not try to stop the flow of fuel.
- Wash exposed skin with water and soap after refueling and before eating or drinking.
- Use only approved and labeled portable containers for transporting and storing fuel.
- Fill portable containers on the ground and not in or on a vehicle to avoid static electrical charges from collecting.
- Keep the dispenser nozzle in contact with the portable container and leave room for expansion.

Important Reminders:

- Contact a hazardous substance coordinator for additional information regarding the Safety Data Sheets (SDS) for gasoline or other fuel sources.
- Review the operating instructions that are posted at the fuel pumps before refueling.

Section 9 - Flagging and Traffic Control

- 9-1 Be Safe as a Flagger
- 9-2 Flagger Safety
- 9-3 Flagging Operations
- 9-4 Flagging PPE
- 9-5 Near Misses in a Work Zone
- 9-6 Near Misses
- 9-7 The Importance of Reporting Near Misses
- 9-8 Traffic Control
- 9-9 Unexpected Weather Changes in a Work Zone
- 9-10 Work Zone and Flagger Safety
- 9-11 Work Zone Safety
- 9-12 Emergency Vehicles in Work Zones

9-1 Be Safe as a Flagger

Every summer, employees working on the roadway are exposed to hazards associated with traffic. An incident that occurred a few years ago involving one of our flaggers was a close call. Fortunately, he did not sustain serious injuries. The flagger had a vehicle stopped when a second vehicle rear-ended the stopped vehicle, which then hit our flagger.

Please the following points in mind to help reduce your chances of becoming a statistic.

As with any operation, specific details of the day's work and possible hazards should be discussed at the start of every shift.

Proper PPE should be worn. This includes hard hat, ANSI Class 3 high visibility multicolored vest, ANSI Class E high visibility chaps.

Flaggers must be standing, at all times, in a highly visible location and always be alert when facing oncoming traffic.

Turn your cell phone off while working as a flagger.

Monitor proper positioning throughout the day to ensure maximum visibility to oncoming traffic. A flagger should never stand on the back side of a hill (or a hump in the roadway), or at the exit of a curve in the roadway.

- During the summer months, use sunscreen, drink plenty of water and rotate workers on flagging duty to reduce the potential for heat related injuries.
- Establish a warning signal and escape route ahead of time, to be used in the event of an emergency.
- Do not leave your position until you are relieved by another flagger.
- Never turn your back towards traffic.
- Flaggers should prepare ahead of time to coordinate expedient passage for emergency vehicles.



9-2 Flagger Safety

Being a flagger in a roadway operation is one of the most important jobs at PennDOT. It's also one of the most dangerous. Flaggers are the first line of defense for work zone operations. You provide communication not only for the crew but also for the traveling public. Without this communication, drivers wouldn't know when to proceed or when to stop, putting their lives and the lives of the workers in danger.

Distracted drivers pose a threat not only to themselves but also to you and your crew. Be aware that they are, unfortunately, here to stay and we can only protect ourselves from their inattentiveness.

Some things you can do are:

- ALWAYS have an avenue of escape if traffic comes towards you.
- Be aware of all types of traffic at all times. BE ALERT.
- Flaggers must be properly attired at all times.
- Proper PPE is a Class 3 Vest and Class E Chaps.
- Flaggers must be stationed on the shoulder.
- Mobile Flaggers do not walk downstream while holding stopped traffic.
- Flaggers must control side roads and driveways.
- Flaggers should notify foreman if traffic queue extends beyond all warning signs. Additional signs should be installed.



9-3 Flagging Operations

On Wednesday, May 1, 2013, an Equipment Operator performing flagging operations for a base repair job was hit by a private motorist. The press is reporting the private motorist could not see our employee due to the sun being in her eyes. The employee sustained serious injuries and was flown by helicopter to the hospital.

In years since, PennDOT has said goodbye to at least two other employees killed in the line of duty while performing flagging operations. Flagging is one of the most dangerous jobs within our work zone operations.

Please be aware of the information that follows during flagging operations:

- All flaggers must have successfully completed the required flagger training.
- A flagger must be standing and alert when facing approaching traffic.
- A flagger must be located in a position that can be seen by traffic so drivers can react.
- A flagger should stand on the shoulder or in the barricaded lane.
- A flagger should not watch the work in progress or try to do any work other than flagging.
- A flagger should not step into or turn your back on traffic.
- A flagger must have a planned route of escape.
- Supervisors/foremen should drive through the work zone at the anticipated speed of the motorists to check for visibility of the flagger.
- If a near miss with an errant motorist is reported by an operator, the supervisor/foreman should investigate and make adjustments as needed.

In addition to reviewing the above reminders, each crew should take some time to discuss their recent work zone and flagging operations to ensure work practices are in accordance with Pub 213 (Temporary Traffic Control Guidelines).

9-4 Flagging PPE

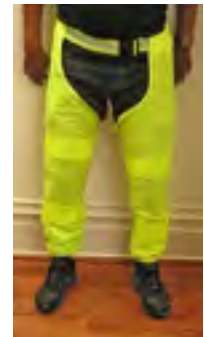
Flaggers have one of the most important jobs at PennDOT. It's your job to keep traffic moving safely and to keep your crew safe while they're working. But who is keeping you safe while you're keeping everyone else safe?

Sadly, no one. For this reason, PennDOT has developed Personal Protective Equipment (PPE) to make sure you are seen while you are providing safety for your crew and the public.

Flagger PPE is different than other PPE. PennDOT rules indicate that a flagger must wear an ANSI Class 3 vest and ANSI Class E chaps to flag. The chaps can be either orange or yellow/green.



Flagger Personnel must wear an ANSI – Class 3 vest and either yellow/green or orange chaps – Day or Night



Flaggers are also expected to wear a PennDOT issued hard hat, a t-shirt with unaltered sleeves (at least six inches in length) and work boots above the ankle.

Always make sure that your vest, chaps and hard hat are clean so the reflectivity of the garment provides the most conspicuity to the traveling public. Remember, you want to be seen.

To be clear, wearing this amount of PPE is a PennDOT rule. You'll see other contractors and utilities wearing less PPE to flag. PennDOT makes every effort to ensure the safety of our flaggers, so a little extra PPE won't hurt a thing.

9-5 Near Misses in Work Zones

Near Misses are events that were observed to have had the potential to be categorized as an accident, but did not result in property damage, an injury or illness requiring professional medical attention, or a fatality. This may include, but is certainly not limited to, work zone intrusions that do not result in an accident. If you have encountered a Near Miss in your work zone, contact your supervisor immediately. A P-25 (Accident Investigation Report) or P-73 (Near Miss Report) must be filled out as well as witness statements from your crew.

Near Misses must be investigated so a plan can be developed to prevent the same type of accident from occurring in the future.

Two fundamental questions should be asked:

1. What hazards caused the accident or near miss?
2. What can be done to keep it from happening in the future?

It's really simple to say, "I can't do anything about these drivers." Or to say, "Accidents happen." But the truth of the matter is that every accident or near miss has a root cause. Causes are separated into four categories:

- Equipment – Was this accident caused by malfunctioning equipment or tools?
- Conditions – Was this accident caused because of a work site configuration, weather, noise, lighting, or an outside influence such as a passing motorist, etc.
- Preparation – Could the job planning been better and if so, would that have prevented an accident?
- Procedures – Were all employees following the job procedures and were they wearing their correct PPE?

Once we have determined the cause, then we will be able to identify and recommend corrective actions.

Corrective actions are the appropriate measures that will be taken to address the hazards that caused the accident or near miss.

Once again there are four categories of corrective actions:

1. Substitution – This eliminates the hazard by using different equipment or processes that achieve the same outcome.
2. Engineering controls – These eliminate hazards by incorporating safety mechanisms into the design of the equipment or configuration of the work site. These types of controls often reduce or eliminate employee's exposures to hazards.
3. Administrative Controls – These types of controls implement or modify existing methods to detecting and addressing hazards which include, but are not limited to: Planning, protocols, policies, procedures, job safety analyses, training, inspection processes, checklists and safety talks.
4. PPE – Personal Protective Equipment is always the last resort for corrective actions. PPE provides a level of protection for employees against hazards for which employee exposure cannot be prevented or controlled.

When near misses are reported, corrective actions can be identified and hazards eliminated – saving lives.

9-6 Near Misses

How many times have you had a close call that made your heart sink and your stomach churn? You thought to yourself – "wow that was close". Believe it or not, the difference between an accident and a near miss is often just a fraction of a second or a fraction of an inch. Unfortunately, the next time that fraction may not be there, and you could end up being hurt.

Near misses are warnings of accidents in the making. If we accept the warnings and look for causes, we may be able to prevent a similar incident in the future.

Reporting

Near Misses must be reported, regardless of the severity. You might think that your near miss is no big deal, but the next time it could happen to someone who isn't as fast or agile and they become seriously injured.

Accidents rarely happen without a warning or two. We must pay attention to these warnings and act to prevent an accident from happening. Many safety practices tend to be reactive, meaning a rule or practice only goes into effect after someone has been hurt or killed. We must be proactive in our approach to safety.

There is a theory suggesting that there is a ratio between the number of serious accidents vs. the number of near misses. The theory is called the Accident Pyramid. The Accident Pyramid says that for every 600 near misses, there will be 30 accidents resulting in property loss, 10 lost time injuries and 1 death.

It is important to report near misses. In doing so, policy and procedure can be changed, JSA's can be written, or a solution can be engineered into a new truck to prevent serious injury.

Investigation

Investigation into a near miss, either fleet or personal injury is extremely important to prevent a serious injury or death. Near Miss reports are filled out the same as an accident report including witness statements and pictures.

Near misses should be investigated for causes and corrective actions and should be discussed at safety committee meetings.

Positive change can result from near miss reporting and investigation. It should be everyone's goal to go home safely every day. Your close call could result in the change that saves someone else's life.

9-7 The Importance of Reporting Near Misses

PennDOT averages about 200 near misses a year. The reporting of near misses can lead to valuable information and positive changes in the workplace. This is especially true when it comes to the reporting of work zone intrusions.

So, what is the difference between a near miss and an accident? Inches or fractions of a second are usually the difference. A near miss can simply be defined as a close call. This means that the incident could have resulted in harm to people, property, or the environment.

It is important that we pay attention to these near-misses and use them as opportunities to prevent future accidents and injuries. Studies have shown that at least one injury occurs for every 10 near misses. If ignored, it's not a matter of "if" an accident will happen, but "when".

Proper reporting of near misses is essential, and the investigation that follows is for the purpose of training, educating, or preventing future accidents. Very few accidents happen due to a single cause and very few accidents occur without some type of warning. If you have witnessed or been involved in a near miss, then you have seen the potential for a future accident.

Over the years, we have all heard co-workers tell stories about close calls they have heard about or experienced on the job.

The stories about near miss accidents usually end with something like:

- "It's a good thing no one was around."
- "One more inch and we would have had it."
- "Good thing we checked for power."
- "Watch for that hole! I almost fell in."
- "That's why we wear hardhats."
- "That thing should have been taken off the job."

Key Points to Remember:

1. Most injuries are preventable. Be proactive!
2. Don't laugh off near misses, next time it might be a serious accident.
3. Consequences of serious injuries go beyond the injured person. Family, friends, coworkers, relationships, and finances can all be permanently affected.
4. Do your part; report all near misses to your supervisor.
5. Take action to address unsafe acts or conditions.

Things to Do:

- Review recent accidents or near misses since the last safety meeting or talk.
- Discuss any hazards you may encounter in your workplace each day.
- Create "What If" scenarios and discuss how you would handle them from a safety perspective.
- Review suggestions for safe working procedures and preventing accidents.



9-8 Traffic Control

PennDOT's mission is to provide safe roadways for the traveling public. That means keeping people safe in a work zone too.

PennDOT's Pub 213 outlines various traffic control patterns foremen can use to eliminate confusion for drivers while negotiating a work zone. These patterns work, unfortunately, sometimes drivers don't pay attention or are impaired in some way while traveling through a work zone putting themselves and you in danger.

What can you do to keep drivers safe in a work zone?

Work zones should not be confusing. For instance, if you plan to be on a road for less than 15 minutes, Pub 213 says you don't have to put out work zone signs. Some foremen take advantage of this rule and neglect to put out signs even though they know they will be working for much longer than 15 minutes.

As a driver, what would you think if you came upon a work zone without signs? Would you be shocked? Would you panic? Would you swerve to miss a worker standing in the middle of the road? All of these things have happened so be sure to set-up a work zone using the correct PATA for the size and type and time allotted for your project.

What can you do to keep yourself safe in a work zone?

- Wear your PPE. Make sure that flaggers are wearing an ANSI Class 3 vest and Class E chaps. Make sure all other personnel are wearing clean ANSI class 2 gear (either a vest or t-shirt).
- Be sure your work zone signs are placed in the appropriate places far enough from the start of the work zone, so you don't surprise a motorist.
- Never turn your back on approaching traffic.
- Keep your cell phone turned off. Using your cell phone while working in a work zone will take your attention away from what is happening around you and could cause you to make a fatal mistake.

Not everyone will obey the rules of the work zone. All that you can do to ensure the safety of the passing motorists is to make sure you are following the safety rules. If a driver refuses to obey the rules while in your work zone, note the make, model and color of vehicle and a description of the driver, then call 911.

9-9 Unexpected Weather Changes in a Work Zone

Have you ever been heavily involved in an operation when, almost instantly, the weather turned for the worst: sudden heavy rain, strong winds, hail or fog? What did your crew do?

What Will You Do?

A PennDOT maintenance crew is actively engaged in a paving operation when a fog that was neither forecasted nor anticipated suddenly rolls in. The fog is dense, reducing sight distances quickly and drastically. Removing equipment promptly to reopen the closed lane is not an option because the freshly laid material is still soft and hot. What do you do?

Typically, we can plan for weather by watching local area radars and being in touch with the County Maintenance Office for weather updates. In the rare event of sudden, unexpected weather changes, please keep the following information in mind:

Can the operation be safely shut down and all equipment removed from the roadway on short notice?

- If so, discuss how this will be done. Designate an area for each vehicle, each piece of equipment, and each worker on foot.
- If not, continue...

How will you maintain visibility to the traveling public for flaggers, work zone signs and channelizing devices? In the absence of channelizing devices, how will the open travel lane be delineated? If flares will be used to illuminate these, where will they be stored so that they are accessible, and who will be responsible for their placement?

When time allows, Foreman should contact management for direction on how to safely continue/discontinue an operation.

As we transition from one season to the next, please keep in mind the possibility of sudden changes in weather conditions. Crews should discuss a plan for these types of situations.

9-10 Work Zone and Flagger Safety

There is always a lot of responsibility given to flaggers to keep the rest of the crew safe in a work zone. That responsibility is not taken lightly, and it is an important one, but if you're not a flagger, what can you do to keep yourself safe in a work zone?

Believe it or not, there are many things you can do to keep yourself safe while working on the road.

- First and foremost, pay attention to everything that is going on around you.
- Listen to back-up beepers – you hear them all the time, but no matter how many times you hear it, you need to look up to make sure you aren't directly behind the backing truck or machine.

- Never assume an equipment operator can see you. Make eye contact with a driver before moving around the equipment.
- DO NOT ride on any part of a moving machine. Employees are not permitted to ride on vehicles or equipment unless specifically designed for the purpose of transporting employees.
- Do not back-up without a spotter.
- Swinging counterweights often create a dangerous pinch-point. Don't get yourself into a spot where you could get squeezed between a counterweight and another fixed object.
- Don't walk alongside moving equipment, keep in the clear in case the unit suddenly turns, slides or the load shifts.
- Don't use your cell phone while in a work zone. Using your cell phone takes your attention away from what is happening around you.
- Stay out from under loads of any machine such as cranes, hoists, backhoes, or excavators. Remember, the operator has no control over what may fall out of the bucket while you're walking under it.
- If a machine hits a power line – stay away! The electricity can travel through the machine and into you, especially if you're on the ground.
- Last, but by no means least, always wear your PPE. Make sure you wear your hard hat, a clean vest and above the ankle boots with good tread.

9-11 Work Zone Safety

Any time you are working in a work zone, you expose yourself to inherent dangers. Working around traffic is hazardous and brings with it a risk of being hit by a traveling motorist.

Every year the Department has its share of mishaps in work zones. Most are minor with no injuries or just minor injuries. Sometimes though, our people pay the ultimate price.

On Wednesday, June 12, at approximately 1pm, an Equipment Operator performing paving operations was hit by a private vehicle. The crew was paving the northbound lane of a road, using work zone set-up PATA 302 for a short-term mobile operation. The private motorist was traveling northbound. The flagger motioned for the driver to proceed through the open southbound lane. The PennDOT employee was standing to the rear of the paver turning the hand crank to adjust the skid plate when he was struck by the private vehicle.

The employee sustained a fractured leg and neck injuries.

Anyone who works on the road can share similar experiences. Some have resulted in life threatening injuries while others are near misses. It doesn't have to be life threatening to be frightening.

Your job is dangerous. You must take every precaution to stay safe while performing your daily duties.

While you're working in a work zone you need to be aware of the following:

- Moving equipment/vehicles.
- Limited visibility from machinery and dust.
- Close proximity to traffic.
- Additional personnel or precautions that need to be considered when there are intersections within the work zone.
- Create "out of bounds" areas that are off limits to workers due to the traffic hazard.
- Provide an escape route in case of emergency.

Work zone set ups must be looked at from the perspective of the driver as well to mitigate the risks from private motorists such as:

- Are traffic lanes clearly defined? Should cones be placed to eliminate any confusion?
- Ensure that flagger communications are clear.
- Are workers clearly visible to the private motorist and out of the line of traffic?



Treat each day like it's your first. Respect the traffic in work zones and be aware that drivers make mistakes. The key is for you not to have to pay for those mistakes with your health or life.

9-12 Emergency Vehicles in Work Zones

Recently, there have been a number of near miss reports involving emergency vehicles traveling through work zones. The reports indicate that the emergency vehicle either didn't slow down for the flagger or only slowed down for a brief time before entering the work zone without being told to proceed.

Emergency vehicles have a job to do to save lives but not at the risk of your life or the lives of your crew.

The following passage is a reminder taken from the flagger handbook on how to deal with emergency vehicles:

Emergency Vehicle

- When informed in advance of an approaching emergency vehicle, the flagger should clear a path for the emergency vehicle by stopping traffic in all directions and allowing the emergency vehicle to pass.
- When no advance notice is given, first stop the emergency vehicle, then stop all traffic in all directions and allow the emergency vehicle to proceed.

As a flagger, if you see an emergency vehicle approaching your work zone, radio to the crew and the other flagger to hold traffic. The most important part of this is inform the crew that an emergency vehicle is about to come into your work zone. Operations should halt until the emergency vehicle passes.

Try to stop the emergency vehicle, but do not put yourself in an unsafe situation. Make sure you have an escape route planned.

Section 10 - Flooding

- 10-1 Flooding
- 10-2 Floods
- 10-3 Working in the Field During Flood Recovery

10-1 Flooding

When weather conditions make a turn for the worse, PennDOT employees are on the front lines battling the hazardous conditions. However, employee safety needs to remain a priority no matter the circumstance. Below are a few potential hazards that may be created due to hazardous weather conditions such as flash flooding or downed overhead utilities with recommendations for safe practices.

What to do in a flash flood:

Flash floods can occur within minutes or hours of excessive rainfall. When flash floods are predicted, or conditions are right for flooding:

- Go to high ground immediately if water starts collecting around you.
- Remain clear of areas subject to flooding, such as low spots, canyons, washes, etc.
- Do not attempt to cross a flowing stream on foot. Six inches of water, when moving at a high rate of speed, can be enough to knock someone off their feet.
- Never drive through flooded areas or standing water. Shallow, swiftly flowing water can wash a crew cab or dump truck from the roadway, and the roadbed may not be intact under the water.
- If your vehicle stalls, abandon it immediately and seek higher ground. Rapidly rising water may engulf the vehicle and passengers. Dial 911 immediately, then notify your supervisor later.
- Be especially cautious at night when it's harder to recognize flood dangers.
- Understand the difference between a Flash Flood Watch and Flash Flood Warning.



Flash Flood Watch

Flash flooding is possible along small streams and rivers. Be prepared to move to higher ground.

Flash Flood Warning

Flash flooding is imminent and occurring. Seek higher ground immediately.

Important Reminders:

- Employees that have responsibilities to monitor bridges for potential flooding and stability issues are not permitted to enter the flood waters. Flood waters include both standing and flowing water.
- It is important for employees to contact their supervisor or manager immediately if a flood occurs.
- Additional information may be found at PA READY, PennDOT.gov and PUB 238 Bridge Safety Inspection Manual.

10-2 Floods

According to ReadyPA, flooding is the most common natural disaster in Pennsylvania. If you've worked for PennDOT for any amount of time, you'll no doubt remember a time or two that you've had to put out signs closing a road because of high water.

There are two types of floods in Pennsylvania: A slow developing flood that happens after an extended rainy period or a warming trend following a heavy snow, or a flash flood that happens very quickly without any visible signs of rain.

Both types of floods close roads, cause property damage, and can put PennDOT workers at risk.

If you're called to help with flooding in your area, make sure you're staying safe.

- Never drive through a flooded roadway. It only takes two feet of fast-moving water to move a vehicle. Turn around – Don't Drown!
- If you come across a stranded motorist – call 911.

After the water recedes, you'll be called to fix washouts, stabilize bridges and landslides.

Know the hazards:

- Downed power lines
- Chemical or biological hazards
- Unstable embankments
- Venomous snakes
- Undermining of the roadway

Many people who die in flooding do so because they have ignored road closure signs. Vehicles will begin to float in just 18 inches of water. Turn around – Don't Drown!

10-3 Working in the Field During Flood Recovery

As you are engaged in flood recovery and assessments, we must remember that safety is paramount. The following safety talk should be given to all employees engaged in flood recovery/assessment operations.

If it doesn't look safe, Stop, Report and Go Back!!!!**Personal Protective Equipment**

- Hard Hat
- Safety Vest
- Gloves
- Footwear
- Eye/Hearing Protection
- Chain Saw/Brush Cutting PPE including Safety Chaps

Road conditions

- Review up to date information about current road and bridge conditions
- Road surface conditions
- Check the surface
- Dry, Wet, Slick, Wash outs
- Are the edges clearly defined
- Check for undermining-BEWARE
- If there is a doubt check
- Pipes
- Pavement may look fine, you need to check the road bed to ensure it is not washed out around the pipe. Inlet and outlet scouring is a good indication.

**Water Safety**

- Do not enter the water to complete inspections.
- Do not drive through standing water.
- Cover reporting process (Personnel Accountability)
- Who to check in/out with and when to report in.
- How to report concerns with roadway/bridges
- Downed electric wires
- Report and stay away until cleared
- Roadway and Right-of-Way Safety
- Stay Alert to the travelling public
- Work Zone Safety
- Be aware of clearances and overhead wires.





Section 11 - Garage Safety

- 11-1 ARC Welding Hazards
- 11-2 Eye and Foot Protection
- 11-3 Forklift Safety
- 11-4 Garage Safety Areas
- 11-5 Garage Safety Inspection
- 11-6 Garage Safety Standards
- 11-7 General Garage Safety Tips
- 11-8 Hydraulic Lift Safety
- 11-9 Maintain Your Tools Safely
- 11-10 Proper Use of Jacks
- 11-11 Tips for Using a Creeper
- 11-12 Welders PPE
- 11-13 Working Safely with Corrosives
- 11-14 Milling Machine Safety

11-1 ARC Welding Hazards

Flash Burns

The most common injuries due to welding are flash burns caused by the ultraviolet light produced by the arc. A flash burn is like sunburn of the outer surface of the eye. You do NOT have to be looking at the arc to get flash burns. If the UV light can reach your eye, even from the side, you will get burned; it often happens to people working near the welder.

You do NOT need dark glasses to prevent flash burns! Clear polycarbonate safety glasses with side shields will stop all ultraviolet light. Anyone within 20 feet of a welding arc should be wearing safety glasses or shielded by an opaque barrier. Remember, it's not whether you can see the arc - it's whether the arc can see you!

Retinal Burns

The arc also produces intense visible light and heat, which is focused on the back of the eye by the lens and can cause blindness in someone staring directly at the arc. That's why the welder needs a hood with a dark lens. Unfortunately, that can make it hard to see what you're doing, so people tend to cheat, lifting up the hood while striking the arc, resulting in flash burns and occasionally pieces of slag in their eyes. The best solution is the electrically tinted hood lens, but if you don't have one available use a lens dark enough to reduce the arc to a comfortable brightness and use a bright light to illuminate the work area so you can see it through the lens. If you cheat, you will get burned!

Dangers Associated with Arc Welding Equipment

Arc welding equipment may not be designed to operate safely in damp, rainy and windy weather, or in the presence of flammable vapors or gasses, corrosive fumes, dirt, or dust.

Wet equipment or wet welders can spell disaster. Wet equipment should be dried off, but only AFTER the power source has been disconnected. Before using welding cables, check the insulation and lead cables for exposed conductors.

Replace all welding leads spliced within 10 feet of the holder. To reduce the chance of shock, check the electrode holders for loose or exposed connections.

Be sure the welding machine frame is properly grounded, and double-check the grounding connections. Never use pipelines carrying gases or flammable liquids or conduits carrying electrical conductors as grounds. Don't ground to a building structure that is a great distance from the weld.

Wet floors are dangerous and can cause electrical shock. Make sure the insulation is sufficient on higher open-circuit voltage. If you are ARC welding under wet conditions, including perspiration, be sure to have an automatic control to reduce the no-load voltage; this prevents electrical shock.

11-2 Eye and Foot Protection

Garage safety requires more than having the right tools for the job and knowledge vehicle repairs. Mechanics must also know about the personal protective equipment, or PPE, required to reduce the potential for injuries, and when to use it.

Eye Protection:

Employees must wear eye protection any time they are positioned outside of designated safe passage areas. If eye injuries have occurred despite the use of safety glasses, safety goggles are necessary for these operations. Safety goggles provide additional protection from chemical splash, mist, and small particles that are not adequately stopped by safety glasses. Supervisors may help designate the use of safety glasses or goggles as appropriate.

Safety glasses and goggles must meet ANSI Z87.1 impact protection standards. Employees who engage in or enter garage or field activities that expose them to eye hazards must be provided protective eyewear, and supervisors will ensure appropriate eye protection is worn when and where it is required. The following list describes some of the operations where eye injury potential exists:

- Spraying or painting operations - paints, coatings, sealants, and aerosol sprays
- Pressure washing – splash and mist containing detergents, dirt, and debris
- Installation or removal of vehicle parts – grease, dirt, and fluids
- Vehicle maintenance – hot chemicals and fluids under pressure
- Working underneath a vehicle – falling dirt, debris, and fluids
- Grinder and power tool operations – high velocity debris

Safety Footwear:

All employees outside of garage safe passage areas must wear safety footwear that is above the ankle with a good tread. Appropriate safety footwear must be worn by all employees exposed to puncture hazards such as nails, glass, wire and other sharp objects.

In addition, toe protection is required in all areas where employees are exposed to impact hazards to the foot, such as falling or rolling objects, or accidental tool impact. If needed, the Department provides toe protection that attaches to safety footwear to provide this protection. Employees may wear their own steel or composite toe safety footwear as an option.

The following list describes a some of the operations where eye injury potential exists:

- Crushed or broken feet, amputations of toes or feet- feet trapped between objects or caught in a crack, falls of heavy objects, moving vehicles (lift trucks, bulldozers, etc.).
- Punctures of the sole of the foot- loose nails, sharp metal or glass objects.
- Cuts or severed feet or toes, lacerations- chain saws, rotary mowers, unguarded machinery.
- Burns- molten metal splashes, chemical splashes, contact with fire, flammable or explosive atmospheres.
- Electric shocks -static electricity, contact with sources of electricity.
- Sprained or twisted ankles- fractured or broken bones because of slips, trips or falls, slippery floors, littered walkways, incorrect footwear, poor lighting.

Please remember to abide by the PPE requirements for proper eye and foot protection within the garage and all work areas. These have been established for your protection.

11-3 Forklift Safety

Anytime you have a large load to carry, look for a forklift to help you with the lift. Forklifts are excellent labor-saving tools that save a lot of time and reduce back injuries. Unfortunately, if you aren't trained on their proper use, a forklift can be a very dangerous piece of machinery.

The following are basic safety rules for operating a forklift:

- All operators must receive training on the forklift operation.
- Wear your seat belt. Your seat belt will keep you on the seat if the forklift tips over because your load is too heavy.
- A parked forklift should have the forks flat on the floor with the controls set to neutral and the parking brake engaged.
- A forklift is "unattended" if operator is more than 25 feet out of the direct vision of the operator. An unattended forklift should be parked with the power turned off.
- Drive within operational lines.
- When operating on an incline, the load should always be on the uphill side of the incline. Drive forward going up the hill and backwards going down the hill.
- When you're operating a forklift unloaded, the forks should be 4-6 inches off the floor.
- Do not allow pedestrians underneath a raised load and allow adequate clearance between you and pedestrians. Honk your horn before you proceed.
- If you're carrying a tall load that blocks your forward vision, drive in reverse and turn your head to see where you're going.
- ALWAYS travel slowly.
- If you're operating around other forklifts, maintain a three-forklift distance between forklifts.
- Stop at all blind corners and intersections.



11-4 Garage Safety Areas

Our garage areas have numerous operations occurring where there is risk of injury, especially to employees and visitors walking through the area who are not aware of these specific hazards.

These could include exposure to hot liquids, flying debris and falling parts. Because of this, each work location must be designated and defined as a no-go zone to employees who are not garage personnel. Employees from outside the garage shall not be in these designated areas unless specifically assisting a mechanic by request or assignment.

Employees not assigned to the garage who need to pass through the area to get to restrooms, exits and offices must remain in a designated and defined safe passage area. This area must be defined to allow employees the most direct route through the garage area to the desired locations.

The following safety precautions shall be in place in all garages:

- Mechanics' work areas shall be defined by outlining each area with a 4" wide, red line.
- Safe passage areas, a minimum of 3 feet wide, shall be defined throughout the garage area with a 4" wide, yellow line.
- Employees traversing the garage area are required to remain within the yellow lines of the safe passage area. Once outside the safe passage area, employees are considered within the garage work area, and proper eye and safety footwear is required to be worn by all employees in this location.
- Only mechanics, supervisors, managers or employees assigned to assist the mechanics are permitted within the work areas.
- The garage weld shop or welding area is intended for the welder, their assistant, supervisors and managers. No employees will be permitted in the weld shop/area unless specifically granted permission by the Equipment Manager or Mechanic Supervisor.
- Signs shall be posted at each doorway or entrance to the garage indicating that proper eye protection is required outside the safe passage area in the garage.

As a result of this policy, it will be necessary to supply proper eye protection at each entrance to the garage area.

11-5 Garage Safety Inspection

Discussion:

Twice a year the Department requires garage safety inspections to identify potential material and equipment hazards. These are conducted by the district safety coordinator; however, more frequent inspections can be done, and these are encouraged. They can be performed by Supervisors, Safety Committee members and/or the Safety Coordinator. Individual employees can also inspect their own work areas, and they should do this daily.

Inspections can identify slip, trip hazards on walking/working surfaces; overhead dangers, moving equipment, chemical labeling and storage and general good housekeeping.

Inspections also verify the location of key information including emergency medical plan, hazard communications (SDS binder), fire extinguishers, fire evacuation signs and routes, eye wash stations and first aid kits.

Safety posters and communications, as well as Safety Committee meeting minutes, must be posted where employees can see them.

Finally, PPE including eye, ear, head and hand protection must be available and worn when required.

Remember:

Safety inspections are done for the safety of employees. However, a quick daily assessment, more in-depth weekly or monthly checks, and safety committee exercises can and should supplement the required semi-annual inspections.

Exercise:

Have each employee return to their work area and inspect for the items mentioned above and not any other hazards they may see. Follow-up with each employee for their findings and correct as necessary.

11-6 Garage Safety Standards

Mechanics are especially vulnerable to chemical exposure, equipment accidents and other workplace hazards, which is why we have workplace standards for garages. These standards are continually updated to keep up with changes in the industry. Failure to comply can result in accidents and injuries.

Right to Know

The standard violated most is the right to know standard, which addresses the use of potentially hazardous chemicals. It requires that employees be notified of the possible dangers of the chemicals they are using. It also requires detailed labeling of all chemicals, inventory lists of chemicals on site, training for employees in the safe use of chemicals, and a written plan that outlines how the workplace will enforce the right to know provision.

Protective Equipment

Adequate safety equipment must be supplied for the workers, for example, respirators to use when painting. The employer must also provide PPE ranging from goggles to noise reduction devices like earplugs and earmuffs.

Tools

All tools must be maintained in good condition so that they may be safely used, and employees should be informed of the proper use of all tools and possible hazards. Some of the larger, more standardized tools, such as the lift, must be inspected and serviced regularly. There are also standards for housekeeping and equipment storage.

Shop Space

The layout of the garage itself also must meet safety standards. The floor must be kept uncluttered and should provide easy access for walking. All spills should be cleaned up immediately, and tools and parts that are not being used should be put away. There are also broader regulations for the shop layout, such as standards for electrical wiring. Fire extinguishers and evacuation plans are also required.

The Department's semi-annual garage inspections address each of these standards, as well as others meant to keep employees safe at work. But inspection time should not be the only time standards are upheld. Make it a habit to check for good housekeeping, proper storage, use of PPE, chemical labeling and all other safety standards to protect yourself and others and make your workplace safe year-round.

11-7 General Garage Safety Tips

There is a lot to remember to remain safe in a garage area. By nature it is full of hazards. But if we follow the safety procedures, we can mitigate those hazards. These are just a few safety tips that will help you work safely every day:

- Allow the engine to cool before beginning work.
- Eye protection is required!
- No loose-fitting clothing or jewelry permitted while working on trucks and equipment.
- Set the parking brake, use wheel chocks and bed props.
- Know the locations of fire extinguishers, eye wash stations and first aid kits.
- No smoking permitted outside designated areas.
- Turn the equipment off and put the keys in YOUR pocket. This prevents anyone from starting the vehicle while you are working.
- Use proper ventilation always.
- Keep your hands clear of the cooling system and never remove the radiator cap while the system is hot.

11-8 Hydraulic Lift Safety

What are some general tips to know when operating an automotive lift?

- Know the load limits of your lift and adaptors. Do not overload. The rated capacity is displayed on the manufacturer's name plate.

- Position the vehicle so that the center of gravity is balanced on the lift according to the manufacturers' recommendations.
- Check overhead clearances before lifting. Watch for antennas, vehicle signs and attachments.
- Close the vehicle doors, hood, and trunk. Make sure no one is inside before raising the vehicle.
- Keep people at least 2m (6 ft) away from vehicle before lifting.
- Do a daily safety check of all components of the lift before using.
- Wear suitable personal protective equipment (PPE) when working under raised vehicles; e.g., goggles or face protection for protection from leaking fluids, rust, dust, etc. or a hard hat to prevent injuries from bumps or falling objects.
- Watch for objects that hang low when walking under a supported vehicle.
- How should I place the vehicle on the automotive lift?

Place the vehicle properly on lift using the following procedure:

- Put the transmission in neutral position, turn off ignition, close all car doors, and check for overhead obstructions such as radio aerials.
- Place adaptors or pads in the proper position under the recommended contact points.
- Check that the automatic chock devices on drive-on or runway lifts are in position before raising a vehicle. Ensure that permanent blocks are sufficient to stop a vehicle. As the lift is raised, watch the automatic chocks at the drive-on end of the lift runners to make sure they operate properly.
- Raise the lift until the vehicle's wheels are just off the floor (about 30 cm or 1 ft).
- Check again to ensure that contact pads and any adaptors are set accurately and that loads are not being placed on parts of the vehicle which might be damaged.
- Lower the vehicle and reposition the vehicle on the lift before continuing further if the contact with the vehicle is not even or if it looks as if the vehicle may slip.
- Do not bang or move the lift quickly at the top. Raise it slowly for the last 45 cm (about 1.5 feet). Banging the lift will stretch the seal bolts and allow oil to leak.
- Lock the lift with the mechanical locking device or use appropriate jack stands.
- Be aware of conditions that could cause the vehicle's center of gravity to shift and cause the vehicle to fall. For example, before lifting a vehicle, remove a load or cargo if it can shift unexpectedly, or follow the manufacturer's recommendations for removing heavy components like engines, axles, or universals. In addition, the removal or installation of parts may cause the center of gravity to shift and the vehicle to become unstable.

What should I do when lowering a vehicle on a hydraulic lift?

- Check that no tools, equipment, jacks or other obstructions are under the lift.
- Make sure that everyone is standing clear of the lift before it is lowered.
- Lower the vehicle slowly and smoothly and allow the lift to go as low as possible.
- Adjust lift arms or other supports, or remove chocks, as needed, so that the vehicle can be moved without bumping into any parts of the lift when the vehicle is driven away.
- Lower the vehicle to the floor before re-entering the area.

What should I avoid doing when operating a lift?

- Do not leave the controls unattended while the lift is in motion.
- Do not jam open the dead stick control.
- Do not raise only one end of the vehicle with the lift. The vehicle could fall and roll.
- Do not work on the vehicle while it is being raised or lowered.
- Do not stand directly in front of a vehicle being driven onto a rack or lift, or into a wash or lube bay.
- Do not rock a vehicle on a lift.
- Do not lower the lift to rest on supporting jacks. Extend the height of the jacks to support the weight of the vehicle.
- Do not use wooden blocks or homemade devices in place of proper lifting adaptors.
- Do not rely on hoisting equipment. Support equipment on blocks or stands designed to support the load.
- Do not lower the vehicle until all people, tools, and materials are clear from under lift.
- Do not try to stabilize a vehicle when it is in the air. Lower it immediately.

11-9 Maintain Your Tools Safely

Maintaining your hand and power tools can help you work more efficiently. Well-maintained, clean tools can also help prevent injury to yourself and others. Here are some tips to help you do both.

Maintaining Hand Tools - Clean tools after each use before you return them to storage. This is also an opportunity to look for any damage or defects. Check your tools' handles for splinters, breaks and cracks. Also, make sure that metal parts show no signs of corrosion or rust. Repair or replace any tools that show signs of damage.

Safety Alert: Don't use tools that need repair or replacement. Broken tools can cause injury.

Safety Alert: Don't use tools inappropriately; you risk injury to yourself, others and damage to the tools.

After cleaning, use an all-purpose oil, such as WD-40® to lubricate tools with adjustable parts. Lightly spray other metal tool parts as well (avoid getting oil on handles), such as screwdrivers and bladed lawn and garden tools. Wipe away any excess with a rag before storing. This will help fight corrosion and rust.

Safety Alert: You should wear heavy gloves when cleaning or removing rust from tools that can cut. Wear safety goggles when using a wire brush to remove rust.

A proper storage system is a must for hand tools. A toolbox, storage container, shelving unit, or a combination of all of these can be used to keep your tools protected and in peak condition.

This can also prevent pinching or crushing injuries caused by searching through piles of tools.

Maintaining Power Tools- Power tools such as electric drills, saws, and sanders need routine maintenance. Because of their mechanical and electrical parts, power tools are more susceptible to problems caused by poor maintenance, dust and debris accumulation and general malfunction.

Dust and grime can bring your power tools to a grinding halt if left unchecked over time. Wipe them clean with a rag after every job has been completed and then store them. Deep clean periodically by using a damp cloth. Get into exhausts and intakes and other hard-to-clean areas with lightly oiled cotton swabs or other slender tools.

Periodically inspect power tools for any signs of wear or damage. Pay special attention to power cords.

Safety Alert: If you see frayed insulation or exposed wires, have the cord repaired or replaced immediately. Damaged power cords can potentially lead to injury from electric shock or can cause a fire. Also, check the cord's prongs to see if they are bent or loose. If any are, repair or replace.

Safety Alert: Always unplug electric tools when cleaning them or making any repairs to avoid the danger of electric shock. It's also a good practice to unplug them when not in use.

11-10 Proper Use of Jacks

What are some safety tips to know when using a jack?

- Visually inspect the jack before each use.
- Use only jacks that are maintained in good operating condition.
- Place the jack securely on a dry, level, clean surface at right angles to the load.
- Position the jack at the jack point recommended by the vehicle manufacturer.
- Shift the vehicle with automatic transmission to park or to low gear, if it has a standard transmission, and apply the parking brake.
- Use chocks in front and back of the wheel that is on the diagonal from the wheel that will be raised (e.g., if jacking up the right, front wheel, use the chocks on the left, rear wheel).
- Do not overload a jack beyond its capacity. All lifts must be vertical.
- Do not position yourself where you could be pinned between the operating handle and the wall if the vehicle or jack moves accidentally.
- If working alone, always arrange to have someone check on you at pre-arranged, regular intervals.

- Place safety stands under the vehicle to support the vehicle if an employee must work under the vehicle.
- Ensure that the safety stands are in good condition and positioned properly and that the correct support pins are used in adjustable axle stands.
- Do not get under a vehicle that is supported by a jack only - always use suitable safety stands.
- Ensure jacks are inspected regularly by a qualified person according the manufacturers specifications.
- Ensure any defects are reported and the jack is taken out of service until a qualified person determines it safe for use again.

11-11 Tips for Using a Creeper

Anytime you decide that it's necessary to take your creeper and get underneath a vehicle, there's no getting around the fact that it's a dangerous task. So it's important to know how to use a creeper safely and how to minimize any risk when you're under a vehicle. Whether you're a novice or a master mechanic, read through these essential safety guidelines and protect yourself and your fellow mechanics from potential injury.

- Make sure the proper stands are in position in case of hoist failure or jack movement.
- Wear appropriate eye and head protection.
- Keep feet clear of other traffic.
- Use tool trays on sides of cart to transport hand tools rather than on your chest.
- Secure creepers in a wall rack when not in use.
- Do not leave creepers leaning against the wall where they could be a tripping or "skate board" hazard.

11-12 Welders PPE

Welders and others performing any type of torch cutting work perform an important mission for the department and need to stay safe while doing it. It can be very dangerous causing damage to your eyes, hearing, skin, head, back neck and your lungs. Because of these hazards, PennDOT and OSHA require welders and anyone doing torch work to wear specific PPE to protect themselves.

Eyes

Anyone doing ARC welding, gas welding or oxygen cutting, must wear eye protection. ARC welders must wear an insulated helmet that protects the eyes, face and neck from radiant energy. Gas welders and oxygen cutters must wear goggles.

If you are doing resistance welding or resistance brazing, you'll need to wear a transparent face shield or goggles, depending on the job.

Respiratory System

Welding fumes and gases can take a toll on your lungs if you've had prolonged exposure. Welding fumes contain harmful complex metal oxide compounds that adhere to your lungs and can cause long-term illness. You must weld where there is adequate ventilation, keep your head away from the fumes, or in some cases use an air purifying respirator. Respiratory protection is required in areas where there is not adequate ventilation.

Head, Neck and Back

It is important to keep your head covered while welding with a hard hat in the field or a regular hat in the garage. Sparks from the welding operation can land on your head causing burns to your skin and scalp and even ignite your hair.

Stay Safe

Remember, the idea is to not get hurt, so be sure to always wear a welder's apron or coveralls when performing any type of cutting or welding work to prevent thermal burns to your torso. It's also a good idea to wear gloves to prevent burns to your hands and of course long pants and long-sleeved shirts.

You also want to protect people that are near to you when welding. If you're in the garage, be sure to pull the flame proof screen prior to welding.

11-13 Working Safely With Corrosives

A corrosive substance is one that will damage or destroy other substances with which it comes into contact by means of a chemical reaction. PennDOT employees, especially those working in garages, may work with many types of corrosives including acetic acid, hydrochloric acid, phosphoric acid and sulfuric acid, just to name a few. It's important to keep the following information in mind when working around corrosives and refer to SDS sheets for further information and guidance to stay safe.

Know the Hazards:

- Eye Damage—Mists and splashes can cause irritation, scarring, or blindness.
- Skin Contact—Can cause dermatitis, burns, or eat away tissue.
- Ingestion—Can burn or destroy tissue in mouth, throat, esophagus, or stomach.
- Inhalation—Can cause bronchitis or lung damage.

Know the Safety Precautions to Follow:

- Read the Safety Data Sheet (SDS) before working with any corrosive.
- Store corrosives separately in properly labeled containers.
- Work in a properly ventilated area or use respiratory protection.
- Wear all required protective clothing, including eye, face, and body protection, gloves, and chemical-resistant footwear.

Know the Proper Action in Case of Exposure:

- Eye Contact—Rinse immediately for at least 15 minutes. Get medical help right away.
- Skin contact—Use the safety shower immediately. Seek medical treatment.
- Ingestion—Do not induce vomiting. Have the victim drink water to dilute the corrosive substance. Seek medical treatment.
- Inhalation—Evacuate the area. Seek medical treatment.

Know the Proper Emergency Response for a Leak or Spill:

- Read the SDS before handling corrosives.
- Know what substances will trigger a fire or explosion with the chemical you are using.
- Have specialized spill kits on hand.

11-14 Milling Machine Safety

Milling Machine Safety

- Safety glasses must be worn at all times in work areas.
- Long and loose hair must be contained.
- Proper footwear must be worn at all times in work areas.
- Close fitting/protective clothing must be worn.
- Rings and jewelry must not be worn.
- Gloves must not be worn when using this machine.

Pre Operational Safety Checks

1. Ensure no slip/trip hazards are present in workspaces and walkways.
2. Do not leave equipment on top of the machine.
3. Check that all machine guards are in position and operate properly.
4. Ensure cutter is in good condition and securely mounted.
5. Complete 614 and note any deficiencies.
6. Faulty equipment must not be used. Immediately report suspect machinery.

Operational Safety Checks

1. Keep clear of moving machine parts.
2. Never leave the machine running unattended.
3. Follow correct clamping procedures- keep overhangs as small as possible and check work piece is secure.
4. Set the correct speed to suit the cutter diameter, the depth of cut and the material.
5. Before adjusting or cleaning switch off and bring the machine to a complete standstill.

Housekeeping

1. Switch off the machine.
2. Remove milling cutters and store them safely.
3. Leave the machine and work area in a safe, clean and tidy state.

Potential Hazards

- Sharp cutters
- Moving components - hair/clothing entanglement
- Eye injury
- Skin irritation
- Metal splinters and burrs
- Flying debris

Section 12 - Heat Illness

- 12-1 Heat Illnesses (Heat Exhaustion and Heat Stroke)
- 12-2 Heat Exhaustion
- 12-3 Heat Illness Prevention
- 12-4 Heat Illness
- 12-5 Prevent Heat Related Illness with Red Cross Tips
- 12-6 Protecting Workers from Heat Stroke
- 12-7 Working in Hot Weather

12-1 Heat Illnesses (Heat Exhaustion and Heat Stroke)

In a hot environment, you may need to be prepared to deal with both heat and humidity. Not doing the right thing can lead to heat exhaustion, which can incapacitate you, or heat stroke, which is life threatening.

Who is affected? Workers exposed to hot and humid conditions are at risk of heat illness, especially those doing heavy work tasks or using bulky protective clothing and equipment. Some workers might be at greater risk than others if they have not built up a tolerance to hot conditions.

Heat Exhaustion: This is more common than heat stroke and often occurs when people work, play, or exercise in hot, humid weather. Body fluids are lost through sweating, causing the body to overheat. The person's temperature may be elevated, but not above 104°F. Symptoms of heat exhaustion include: heavy sweating, paleness, muscle cramps, tiredness, weakness, dizziness, headache, nausea or vomiting and fainting. Basic treatment is to help the victim to cool off by taking them to a shaded area and have them slowly hydrate themselves with water as they rest. Always document this and seek medical attention if symptoms worsen or last longer than one hour.

Heat Stroke: If heat exhaustion is untreated, it may progress to heat stroke, which is a medical emergency. Heat stroke occurs when a person's cooling system, which is controlled by the brain, stops working and the internal body temperature rises to the point where brain damage or damage to other internal organs may result. Symptoms of heat stroke include: unconscious or markedly abnormal mental status (dizziness, confusion, hallucinations or coma), flushed, hot and dry skin (although it may be moist initially from previous sweating or from attempts to cool the person with water), hyperventilating and body (core) temperature of 105°F or more. If heat stroke is suspected, emergency medical services should be contacted immediately so that the person can be transported to a hospital. While waiting for emergency medical services to arrive, and if the person is conscious, move the person to a cooler environment and use lukewarm water to moisten the skin.

How can heat illness be prevented? Working outside as the summer grows hotter can help build up a tolerance to the heat and allow you to become acclimated to it and gradually increasing workloads can build up tolerance to heavy exertion. Regardless, one should remember three simple words: **water, rest, shade.**

- Drink plenty of water to ensure you are properly hydrated. Avoid caffeinated drinks, alcohol or large amounts of sugar.
- Take the necessary amount of breaks (preferably in a shaded area).
- When working in the sun, use sunscreen with a sun protection factor (SPF) of at least 15, which blocks 93 percent of harmful ultraviolet (UV) rays.

12-2 Heat Exhaustion

When you work outside all summer, you know that unless you drink lots of water and wear light clothing you run the risk of suffering from heat exhaustion or worse, heat stroke. Even the most seasoned worker can fall prey to the heat and sun.

How to keep yourself safe

- Drink lots of water – it's advisable to drink two 16 oz bottles every hour.
- Avoid drinking alcohol (even the night before) and caffeinated products. Alcohol and caffeine dehydrate the body.
- Avoid drinking ICE water. Ice water can cause cramping and the absorption rate of ice water is slower than cool water.
- Wear light, loose clothing.
- Seek medical attention if not feeling well.

How to Recognize Heat Exhaustion

- You feel dazed, you begin to stagger or you feel dizzy.
- You have a feeling of nausea or you begin vomiting, your face looks pale and you get a case of the chills.
- You pass out or faint, you have a weak pulse.

What to do if Someone is Suffering from Heat Exhaustion

- Call 911 immediately.
- Get the patient to a cool area – preferably an air-conditioned vehicle or into the shade.

- Loosen the patients clothing.
- Cool the patient down with cool (not ice) water.
- Use cool compresses on the head and chest area.

Heat exhaustion and heat stroke are life threatening situations. Do not take chances, if you feel ill after being in the sun or the extreme heat, take a break. Get out of the sun or heat, drink cool water or an electrolyte drink.

12-3 Heat Illness Prevention

PennDOT employees are subjected to a variety of climates with many jobs requiring them to spend most of their day outdoors, exposed to the elements. With summer here, employees need to remain mindful of rising temperatures. Taking preventative steps to stay hydrated and keep body temperatures regulated will reduce the risk of heat related illnesses which can be incapacitating and life-threatening.

Who is at risk?

Many factors, including outdoor temperatures, time of day, level of exertion and physical limitations all contribute to heat-related illness. Additional factors to consider include employee's tolerance to heat, personal health and age.

How can heat illness be prevented?

As temperatures rise, the body releases heat more slowly. As humidity increases, sweat evaporation decreases making the body's cooling process much more difficult. Heat illnesses are preventable but often the effects of overheating are not anticipated – or recognized. Regardless, remember three simple words: water, rest and shade.

Before you or your coworkers head outdoors: Check the weather and plan accordingly if high temperatures are forecast.

- Always use sunscreen, even if it's not overly hot outside.
- Begin the shift fully hydrated and drink water every 15 minutes.
- Avoid caffeine and alcohol.
- Wear lightweight clothing and a hat with a brim.
- Take frequent breaks, as needed and preferably in a shaded or air-conditioned area.
- Watch for the signs of heat illness and report heat symptoms early.



Heat Safety Tool

The U.S. Department of Labor (DOL), Occupational Safety and Health Administration (OSHA), the Centers for Disease Control and Prevention (CDC) and the National Institute for Occupational Safety and Health (NIOSH) have developed a cell phone application that allows foremen and supervisors to calculate the heat index and based on the heat index, display a risk level to outdoor employees. Once the risk level is displayed, with a simple click, the app reminds you about protective measures that should be taken and implemented to prevent heat illness.

Heat Index	Risk Level	Protective Measures
Less than 91°F	Lower (Caution)	Basic heat safety and planning
91°F to 103°F	Moderate	Implement precautions and heighten awareness
103°F to 115°F	High	Additional precautions to protect workers
Greater than 115°F	Very High to Extreme	Triggers even more aggressive protective measures

References:

<https://www.nsc.org/> - Content
<https://www.osha.gov> – Content <https://www.cdc.gov/disasters/extremeheat/index.html> – Content
<http://www.dli.pa.gov/Businesses/Compensation/WC/safety/paths/resources/Pages/Safety-PowerPoints.aspx> - Pictures

12-4 Heat Illness

Finally, summer is here! So is the heat and hot weather! Let's talk about how we are going to protect ourselves against the hazards of heat and humidity. If we neglect to take preventative steps to keep our bodies hydrated and body temperatures regulated, we run the risk of overheating. When our bodies start to overheat, heat illnesses set in that can be incapacitating and life-threatening rather quickly.

We can estimate the health risk we might encounter on a given day by referring to the NOAA's National Weather Service Heat & Humidity Index Chart.

Who is at Risk?

Anyone exposed to hot and humid conditions is at risk of heat illness, especially those doing heavy work tasks or using bulky protective clothing and equipment. **New workers, temporary workers, or those returning to work after a week or more off** who have not built up a tolerance to hot conditions might be at a greater risk than others. All workers are at risk during a heat wave.

How can heat illness be prevented?

Working outside as the summer grows hotter can help you build up a tolerance to the heat and allow you to become acclimated to it. Gradually increasing workloads can build up tolerance to heavy exertion. Working in full sunlight can increase heat index values by 15°F. Keep this in mind and plan additional precautions for working in these conditions. Regardless, remember three simple words: **water, rest, shade.**

What are the common precautions and preventative measures against Heat Illness?

- 1) Drink water frequently, and avoid caffeinated drinks, alcohol, and large amounts of sugar.
- 2) Wear a light-weight, light-colored shirt made of cotton, cotton-blend, or other moisture wicking materials.
- 3) When working in the sun, use sunscreen with a sun protection factor (SPF) of at least 15, which blocks 93 percent of harmful ultraviolet (UV) rays.
- 4) Take more frequent breaks, as needed, and preferably in a shaded area.
- 5) Remember and watch for the signs of heat illness, and report heat symptoms early.
- 6) Know what to do in an emergency.

Common Heat Illnesses – Symptoms and Treatment

1. **Heat Rash** occurs when sweat does not evaporate and gets trapped beneath the skin, causing the skin to become inflamed. A cluster of red bumps develops in skin folds and/or where clothing causes friction on skin, often on the neck, and/or upper chest area. Heat rash is the most common problem in hot work environments. Heat rash usually heals once the skin has cooled.
2. **Heat Cramps** are painful, involuntary muscle spasms that usually occur during heavy work in hot environments, and may be more intense and prolonged than a typical nighttime leg cramp. Loss of fluids and electrolytes in the body contributes to the heat cramps. Muscles most often affected include the calves, arms, abdominal wall, and back; although heat cramps may involve any muscle. If you suspect heat cramps, rest briefly and cool down. Drink clear juice or electrolyte-containing sports drinks. Practice gentle, range-of-motion stretching and gentle massage of the affected muscle group. If the cramps do not go away within an hour, seek medical attention.
3. **Heat Exhaustion** occurs when the body begins to overheat due to loss of water and salt from heavy sweating. Heat exhaustion is more common than heat stroke and often occurs when people engage in strenuous physical activity in hot, humid weather. Symptoms include heavy sweating, rapid breathing, a fast pulse, muscle cramps, nausea or vomiting, weakness, headache, and dizziness. A person's temperature may be elevated, but not above 104°F. Without prompt treatment, heat exhaustion can lead to heat stroke. Help the victim to cool off by taking him or her to a shaded area and having the person slowly hydrate with water and rest. Seek medical treatment if symptoms worsen or last longer than one hour.



Heat Exhaustion Symptoms

4. **Heat Stroke** is a life-threatening illness that can occur if the body temperature rises above 104°F. The symptoms are similar to heat exhaustion but may also include flushed skin, altered mental state or behavior (confusion, agitation, slurred speech, irritability, and/or delirium), seizures, and/or loss of consciousness. This condition needs immediate medical attention! If heat stroke is suspected, emergency medical services should be contacted immediately so that the person can be transported to a hospital. While waiting for emergency medical services to arrive, cool the person however possible: move the victim to shade or indoors, remove excess clothing, fan the person, apply cool water to the skin, or place ice packs or cold, wet towels on the person's head, neck, and armpits.

Heat Stroke Symptoms



Red, Hot, Dry Skin

High Temperature

Confusion



Convulsion

Fainting

What to do if an employee becomes ill?

- 1) Notify a supervisor immediately. For heat stroke symptoms, call 911.
- 2) Move the person to a cooler environment and apply cool water to the skin.
- 3) Have someone stay with the worker until help arrives.

12-5 Prevent Heat Related Illness and Injury with Red Cross Tips

Know How to Recognize and Treat the Signs

Everyone is at risk when temperatures rise above 90 degrees.

Heat-related illnesses can cause serious injury and even death if untreated. Signs of heat-related illnesses include nausea, dizziness, flushed or pale skin, heavy sweating and headaches. Victims of heat-related illness should be moved to a cool place, given cool water to drink and ice packs or cool wet cloths should be applied to the skin. If a victim refuses water, vomits, or loses consciousness, call 911 or the local emergency number immediately.

The American Red Cross offers the following tips for staying cool and safe:

Dress for the heat. Wear lightweight, light-colored clothing. Light colors will reflect away some of the sun's energy. It is also a good idea to wear hats or to use an umbrella.

Drink water. Carry water or juice with you and drink continuously even if you do not feel thirsty. Avoid alcohol and caffeine, which dehydrate the body. Avoid using salt tablets unless directed to do so by a physician.

Eat small meals and eat more often. Avoid high-protein foods, which increase metabolic heat.

Slow down. Avoid strenuous activity. If you must do strenuous activity, do it during the coolest part of the day, which is usually in the morning between 4 and 7 a.m.

Stay indoors when possible. If air-conditioning is not available, stay on the lowest floor out of the sunshine. Remember that electric fans do not cool, they simply circulate the air.

Know What These Heat-Related Terms Mean:

Heat cramps: Heat cramps are muscular pains and spasms due to heavy exertion. Although heat cramps are the least severe, they are an early signal that the body is having trouble with the heat.

Heat exhaustion: Heat exhaustion typically occurs when people exercise heavily or work in a hot, humid place where body fluids are lost through heavy sweating. Blood flow to the skin increases, causing blood flow to decrease to the vital organs. This results in a form of mild shock. If not treated, the victim may suffer heat stroke. Signals of heat exhaustion include cool, moist, pale flushed or red skin; heavy sweating; headache; nausea or vomiting; dizziness; and exhaustion. Body temperature will be near normal.

Heat stroke: Also known as sunstroke, heat stroke is life-threatening. The victim's temperature control system, which produces sweating to cool the body, stops working. The body temperature can rise so high that brain damage and death may result if the body is not cooled quickly. Signals include hot, red and dry skin; changes in consciousness; rapid, weak pulse; and rapid, shallow breathing. Body temperature can be very high—sometimes as high as 105 F.

General Care for Heat Emergencies:

Heat cramps or heat exhaustion: Get the person to a cooler place and have him or her rest in a comfortable position. If the person is fully awake and alert, give half a glass of cool water every 15 minutes. Do not let him or her drink too quickly. Do not give liquids that contain alcohol or caffeine. Remove or loosen tight clothing and apply cool, wet cloths, such as towels or sheets. Call 911 or the local emergency number if the person refuses water, vomits or loses consciousness.

Heat stroke: Heat stroke is a life-threatening situation! Help is needed fast. Call 911 or your local emergency number. Move the person to a cooler place. Quickly cool the body. Immerse victim in a cool bath or wrap wet sheets around the body and fan it. Watch for signals of breathing problems. Keep the person lying down and continue to cool the body any way you can. If the victim refuses water or is vomiting or there are changes in the level of consciousness, do not give anything to eat or drink.

12-6 Protecting Workers from Heat Stroke

Heat Illness

Exposure to heat for an extended period of time can cause illness and some cases death. The most serious heat illness is heat stroke. Heat stroke is the last and worst heat illness. Heat problems leading to heat stroke include, heat exhaustion, heat cramps and heat rash. If these symptoms begin to appear, get out of the heat immediately and start drinking water.

Heat Illness Causes

- Dehydration – low liquid intake
- Heavy physical labor
- High temperature and humidity, direct sun exposure, no breeze or wind
- No recent exposure to hot temperatures
- Waterproof clothing

Symptoms of Heat Exhaustion

- Headache, dizziness or fainting
- Weakness and wet skin
- Irritability or confusion
- Thirst, nausea or vomiting

Symptoms of a Heat Stroke

- May stop sweating
- May be confused, unable to think clearly, pass out, collapse or have seizures

To Prevent Heat Illness

- Establish a complete heat illness prevention program.
- Provide training about the hazards leading to heat stress and how to prevent them.
- Provide a lot of cool water to workers close to the work area. At least one pint of water per hour is needed.
- Modify work schedules and arrange frequent rest periods with water breaks in shaded or air-conditioned areas.
- Gradually increase workloads and allow more frequent breaks for workers new to the heat or those that have been away from work to adapt to working in the heat (acclimatization).
- Designate a responsible person to monitor conditions and protect workers who are at risk of heat stress.
- Consider protective clothing that provides cooling.

How to Protect Yourself and Your Co-workers

- Know signs/symptoms of heat illnesses; monitor yourself; use a buddy system.
- Block out direct sun and other heat sources.
- Drink plenty of fluids. Drink often and BEFORE you are thirsty. Drink water every 15 minutes.
- Avoid beverages containing alcohol or caffeine.
- Wear lightweight, light colored, loose- fitting clothes.

What do you do When a Worker has a Heat Illness?

- Call a supervisor for help. If the supervisor is not available, call 911.
- Have someone stay with the worker until help arrives.
- Move the worker to a cooler/shaded area.
- Remove outer clothing.
- Fan and mist the worker with water; apply ice (ice bags or ice towels).
- Provide cool drinking water, if able to drink.

IF A WORKER IS NOT ALERT OR SEEMS CONFUSED, THIS COULD BE HEAT STROKE! CALL 911 IMMEDIATELY AND APPLY COOL COMPRESSES TO THE HEAD AND NECK.

12-7 Working in Hot Weather

Working outside in the summertime heat can be dangerous. Heat exhaustion and heat stroke happen when the body's core temperature has risen to 104 degrees or higher. Heat exhaustion is always the pre-cursor to heat stroke. If heat exhaustion isn't addressed, heat stroke will most certainly follow. The good news is that both heat related illnesses are preventable by following just a few simple steps.

Symptoms

Let's take a look at the symptoms of heat exhaustion.

- Weakness
- Clammy Skin
- Headache
- Feeling Dizzy
- Nausea or Vomiting

Once you begin feeling these symptoms, Heat Stroke is not far away if you don't take action to reduce your temperature quickly.

Heat Stroke

- Confusion
- Fainting
- You stop sweating – skin turns hot and dry.
- Convulsions or seizures

What can you do?

Once you start to show the symptoms there are only a few things you can do.

- Get out of the heat – find an air-conditioned vehicle or shade.
- Start pushing water into your system.
- Put cool cloths on your forehead and neck.
- Call 911.

Prevention

The best way to not experience heat exhaustion or heat stroke is by planning.

- **Drink Water:** If you know you'll be working in the heat for an extended time, start hydrating the night before. You should increase your water intake and drink cool water every 15 minutes when working in hot temperatures. You should drink about 4 cups an hour or two 16 oz. bottles.
- **Wear light colored, loose fitting clothing.** When you're wearing PPE that is heavy like those worn for seal-coating operations, you'll need to take more frequent breaks and drink more water.
- **Avoid alcohol and caffeine,** these types of drinks cause your body to dehydrate.

If you see a co-worker exhibiting signs of a heat illness, call 911 immediately. Get them out of the hot weather and into a cool, air-conditioned vehicle or under a shady tree. Make sure they start drinking cool water as soon as possible.

Section 13 - Hot Oil - Asphalt

- 13-1 Crack and Joint Sealing
- 13-2 Crack Sealing Hazards
- 13-3 CRAFCO Safety
- 13-4 Safety with Hot Liquid Asphalt
- 13-5 Personal Fire Safety
- 13-6 CRAFCO Emergency

13-1 Crack and Joint Sealing

Crack and joint sealing is a dangerous operation. If you are either the wand, squeegee, loading, compressed air-gun operator, or an employee operating the tar kettle, there are numerous hazards to be aware of during this operation. These hazards include:

- Heat exhaustion
- Hearing loss
- Struck-by debris/traffic
- Strains/sprains
- Crushing injuries
- Flying debris
- Foreign objects in eyes
- Ergonomic concerns
- Slips, trips or falls
- Burns/thermal injuries

Employees in the following roles are required to wear the appropriate personal protective equipment (PPE) to control hazards and prevent injuries:

Wand operator(s) – Hard hat with full face shield attached, flame-resistant hood (optional), loose-fitting coveralls or welder's apron (optional), long-sleeved shirt, long pants, high-visibility vest and leather gloves with gauntlets.

Squeegee operator(s) – Hard hat with full face shield attached, long-sleeved shirt, long pants, high-visibility vest and leather gloves with gauntlets.

Loading operator(s) for machines requiring manual loading – Hard hat with full face shield attached, flame-resistant hood, loose-fitting coveralls or welder's apron, long-sleeved shirt, long pants, high-visibility vest and leather gloves with gauntlets.

Compressed air-gun operator(s) – Hard hat, goggles and high-visibility vest.

Employee(s) operating the tar kettle – Hard hat with full face shield attached, flame-resistant hood, loose-fitting coveralls or welder's apron, long-sleeved shirt, long pants, high-visibility vest and leather gloves with gauntlets.

Things to Remember

Safety:

- A high-visibility vest is not required if an employee is wearing coveralls that meet the ANSI standards for class 2 visibility and reflectivity.
- Employees wearing coveralls or a welder's apron that does not meet the ANSI standard shall wear a high-visibility vest over the coveralls or welder's apron.

First Aid:

- The National Asphalt Pavement Association suggests applying cold water, not ice, to a burned area. Do not remove the asphalt from the burn victim; let medical professionals do it.

Additional information can be found in PUB-445M Manual for Employee Safety & Health.

13-2 Crack Sealing Hazards

As roadways age and budgets shrink, the Department will continue adding SR numbers to their ever-increasing amount of crack sealing operations. Crack sealing is a way to strengthen and lengthen the life of a roadway, but it doesn't come without its hazards.

Some of these include but are not limited to heat exhaustion, hearing loss, struck-by debris or traffic, sprains and strains, crushing injuries, foreign objects in eyes, hand fatigue, slip, trip or fall injuries and burns, including thermal burns.

To lessen the probability of these potential hazards, the following actions and procedures are recommended:

- Hydrate frequently especially before the start of the job!
- Wear hearing protection, i.e. ear plugs or earmuffs.
- Wear safety glasses, a face shield is not enough!

- Inspect all equipment, hoses and tools prior to use.
- Use proper lifting techniques.
- When handling tools or materials, maintain a firm grip with both hands and keep close to your center of gravity.
- Use a spotter to avoid striking a co-worker with a piece of equipment.
- Never use compressed air to clean clothing or point the nozzle at yourself or others.
- Wear leather work boots with good tread.
- Know your surroundings.
- The person operating the compressed air nozzle must wear dust-goggles.
- Keep body inside of the work zone area.
- When possible, stretch hands outward to maintain blood flow and reduce cramping.
- Rotate workers as needed (to avoid thermal injuries, heat exhaustion, overexertion, etc.).
- Keep your back as straight as possible while applying material.
- When applying material, employees, at a minimum, must wear leather, heat resistant gauntlets, thermal hood, welding apron or coveralls, long sleeves, safety glasses or goggles and face shield.
- When operating squeegee employees, at a minimum, must wear leather, heat resistant gauntlets, safety glasses or goggles, face shield, and long sleeves.

As per Pub 445 (PennDOT's Safety Policy Handbook), Pub 445M (Manual on Employee Safety and Health) and Pub 517 (PennDOT Job Safety Analysis Manual), the following PPE must be used and worn during Crack Sealing Operations:

- Hard hat
- ANSI Class 2 vest
- Heat resistant leather gauntlets,
- Hearing protection (if decibel level exceeds 85)
- Safety glasses
- Face shield
- Dust goggles
- Nomex hood
- Welder's apron or coveralls (loose fitting and rated to protect against thermal burns)
- Long-sleeved shirt

*The duties you're performing dictates how many of these PPE items you must wear.

13-3 Crafc0 Safety

When the snow finally melts in the spring until the last leaves are falling in the fall, you can always count on one thing, you're going to be doing a crack sealing operation.

Crack Sealing has become a way of life at PennDOT. Pavement preservation is a must for Pennsylvania roadways and crack sealing is a cost-effective way to extend the life of the pavement and reduce potholes during the freeze thaw cycle.

Crack sealing brings with it a host of hazards that can be eliminated if operators follow the safety rules.

PPE

Operators working on the road during a crack-sealing operation will need to wear some specific PPE depending on the job they're doing. For instance:

- Wand Operators must wear a hard hat with a full-face shield, a thermal hood (optional), loose-fitting coveralls or a welder's apron (optional), long-sleeved shirt, long pants and leather gloves with gauntlets.
- Squeegee Operators must wear a hard hat with a full-face shield, long sleeved shirt, long pants, and leather gloves with gauntlets.

- The loading operator (for machine requiring manual loading only), must wear a hard hat with full face shield, thermal hood, loose fitting coveralls or welders' apron, long sleeved shirt, long pants, and leather gloves with gauntlets.
- Compressed air gun operators must wear goggles.

You might think that all this PPE is an overkill. That thought is quite possibly true, but if anything were to happen and hot oil was spreading or splashing your way, you'll be happy you had your PPE on.

Additional safety items to have close by

- Fire extinguisher – The CRAFCO Company recommends having a 10-pound ABC or Co2 type fire extinguisher available for any fire that might occur. Before every use of your CRAFCO Machine, make sure that fire extinguisher can be removed from the machine. If the fire extinguisher is glued to the machine with material, work to get it free. Have another fire extinguisher close by to use a back-up.
- First aid kit – Make sure you know where your first aid kit is and that all the materials in it are up to date.
- Burn Packs – make sure you have an adequate number of burn packs available if one or more members of your crew were injured.
- Cool water. Make sure you have a cooler full of cool water. The best way to treat a hot asphalt/hot oil thermal burn is to fully immerse the burn area in cool water. This water is not for drinking but should be changed daily.

Learn to be safe

- Study and know the operator's manual. Learn and understand your machine's operating and maintenance characteristics, capacities and limitations.
- Learn the location and function of all controls, indicators and warning devices especially the emergency shut-off button.
- Be familiar with safety devices and instructions on your machine.
- Learn to recognize the machine's warning and safety signals. They will alert you to conditions that may make it hazardous to continue operation.
- Carefully read and follow all safety signs and instructions on the machine.
- Keep all safety and warning signs on your machine in good condition. If a warning or safety sign is damaged in any way – report it to your foreman and garage to be replaced.

13-4 Safety with Hot Liquid Asphalt

For properly maintained roads, streets, and highways hot liquid asphalt material must be applied at one point or another. Although methods will vary the procedures for applying have one thing in common: the asphalt must be heated to the prescribed temperature to perform well. Because transferring heating and applying these produces can be dangerous caution and awareness of safety must be kept foremost in an applicator's mind.

Most applications of hot liquid asphalts involve either distributor trucks or crack-seal machines. Safety tips for both will be covered in this tech sheer. Keep in mind that your greatest allies when it comes to ensuring safety are a deliberate approach to operating the equipment and an awareness of what those around you are doing.

Employee Safety

The high temperatures at which asphalt products must be applied demand that equipment operators and crew members wear personal protective equipment (PPE).

Distributor Operators

The driver of a distributor truck is unlikely to come in contact with hot asphalt during the application process when he is seared safely behind the wheel. However, a driver faces a greater risk to be burned when refilling the truck or unclogging plugged nozzles. At a minimum, the driver should wear a hardhat, face shield, leather gloves, and a long-sleeved shirt. During crack-sealing operations, the operator of the wand, squeegee and loading operators, and anyone else working near the hot asphalt should wear the PPE as outlined in the following chart.

Operators must observe all caution and warning signs and placards on the equipment. The warnings are there for a reason: to keep you from getting burned. Know both the application and safe heating temperatures for all the products you're using. Overheating asphalt products will not only destroy their desirable properties, but the results can be extremely hazardous.

Weld Operators: These employees must wear a hard hat with full face shield attached, thermal hood (optional), loose fitting coveralls or welder's apron (optional), long sleeved shirt, long pants and leather gloves with gauntlets.

Squeegee Operators: Employees operating a squeegee must wear a hard hat with a full face shield attached, long sleeved shirt, long pants, and leather gloves with gauntlets.

Loading Operator: Employees loading material into a machine requiring manual loading ONLY, must wear a hard hat with full face shield attached, a thermal hood, loose fitting coveralls or welder's apron, long sleeved shirt, long pants and leather gloves with gauntlets.

Compressed Air Gun: Any employee operating the compressed air gun, removing dirt from the cracks must wear goggles.

Material Safety

Identify the safe heating temperature range and Flash point of the materials. safe heating temperature is the temperature range in which the material can be properly applied to the roadway. Flash point is the temperature at which the material will ignite if oxygen and an ignition source are present. The Flash point of a given material is determined by performing a test, called the Cleveland Open Cup method, in which the material is heated to the temperature at which it will produce a Flash when an ignition source is passed over it. Material safe heating temperatures and Flash points can be found on the SDS form that a company includes with the materials shipped from the manufacturer. Additionally, this information is printed on the boxes the material is shipped in. Avoid allowing any water to enter the machines and equipment. Water will expand rapidly once in contact with hot asphalt products and can cause the products to overflow and spill onto the workers. Spills are not only a burn hazard to workers, but a potential source for fire or explosion.

Equipment Safety

Read and fully understand the operator's manuals before operating any equipment that carries, heats, or dispenses liquid asphalt. Keep copies of the manuals on the jobsite for reference. The operator's manual provides valuable information for the safe operation of equipment, as well as for its proper startup, shutdown, and routine maintenance.

Never substitute "after-market" parts for original equipment manufactured parts without first consulting the manufacturer. Going to the local auto parts store for rubber hoses for the crack-seal machine could be a costly and dangerous practice. Not all rubber hoses are compatible with the unique ingredients or high application temperatures of some asphalt material. A rupture of a hose under pressure of hot asphalt is hazardous to the operator and to anyone near or passing by the equipment.

Know the proper procedure for adding more material to the equipment. Before opening access lids, determine whether circulation pumps should be on or not, burners and engines should be shut down, and auger systems should be turned off. These and more are important to safe operation. Keep a fully charged fire extinguisher rated for burning oil readily available at the worksite.



Safety Around Distributor Trucks

Always verify the type of material in the truck and the type of material added to the truck. Mixing oils will not initially result in an explosion or fire, but the two oils will congeal (glob together) into one large, sticky mess and will not spray out of the nozzles. If the operator then heats the material to get it to spray, a fire or explosion could result from overheating.

13-5 Personal Fire Safety

Accidental fire in the workplace are uncommon but can happen especially when working with hot liquid asphalt or other types of hot oils. To prevent a fire from starting and from being burned yourself, follow these safety rules.

- Dispense flammable liquids only in designated areas that are free from flames and sparks or other sources of ignition (including lit cigarettes).
- Keep all containers of flammable liquids closed or covered when not in use, and return them to their designated storage area when you're finished using them.
- Store oily rags in closed airtight containers. Remember, oil can catch fire quickly.

- Be sure to ground all flammable materials to prevent the possibility of static electricity buildup which could lead to an explosion.
- Know where the fire extinguisher is and know how to use it. If you're using a tar kettle, make sure the fire extinguisher is free of tar and be easily removed from the kettle.
- Never clean your clothing with gasoline, solvents or other flammable agents. A spark can ignite your clothing and cause serious injury.

If your clothing catches fire, STOP, DROP AND ROLL. Never run if you're on fire. Try to extinguish or smother the fire.

13-6 CRAFCO Emergency

Burn Scenario:

A crew was crack-sealing. Everyone had the proper PPE on. The wand operator noticed a bulge in the hose to the wand and before he was able to say anything, the hose popped. Heated Crafc material splattered on his apron and onto the squeegee operator's shoulder.

What do you do?

1. Find and push the Emergency Shut-Off Button. (All CRAFCO personnel should be trained on where the Emergency Shut-Off button is and how to use it).
2. Stop all work activity.
3. Call 911 and begin first aid treatment.
 - a. Tell EMS the severity of the injury.
4. Shut down the roadway.
5. Keep calm and begin to assign personnel to first aid, flagging, etc.

First aid – Fire procedures

All personnel should be trained and familiar with all safety and first aid equipment.

1. Treat the burn area with cool water (NOT ICE WATER) and compresses. (t-shirts, clean rags will work).
2. Change compresses every couple of minutes.
3. DO NOT peel the CRAFCO material from the skin. This will cause infection and a great deal of damage.
4. Treat the burn victim for shock.
 - a. Elevate head and feet and try to keep this person calm.
5. Try to get the burn victim to lie down. (on the ground, in the back of a crew cab).
6. Do not allow the burn victim to walk around and cause a secondary incident.
7. Relay to the EMS personnel your exact coordinates and allow them to determine if there is enough room for a landing zone.
8. If you are in a remote area – ask them if you can meet the ambulance.

Section 14 – Housekeeping and Storage

- 14-1 Good Storage Practices
- 14-2 Housekeeping for Safety
- 14-3 Tips for Effective Workplace Housekeeping
- 14-4 Housekeeping
- 14-5 Material Handling
- 14-6 Material Storage
- 14-7 Moving, Handling and Storing Materials
- 14-8 Proper Material Storage
- 14-9 Good Housekeeping in Garage Areas
- 14-10 Proper Maintenance of Department Property

14-1 Good Storage Practices

We spend nearly as much time at work as we spend at home, so why not make it nice? When you have clutter at work it can lead to objects falling on co-workers, poor visibility and could even create a fire hazard. It is important to store materials in proper storage areas. Stockrooms for example are organized and designed for material storage, however, to save time some workers will store a ream of paper below their desk or pour cleaning solution into an unlabeled bottle for their personal use.

Here are some examples of good storage practices:

- If you must store boxes at your desk, make sure they are stored away from any travel path.
- Never store boxes on top of file cabinets or on top of heating units.
- Never put heavy items on top of file cabinets.
- Always stack material so it will not fall over.
- Always try to store materials inside file cabinets or on shelving units.
- Office equipment such as computers, monitors, index files, lights or calculators should not be placed on the edges of a desk, filing cabinet or table.
- Aisles, corners and passageways must remain unobstructed. There should be no stacking of materials in these areas.
- Storage areas should be designated and used only for that purpose.
- Store heavy items so you do not have to reach across something to retrieve them.
- Fire equipment, fire extinguishers, fire doors and exits and sprinkler heads should remain unobstructed, Do not place anything in front or around these items. Materials should be a minimum of 18 inches away from sprinkler heads.
- Do not place materials in front of electrical circuit breaker boxes.

14-2 Housekeeping for Safety

Most of you probably have house cleaning responsibilities at home. For some of you, it's a weekly chore. Whatever the case may be, you'll agree that good housekeeping practices are important at home. However, we sometimes overlook good housekeeping on the job. The orderly arrangement of work areas is vital to the safety of all workers, whether they are involved with machines and tools or appliances and furniture.

Approximately 6,000 persons are killed on the job annually in the United States. Seventeen percent of these are caused by falls, many resulting from poor housekeeping: tripping over loose articles such as tools left in aisle ways and work areas, wet spots on the floor, or trash and other articles left in stairways.

During periods of rain and snow, you know what happens when you and the kids track water into the house. Tracked-in water is a serious problem at work, too. Wet spots cause slips and falls. They must be cleaned up immediately, regardless of who was responsible for it being there.

At home, family members are expected to throw trash in the waste basket and not on the floor. We have plenty trash receptacles at work, so there is no excuse for waste paper, soda cans, or other materials being thrown on the floor.

We ask our children to keep their belongings stored neatly. The same is true for work; keep tools and equipment off the floor and stored in the proper places. This not only reduces tripping hazards but protects Department equipment.

Did you ever go to your closet at home to get your golf clubs and have to pull them out from under other articles? Things start falling all over, and it's a mess. The same principles apply when storing materials or equipment on the job. Take time to make the piles neat. It's unsafe to stack them too high and, if possible, it's best to keep them away from other equipment or articles that are used often.

Let's face it. It is a lot easier to do your job when everyone practices good housekeeping. When each of us keeps his or her own area in order, we make a safer workplace for everyone. So remember, "Good housekeeping is an everyday experience."

14-3 Tips for Effective Workplace Housekeeping

According to OSHA, good housekeeping implies that a workplace is kept in an organized, uncluttered and hazard-free condition. Safe work environments lead to healthier workers, higher worker morale and increased productivity. Some basic tips include:

Prevent slips, trips and falls

- Report and clean up spills and leaks.
- Keep aisles and exits clear of items.
- Consider installing mirrors and warning signs to help with blind spots.
- Replace worn, ripped or damaged flooring.
- Eliminate slippery conditions, such as snow, ice, oil and grease from walkways and working surfaces as necessary.

Eliminate fire hazards

- Keep combustible materials in the work area only in amounts needed for the job.
- Store quick-burning, flammable materials in designated locations away from ignition sources.
- Avoid contaminating clothes with flammable liquids.
- Keep passageways and fire doors free of obstructions.
- Hazards in electrical areas should be reported, and work orders should be issued to fix them.

Prevent falling objects

- Shut file cabinet drawers when not in use and open one filing cabinet drawer at a time to prevent a tip-over.
- Store heavy objects close to the floor and out of walkways.
- Store tools, equipment and materials properly to prevent falling or sharp edges being exposed.

Clear clutter

- Tidy up desks or workstations.
- Return tools and other materials to storage after using them.
- Dispose of materials that are no longer needed.
- Keep aisles, stairways, emergency exits and doors clear of clutter.
- Ensure all cords are properly secured and covered.
- Make sure cups, glasses and containers have lids on them to prevent spills.

Information courtesy of Safety+Health® magazine

14-4 Housekeeping

Good housekeeping is more than just a rule, it is a way to keep yourself and your co-workers safe from hazards.

Unsafe conditions and procedures must be identified before anything can be done to correct them. Therefore, every employee is responsible for reporting unsafe conditions or procedures immediately to their supervisor once they have been identified.

Safety is an individual commitment, and each employee must incorporate safe work practices into every area of their job.

General Safety Rules

- Never do anything unsafe to get the job done faster.
- Use handrails on steps or other elevated platforms.
- Obey warning signs and tags – they are posted to point out hazards.
- Being under the influence of drugs or alcohol is prohibited at work.
- Firearms or explosives (including fireworks) is prohibited at work.
- Horseplay, running, pushing or fighting will not be tolerated.

Housekeeping

Aside from accident prevention benefits, good housekeeping can contribute to efficient performance and a good state of mind. When tools and materials are returned to their proper place, they are easier to find the next they are needed. Here are a few suggestions to keep good housekeeping in your daily work.

- Wipe up all spills immediately and pick up all objects that should not be on the floor.
- Keep work areas and storage facilities clean, neat and orderly.
- Keep all aisles, stairways, exits and access areas clear from debris or clutter.
- When piling materials for storage, make sure the base is level and firm.
- When using extension cords or hoses mark them or cover them to eliminate tripping.
- Eliminate clutter – discard old and unused materials.
- Empty garbage daily.
- Keep your area clean, safe and clutter free for yourself and your co-workers.

14-5 Material Handling

Proper material handling is part of the successful working of any job. Material handling is also potentially dangerous to those moving the materials from the delivery vehicle to its storage place. Safe practices will help you avoid material handling injuries.

Material Storage

- Ensure that floors can handle the storage loads.
- Keep materials six feet away from open floors or landings; ten feet away from the exterior of the building.
- Keep all aisles and passageways clear.
- Do not store non-compatible materials together. For example, gas containers and bulk lumber do not mix.

Proper Lifting Techniques

- Know your individual lifting capacity.
- Know the capacity of the load to be lifted.
- Avoid over-extending or twisting your back.
- Use your legs to lift - keeping your back straight - with the load close to your body.
- Get help if needed.

Remember: There is a place for everything and everything needs to be in its place. The proper storage of work materials will make your job easier. Proper lifting and handling, with help if needed, will keep you from being injured on the job.

14-6 Material Storage

Proper material storage is a vital part to every construction site and to good site housekeeping. This is especially true with finish hardware since it can take so long to receive the materials from the supplier after the order is placed. It also makes good sense, since materials must be stacked and placed properly so you can access the materials easily and safely.

Guide for Discussion

- Stack materials properly and only to recommended heights.
- Keep aisles and passageways clear; never store materials in such a way as to block either.
- Never store materials within six (6) feet of a hoist way entrance, floor opening, or at second floors and higher.
- Segregate incompatible materials.
- Don't stack flammables next to combustibles.
- Never store more materials than are to be used immediately on scaffolds or runways.
- Remove all nails from lumber stacks.

- Block all cylindrical storage areas to prevent spreading or tilting. When possible, cross-tie tiers of a material to increase support.
- If heavy materials or large quantities of materials are to be stored on floors above grade, know the load limits of the floor and don't exceed them.

Remember: One way to increase efficiency and safety on the job is to store materials correctly the first time. It just makes good sense.

14-7 Moving, Handling and Storing Materials

Injuries often occur when moving, handling and storing materials. We don't think twice before moving a box, how we handle it or where we put it. Back injuries and strains/sprains are just some of the injuries that can occur from improper lifting.

Here are some tips to remember when moving, handling or storing materials and, what to do if an incident does occur:

- Things to consider when manually moving material:
 - o Be sure you can lift the weight of the load.
 - o Grasp the load with your hand and not just your fingers.
 - o See the path of travel.
- Handles/holders can be attached to a load to reduce the chances of fingers being pinched or crushed.
- Use appropriate personal protective equipment (PPE):
 - o Gloves
 - o Safety glasses
 - o Protective footwear
- Store materials properly:
 - o Keep storage areas neat and organized. Do not store materials in designated walkways.
 - o Do NOT block exits, fire extinguishers, fire alarms, etc. Place combustible and flammable materials in their appropriate location.
 - o Reduce the size and weight of the objects being lifted, use mechanical lifting aid if needed, and/or change the height of the shelf.
- Consider the height, weight, accessibility, condition of container(s), and location of storage when storing materials.
 - o Load limits must be posted in storage areas.
 - o Check labels for height limitations.
- Take a few minutes to secure a lifting aid or ask for help to prevent an ergonomic injury.

Read this scenario: An employee must move an object that is too heavy and awkward to hold. The employee needs to move this item across the room but is not going to take the time to ask for help or get a lifting aid. The employee decides to pick up the object and quickly moves it across the room. Unfortunately, the employee lifts with their back instead of their legs and feels a strain in their back. The employee keeps going but fails to see the "caution wet floor" sign when going across the room. The employee already has a strained back, then slips on the wet floor and twist their knee. Now the employee has a strained back and a strained knee because of not taking proper precautions.

Ask the audience:

1. What could the employee have done differently to prevent the employee from getting injured?
2. What should the employee do now after sustaining two injuries?

Potential Answers to Question One:

The employee could have:

- Got a lifting aid to move the item.
- Asked someone for assistance to move the object.
- Made the load lighter so that the employee was able to carry the load without needing assistance.
- Slowed down and checked the surroundings to notice that there is a wet floor.

Note to Supervisors: When injuries occur, information needs to be recorded in Pub 805 Grab and Go Packet. There were updates to Pub 805 (Work-Related Injury) and Pub 806 (Fleet & Equipment Accident):

1. Office of Administration documents were removed, and online links were provided (Page 1 of Pub 805).
2. Criteria for taking photos has been updated for supervisors (Page 7 of Pub 805 and Page 9 of Pub 806).

Potential Answers to Question Two:

- All accidents, near misses and unsafe conditions/acts need to be reported to your supervisor immediately and employees are to follow the supervisor's instructions and proper procedures.
- If there is any doubt concerning the need for professional medical care, then it should be provided as a precautionary measure.
- If an employee requests medical treatment, it is the supervisor's responsibility to see that the employee receives it. If the supervisor determines that professional medical treatment is necessary, the injured employee must comply.

14-8 Proper Material Storage

Proper material storage is vital to every construction site and is necessary to good housekeeping. Often, materials are ordered well in advance of a job and must be stored until it's time to start work. It is important to properly stack materials upon arrival so when needed they can be accessed easily and safely. Remember, poorly stacked materials are dangerous to you and your co-workers.

Here are some ways to properly receive and stack materials:

- Never store materials within six feet of a hoist way entrance, floor opening or at second floors or higher.
- Keep aisles and passageways clear.
- Segregate incompatible materials.
- Don't stack flammable materials next to combustible materials.
- Never store more materials than are to be used immediately on scaffolds or runways.
- Remove nails from all lumber stacks.
- Never stack anything higher than eight feet.
- Block all cylindrical storage areas to prevent spreading or tilting.
- If heavy materials or large quantities are to be stored on floor above grade, know the load limits of the floor and don't exceed them.
- If storing materials on shelving units, be sure to secure the shelving unit to a secure wall to prevent tipping.

Policy

PennDOT is committed to reducing the hazards associated with potential contagious disease. This protocol provides PennDOT employees with the basic information on cleaning and disinfecting surfaces after individuals who have entered a facility and are suspected/confirmed to have potentially exposed others to an easily transmitted contagious disease and is in accordance with the Department of Health building safety measures. PennDOT is committed to assuring a clean and safe workspace to limit the survival of any contagious disease.

14-9 Good Housekeeping in Garage Areas

Keeping your work area clean and organized is essential to working safely. Take a look at this picture. Is it a safe work area? What kinds of injuries can occur with a work area like this?

Housekeeping is crucial to safe workplaces. It can help prevent injuries and improve productivity and morale. Focus especially on the following areas:

Prevent slips, trips and falls Workplaces should be kept clean, orderly and sanitary. This includes passageways, storerooms and service rooms. Floors should be clean and dry with adequate drains.

Eliminate fire hazards- Employees are responsible for keeping unnecessary combustible materials from accumulating in the work area.

Prevent falling objects- Protections such as a toe board, toe rail or net can help prevent objects from falling and hitting workers or equipment. Other tips include stacking boxes and material straight up and down to keep them from falling. Place heavy objects on lower shelves, and keep equipment away from the edges of desks and tables. Also, refrain from stacking objects in areas where workers walk, including aisles.

Clear clutter- When an area is cluttered, you're going to likely have a cut or laceration injury. Workers must return tools and other materials to storage after using them and dispose of materials that are no longer needed. Also be sure to keep aisles, stairways, emergency exits, electrical panels and doors clear of clutter, and purge untidy areas.

Store materials properly- Storage areas should not have an accumulation of materials that present hazards for tripping, fire, explosion or pests. Unused materials and equipment should be stored out of the way of workers. Avoid using workspaces for storage and put everything back in its proper place.

14-10 Proper Maintenance of Department Property

As the winter season quickly approaches, it is important to take a look at best practices to prevent accidents and injuries from occurring in areas under our control. One way to do this is good housekeeping and driving cautiously on our Department properties (stockpiles, garages and parking lots).

Please keep these housekeeping tasks in mind during your down time. A little attention to housekeeping and practicing safe driving could go a long way in incident prevention.

Stockpiles:

- Keep scrap metal piles clean and organized.
- Do not allow piles in walking/driving paths.
- Hang heater cords off the ground when not in use to avoid tripping.
- Ensure proper maintenance is completed on exterior lights.
- Clear walkways of ice and snow.
- Dispose of trash frequently.
- Ensure first aid kits are stocked with current items.
- Perform the “Circle of Safety” before operating a vehicle.
- Use a spotter when backing.
- Drive cautiously.

Garages:

- Clean up spills immediately.
- Ensure work areas are cleared of debris.
- Ensure first aid kits are stocked with current items.
- Check chemical labels. If necessary, create new, legible labels.

Parking Lots:

- Ensure proper maintenance is completed on exterior lights.
- Clear walkways of ice and snow.
- Perform the Circle of Safety before operating a vehicle.
- Use a spotter when backing.
- Drive cautiously.

Note: Stockpile and Garage checklists are handy tools to use while cleaning up work areas.

Section 15 – Hygiene and Wellness

- 15-1 Good Housekeeping in Garage Areas
- 15-2 Hand Hygiene
- 15-3 Hand Washing
- 15-4 Cold and Flu Prevention
- 15-5 Prevent Colds and Flu with Frequent Hand Washing
- 15-6 Office Hygiene - Preventing the Spread of Germs
- 15-7 Office Safety
- 15-8 Construction Hazards
- 15-9 Seasonal Flu Prevention Tips

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15-2 Hand Hygiene

Personal hygiene is the basic concept of cleaning and grooming. While it is an important part of our daily lives at home, personal hygiene isn't just about combed hair and brushed teeth; it's important for health and safety in the workplace. Workers who pay attention to personal hygiene can prevent the spread of germs and disease that cause the flu or common cold, reduce exposures to chemicals and contaminants and avoid developing skin allergies, skin conditions, and chemical sensitivities.

The first principle of good hygiene is to avoid an exposure by forming a barrier over the skin with personal protective equipment (PPE) such as gloves, coveralls, and boots. It is important to check the PPE often for excessive contamination, wear, tears, cuts, or pinholes. Workers should clean, decontaminate or replace protective equipment when necessary to make sure it doesn't collect or absorb irritants.

Basic hand washing and skin care can prevent work exposures and disease. Good washing and scrubbing with water and soap helps to remove germs, contaminants, and chemicals. It can also prevent exposure by ingestion and cross-contamination of the surfaces and objects we touch.

Hand washing is important before and after using the restroom. To control the spread of germs that can cause the flu or common cold, workers should wash their hands whenever they cough, sneeze, or blow their noses, and whenever they are around someone that is sick.

Hand washing involves more than a quick rinse under a faucet. To wash hands properly:

- Wet hands under the faucet.
- Apply liquid or bar soap to cover all surfaces up to the wrist area at minimum.
- Hold hands out of the water for at least 20 seconds while scrubbing and lathering all skin surfaces.
- Rinse with clean water and dry hands with a disposable towel.

To use a hand sanitizer:

- Apply the appropriate amount of sanitizer into the palm of the hand.
- Rub hands together until dry, covering all surfaces up to the wrist area at minimum.

Proper personal hygiene and hand protection can help keep workers productive and on the job.

15-3 Hand Washing

No one likes to be sick. Catching a cold or the flu can wipe a person out for a week or more. Believe it or not, the single most important action you can take to avoid a cold or the flu is to wash your hands.

When you do not properly wash your hands, you spread germs that can cause you to be sick but also can cause your co-workers to catch that same bug. This is especially true when you share bathroom facilities or food preparation areas like are present at your stockpile.

The germs that live on your hands spread to your body if: you bite your nails, touch your eyes or nose or if you have any open wounds, even if those wounds are as small as a hang nail. Any break in the skin can allow the germs that carry cold and flu viruses to enter your system.

We carry millions of germs on our hands all the time, most are harmless but every now and then you find some that are nasty! We've already talked about colds and the flu, but you can also be exposed to illnesses like Hepatitis A, MRSA (Methicillin-resistant staphylococcus aureus), E.Coli and many other bacteria and viruses.

Wash your hands after you use rest room facilities, wash your hands before you eat and wash your hands anytime you feel you may have been exposed. If you already have a cold, wash your hands after you blow your nose or sneeze.

You can also use hand sanitizer. Squeeze out enough to coat both hands and then rub the sanitizer generously on your hands and between your fingers. It's also a good idea to rub some sanitizer onto your wrist area just in case.

When you wash your hands, make sure you're using soap and water. Again, use a generous amount of soap to coat both hands. Lather up your hands, on your palms, the back of your hands and between your fingers. Do this for about 20 seconds, then rinse thoroughly. It sounds simple, but when we get in a hurry, this could be the place we short cut.

When you dry your hands, you should use a single use towel, like a paper towel and then throw it away. Turn the water off using a clean paper towel and then turn the door handle with that paper towel and let yourself out of the room. Throw the towel away as you leave the room.

Yes, you should even wash your hands if you've been wearing gloves all day. Germs and viruses are sneaky. Outsmart them by washing your hands.

15-4 Cold and Flu Prevention

With winter cold and flu season in full swing -- and a nasty strain of norovirus circulating -- everyone's trying to dodge the bugs.

The common cold (rhinoviruses) and the flu are always miserable experiences. You know the symptoms—sneezing, scratchy throat, runny nose, nasal congestion, watery eyes. Are you getting a cold? But what if you also have a fever, headache, fatigue, muscle aches and chills? Then you might have the flu, which is much more serious. The Centers for Disease Control and Prevention (CDC) estimates that as many as 49,000 people die from the flu or flu-like illness each year.

However, it's not only cold and flu season, it's also norovirus season.

Sometimes called the “**stomach flu**,” norovirus is the most common cause of acute viral gastroenteritis around the world, and the most common cause of foodborne illness in the United States. Unlike some other infectious diseases, we can get norovirus time and again, and the average person will experience a norovirus infection five times in their life.

What are the Symptoms?

Norovirus symptoms usually appear 12 to 48 hours after first exposure to the virus, and last approximately one to three days. The most common symptoms of norovirus are:

- Diarrhea
- Vomiting
- Nausea
- Stomach pain



Other symptoms include:

- Headache
- Fever
- Body aches

People with norovirus are most contagious when they are sick, and for a few days after they feel better. So, how is it spread? Norovirus spreads quickly and rapidly, people can become infected with it by:

- Eating food or drinking liquids that are contaminated with norovirus, most likely prepared by an individual who is infected with the virus.
- Touching surfaces or objects with norovirus on them and then putting your hand or fingers in your mouth.
- Having direct contact with a person who is infected with norovirus, for example, when sharing foods, utensils with them.



15-5 Prevent Colds and Flu with Frequent Hand-Washing

Your best protection from the common cold and flu is **frequent hand-washing**. Both flu and cold viruses are transmitted the same way—through microscopic droplets from an infected person's respiratory system and/or digestive system.

About 80% of contagious diseases are transmitted in this manner. The simple friction that occurs when you rub skin against skin while using warm water and soap followed by thorough rinsing and drying can get rid of most potentially harmful germs. While germs are often transferred to others through office and household objects— telephones, doorknobs, toothbrushes, and faucet handles—the biggest transportation center for germs is your hands. Yet some studies reveal that many Americans using public restrooms don't wash their hands before leaving. People also forget to wash their hands before preparing meals, and they grab snacks without thinking of washing their hands beforehand. If you want to help prevent colds and flu, just stop—and wash your hands.



Additional steps to reduce the spread of vires that cause illness.

Even though rhinoviruses and norovirus are highly contagious, there are ways you can reduce the risk of its spread. According to the Centers for Disease Control and Prevention, follow these steps to reduce the spread of the virus.

- Practice good hand hygiene. Make sure to wash your hands with soap and water at key moments, especially after using the restroom since the virus can spread through stool. Alcohol-based hand sanitizers with at least 60% alcohol can be used in addition to handwashing.
- Disinfect frequently touched surface. Immediately disinfect and clean contaminated surfaces with a disinfectant and cleaner formulated to kill rhinoviruses and norovirus.

- Wash fruits and vegetables when preparing food; follow proper food preparation guidelines.
- Do not prepare meals when you are sick.

Whether you think you might have a cold, flu or norovirus, if you're sick it's important to consult a doctor and take precautionary measures to help you and everyone stay healthy.

15-6 Office Hygiene- Preventing the Spread of Germs

No one wants to spread germs, flu, colds and other communicable diseases in the workplace. Food preparation and storage are also concerns in the office setting. Follow these guidelines to ensure a safe and healthy office atmosphere for all.

Cold and Flu Guidelines:

Wash hands often and/or use unscented hand sanitizer provided in the office. Keep your desk area and public counters clean.

Cover your nose and mouth when sneezing and coughing (or cough into your elbow). Use single-use tissues for wiping your nose.

Wash your hands after coughing, sneezing or using tissues.

Do not touch your eyes, nose or mouth (viruses can transfer from your hands to you). Use social distancing in situations where the risk of infection is high.

Food and Dining Guidelines:

Do not share cups, glasses, dishes or cutlery. Do not store perishable food in your desk.

Keep hands, surfaces and utensils clean.

Keep foods at the appropriate temperature. Foods not kept at proper temperature, especially if left out for prolonged periods of time, can allow bacteria to grow in the food.

When preparing foods for potlucks, cook thoroughly and do not use utensils or serving dishes that have come in contact with raw foods.

Do not prepare food for a potluck if someone in your home has been ill within the past week. You could pass their sickness on to others at the party through your food.

15-7 Office Safety

Offices seem like they should be a safe place to work. Right? Compared to industrial work environments that is probably true, but believe it or not, offices can carry with them their own set of safety issues. Let's explore some of those issues.

The leading cause of injury in Pennsylvania and the nation is slips, trips and falls. This type of injury can occur anywhere. When you're in field production, plowing snow or walking across the room to pick up a copy, you can be injured by a fall.

Office workers are subjected to and can be injured by falls, fires, electric shock, cuts, and bruises. They can develop long-term injuries and disabilities from repetitive work such as keyboarding.

There are things you can do to make your office space safer.

- Watch for tripping hazards like cords or cables.
- Keep purses, computer bags, brief cases and backpacks out of the travel path.
- Keep desk drawers and cabinets closed while not in use.
- Load file cabinets from the bottom. Keep the heavy items on the bottom so the cabinet is not top-heavy.
- Clean up any spills right away. If a spill cannot be cleaned up right away, arrange for a barricade to warn people of a potential slipping hazard.
- Floors that are wet from cleaning should also be barricaded to warn people of a potential slipping hazard.
- Materials should be stored in designated areas not in boxes on the floor or on top of filing cabinets.
- Use safe lifting techniques. Back injuries are very common in office settings. To pick up a heavy item, squat down beside it and use the strength of your legs to lift the object. Bend your knees, not your back. You can hurt your back lifting as little as five pounds if you don't lift it properly.
- Store sharp implements such as scissors, paper knives and letter openers separately to prevent cuts and puncture wounds.
- Repetitive strains are increasing in offices. When doing any repetitive work, take a break and frequently switch to other tasks to give yourself a rest.

15-8 Construction Hazards

The Leading causes of fatalities on a Construction Site are: Falls, Struck by an object, caught in or between and electrocutions. The following are some ways to prevent yourself from being hurt or killed.

Prevent Falls

- Wear and use a personal fall arrest system.
- Install and maintain perimeter protection.
- Cover and secure floor openings and label floor opening covers.
- Use ladders and scaffolds safely – know and use the protocols.

Prevent Struck-By Accidents

- Never position yourself between moving and fixed objects.
- Wear high-visibility clothes near equipment or other vehicles.

Prevent Caught-In/Between

- Never enter an unprotected trench or excavation 5-feet or deeper without an adequate protective system in place; Some trenches under 5-feet may also need such a system.
- Make sure the trench or excavation is protected either by sloping, shoring, benching or a trench/shield system.

Prevent Electrocutions

- Locate and identify utilities before starting work.
- Look for and identify overhead power lines when operating equipment.
- Maintain a safe distance away from power lines; learn the safe distance requirements.
- Do not operate portable electric tools unless they are grounded or double insulated.
- Use ground-fault circuit interrupters for protection.
- Be alert to electrical hazards when working on ladders, scaffolds or other platforms.

15-9 Seasonal Flu Prevention Tips

According to the Centers for Disease Control (CDC) The single best way to prevent seasonal flu is to get vaccinated each year, but good health habits like covering your cough and washing your hands often can help stop the spread of germs and prevent respiratory illnesses like the flu. There also are flu antiviral drugs that can be used to treat and prevent flu. The tips and resources below will help you learn about steps you can take to protect yourself and others from flu and help stop the spread of germs.

- Get Vaccinated - The seasonal flu vaccine protects against the influenza viruses that research indicates will be most common during the upcoming season.
- Avoid close contact- Avoid close contact with people who are sick. When you are sick, keep your distance from others to protect them from getting sick too.
- Stay home when you are sick- If possible, stay home from work, school, and errands when you are sick. This will help prevent spreading your illness to others.
- Cover your mouth and nose- Cover your mouth and nose with a tissue when coughing or sneezing. It may prevent those around you from getting sick. Flu and other serious respiratory illnesses, like respiratory syncytial virus (RSV), whooping cough, and severe acute respiratory syndrome (SARS), are spread by cough, sneezing, or unclean hands.
- Clean your hands- Washing your hands often will help protect you from germs. If soap and water are not available, use an alcohol-based hand rub.
- Avoid touching your eyes, nose or mouth - Germs are often spread when a person touches something that is contaminated with germs and then touches his or her eyes, nose, or mouth.
- Practice other good health habits - Clean and disinfect frequently touched surfaces at home, work or school, especially when someone is ill. Get plenty of sleep, be physically active, manage your stress, drink plenty of fluids, and eat nutritious food.

Section 16 – Insects and Poisonous Plants

- 16-1 Bees
- 16-2 Facts About Chronic Wasting Disease
- 16-3 Giant Hogweed and Ticks
- 16-4 Ticks and Lyme Disease
- 16-5 Poison Ivy
- 16-6 Poisonous Plants
- 16-7 Poisonous Spiders and Snakes
- 16-8 Spider Bite Symptoms
- 16-9 Preventing Tick Bites
- 16-10 Protect Yourself from MRSA
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- 16-12 Rabies - Precaution and First Aid
- 16-13 Snakes
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- 16-15 Tick Bites and Lyme Disease
- 16-16 Ticks
- 16-17 Open Season on Ticks
- 16-18 Ticks – How to Keep Yourself Safe
- 16-19 Ticks

16-1 Bees

It's that first warm day of spring, the birds are singing, and the bees are buzzing. It seems like it should be a perfect day until that buzzing bee decides your arm looks tasty and you get stung.

For most people, a bee sting is a nuisance, but for others, a bee sting can lead to itching hives, a reddening of skin and a rash and for some anaphylactic shock, which close the throat and inhibits a person from breathing.

According to NIOSH 95-100 people die each year from bee stings.

Naturally, even if you aren't allergic, no one wants to get stung by a bee. It hurts! Bee stings can cause swelling, redness and irritation at the sting site.

If you know you are allergic to bee stings and carry medication such as an epinephrine injector, please let your supervisor know where you keep it. Also instruct your co-workers on how to use it and that you **MUST be taken to a medical facility as soon as possible after epi-injection.**

If you have an allergy to bee stings, consider wearing a medical bracelet that identifies your allergy.

For those who aren't allergic:

- Try to remove the stinger.
- Wash the area with soap and water.
- Apply a cold compress to reduce swelling and reddening.
- If the pain persists, take an over the counter pain reliever.
- Apply hydrocortisone cream.
- If itching or redness persists, take an oral antihistamine like Benadryl.
- Avoid scratch the sting area.

The best way to prevent bee stings is to avoid bees. Remove hornet nests, avoid perfumed soaps, shampoos and deodorants, wear clothing that covers as much of the body as possible and avoid flowering plants.

16-2 The Facts About Chronic Wasting Disease

As a worker for the Department of Transportation, you have most likely come across a dead deer in your time. Maintenance Employees are often asked to remove a deer from the right-of-way to keep the traveling public safe.

There has been a lot of talk about Pennsylvania's white-tailed deer population and chronic wasting disease and what effects CWD has on humans.

What is CWD?

CWD is a contagious neurological disease affecting deer, elk and moose. It causes a degeneration of the brain of an affected animal that makes the animal act abnormally resulting in emaciation, (looking like they're starving to death), loss of bodily function and ultimately death.

How does CWD spread?

Transmission of CWD is thought to be done from animal to animal through urine, saliva or feces. There is no evidence to support any transmission of CWD from animal to human through contact or touch. There is no risk to humans, however public health officials recommend caution to hunters and encourage them to have their deer tested. If the deer tests positive for CWD, hunters are encouraged not to eat the animal.

Picking up Dead Deer

If you must move or pick up a dead deer protect yourself with the following PPE:

- Leather gloves
- Goggles
- Boots
- If you're on or next to a roadway remember to wear your ANSI class 2 vest or t-shirt and hard hat.

16-3 Giant Hogweed and Ticks

Giant hogweed is an invasive species from Central Asia that has taken root in the commonwealth, located most commonly in the area around Lake Erie it has also been found growing in localized pockets of open areas across the commonwealth.

Standing 8 to 14 feet high and crowned with white umbrella like flowers that can span up to 3 feet. The sap of the giant hogweed can cause rash and/or burns to skin upon contact. Exposure to sunlight increases these effects often leading to long-term scarring.

Preventative Measures

- Avoid contact with the plant while working in the area, if at all possible.
- Wear personnel protective equipment and long clothing to cover as much skin as possible including a long-sleeved shirt, long pants, gloves and safety glasses.
- Avoid weed whacking or mowing the plant to prevent the sap from splattering.

Sap Exposure

- Shelter the area of skin exposed to the sap from sunlight, immediately.
- Clean the affected area using soap and water to remove the sap.
- Monitor the skins reaction, minor exposures can be treated using aluminum acetate cream, available over the counter, severe reactions may require medical treatment.

Ticks

Ticks are prevalent through-out Pennsylvania in areas covered by heavy brush, long grass or trees. They attach themselves to humans embedding their mouths in order to feed on blood and often feel and look like a small scab until closer inspection. Ticks can transmit several diseases to humans the most common of which is Lyme disease which can have long term health effects if left untreated.

Preventative Measures

- Wear long clothing tucked in to cover and prevent access to your skin, light colored clothing makes it easier to spot ticks.
- Apply insect repellent containing 20-30% DEET to exposed skin.
- Treat clothing and shoes with products containing Permethrin following the manufacturer's instructions. **Do not apply permethrin directly to skin.**
- After coming in from being outdoors:
 - Take the time to inspect for ticks using a mirror to perform a full body check.
 - Pay attention to the back of the knees, under the arms, inside the belly button, between the legs and in and around your hair and ears.
 - Using a comb with fine teeth will help find adult ticks in the scalp and hair.
 - Wash and tumble dry clothing on high heat for one hour, to kill ticks.
 - Bath or shower as soon as possible, which can cause ticks to detach themselves from your body.

Tick Removal

- Remove an embedded tick (feels like a small scab) by using fine-tipped tweezers or a tick removal device, to grasp the tick by the head close to the skin being careful not to squeeze the body of the tick.
- Gently pull the tick straight up.
- Do not twist the body of the tick or leave the head intact in the skin.
- Use the tweezers to remove the mouth parts if they break off and remain imbedded in the skin.



- Thoroughly clean the area around the tick bite.
- Wash your hands with soap and warm water once the tick has been removed.
- If possible, save the tick on a wet paper towel and store it in a closed container. Label the container with the date that the bite occurred.
 - If Lyme disease is suspected, take the tick to the physician and inform them of the symptoms and bite date. This may assist in diagnosing a tick-borne disease.

16-4 Ticks and Lyme Disease

Pennsylvania leads the nation in Lyme Disease cases. According to a 2015 report there were nearly 70,000 cases of Lyme treated in the state. Lyme is contracted by being bitten by a blacklegged tick. The smaller the tick, the worse the exposure. Contrary to popular belief, ticks can and will bite an unsuspecting person any time of the year. Ticks do not go dormant like bees; ticks are always waiting on their next meal that could very well be you.

Signs and Symptoms of Lyme Disease

Sometimes you know you've been bitten by a tick because you see it embedded in your skin, but sometimes when the tick is very small, you may not notice a tick. What you will notice though is that within three days you may have a fever, experience chills, fatigue, muscle aches or swollen lymph nodes. These symptoms may or may not be accompanied by a rash.

Most people know they have Lyme Disease by the bullseye rash that they get. That rash is not always at the bite mark. The bullseye can start very small but expand up to twelve inches in just a few days.

Embedded Tick

If you see the tick embedded in your body – use extreme care in removing it. Ticks hold the poison that carries Lyme Disease in their heads, so if you remove the tick but leave the head, you haven't accomplished your mission to not get Lyme Disease. To remove a tick you should:

- Use fine tweezers or a tick remover – grasp the tick as close to the skin's surface as possible.
- Pull upward with steady, even pressure. Don't twist or jerk the tick. This can cause part of the mouth to break off and remain in the skin.
- Don't burn the tick – this will only scare them into releasing the poison into your body.
- After removing the tick, thoroughly clean the bite area and wash your hands with rubbing alcohol and soap and water.
- Never crush the tick with your fingers. Instead put a live tick in a plastic bag or flush it down the toilet.
- After removing the tick, follow-up with your physician.
- Lyme Disease is treatable and curable if you catch it early. Most doctors will prescribe an anti-biotic that will kill the disease.

16-5 Poison Ivy

One of the most common plant-borne allergens is Poison Ivy. Poison Ivy can be found in nearly every state in the United States. A simple touch of the leaf can cause an allergic reaction that will last for days and in some cases weeks.

What does Poison Ivy look like?

All varieties of poison Ivy have three leaves.

The leaves can be shiny or dull, have teeth or be toothless. It can be hairy or hairless. It can grow as a vine or shrub, And will survive almost anywhere.

Not everyone is allergic to Poison Ivy. If you are one of the unfortunate people who are, you should use extreme caution if you come in contact with Poison Ivy. Once you come in contact with poison Ivy, nothing can be done to prevent you from having an allergic reaction to it. The best way to not get poison Ivy is to avoid it or wear PPE to prevent it.

Do the following to protect yourself from Poison Ivy:

- Know how to identify Poison Ivy and then avoid it.
- Wear long pants, long sleeved shirts, boots and gloves when entering any area that you think could have Poison Ivy.
- If exposed, wash the exposed area with soap and water immediately. Do not touch any other part of your body with an exposed hand. The rash will spread!

Poison Ivy Rash Care

- Use a cold compress, calamine lotion, non-prescription hydrocortisone cream, or an antihistamine to ease the itching.
- See a doctor if the rash is near your eyes.
- If you have a severe reaction (not being able to breathe) call 9-1-1.

CAUTION: Never burn a Poison Ivy plant. The smoke from the burning plant will carry the poison to anyone near the fire.

16-6 Poisonous Plants

Recently a co-worker was exposed to Sumac and had a severe allergic reaction. In the summer we are often working in areas of thick under growth. Trees are often covered in vines and plants that require cutting. These plants and vines often cause allergic reactions. The most common poisonous plants are Poison Ivy, Poison Oak and Sumac. Contact with these plants can cause a skin rash called allergic contact dermatitis. The rash normally appears 4 to 48 hours after contact to the oil (Urushiol) found in the poisonous plant.

The red, uncomfortable itchy rash often shows up in lines or streaks. Blisters or hives may appear in large raised areas. The rash is caused by contact with Urushiol found in poison ivy, oak, or sumac. The oil is present in all parts of the plants including: the leaves, stems, flowers, berries, and roots. Urushiol is an allergen, so the rash is actually an allergic reaction to the oil in these plants. Indirect contact with Urushiol can also cause the rash. This may happen when you touch clothing or tools that have been in contact with the poisonous plants.

These rashes are not contagious. The severity of the rash is based on the amount of exposure to the Urushiol in the plants. The more you come in contact with the plant oil the more severe the skin rash. To relieve the symptoms in mild cases the use of wet compresses, cool baths and non-prescription antihistamines and calamine lotion is recommended. Moderate to severe cases of the rash may require medical attention. The physician may prescribe steroids.

The best way to prevent the rash is to learn to identify and avoid the plants.



Poison ivy grows as a vine everywhere in the United States and Canada. It can be recognized by its pointed glossy, dark green leaves arranged in a group of three. The leaves turn scarlet in the autumn. The small greenish-white flowers in the spring are followed by greenish-white waxy berries in the summer. "Leaves of three let it be."

Poison oak takes the form of a woody shrub but it also may appear as a vine similar to poison ivy except the edge of the leaves are more deeply notched. It grows mainly in the Pacific coast but it has been found in the Eastern United States.

Poison Sumac is the most vicious of the three plants, it is a shrub-like plant or small tree which can reach a height of 25 ft. its leaves are arranged in pairs with a single leaflet at the end. The leaves are velvety and bear a bright orange color in the spring. The leaves turn bright red during the fall. Sumac grows primarily in the Eastern United States in wet ground areas.

Please avoid these plants when possible. If you cannot avoid contact with the plants heavy clothing is recommended (long-sleeved shirts, long pants and gloves).

16-7 Poisonous Spiders and Snakes: Safety Hazard Awareness

With the past few weeks becoming warmer or just down-right hot, one of nature's most dangerous natural creatures have been more active – those reptilian wonders we call SNAKES as well as the eight-legged creatures called SPIDERS. Over Recently, District 3-0 has had two poisonous spider bites and a near miss encounter with an aggravated rattle snake in the right-of-way too near a flagger. The following safety talk is to remind all employees the safety precautions and emergency steps if bitten while working the field.

Here's How:

Avoid Snakes and Spiders! Know the environment where you are working and walking and the kinds of snakes, spiders and other natural hazards. Avoid dense brush, stacked firewood, rock piles, etc. – Think before you leap! If you are bitten, identify the snake or spider if possible. As a rule, most poisonous snakes have a triangular shaped head, and somewhat flat. Know the distinct kinds of poisonous snakes and insects of the area! Same if bitten by a spider, try to identify what type of spider, most common poisonous spider in our area are the **Brown Recluse** and **Black Widow**.

Watch where you step...Don't assume there isn't a snake, just because you don't hear their distinctive rattle. If you do hear the presence of a rattle snake near your, **STOP**, look around, and proceed with caution to a safe area. Also, immediate inform your supervisor and others around, so they don't indirectly stumble on the same snake without warning.



Pennsylvania Timber Rattlesnake

Don't interact with the snake. As silly as it sounds, one of the common causes of a rattlesnake bite is when someone interacts with the snake or gets too close.

Watch where you put your hands! Rustle around with a stick and look prior to reaching into an area that may have a snake that you can't see. Don't just reach down or inside and scare the snake and get bit. No matter what – watch where you put your hands!

DO NOT LIST FOR SNAKE BITES INCLUDES:

1. If bitten by a rattlesnake, DO NOT use ice to cool the bite.
2. If bitten by a rattlesnake, DO NOT cut open the wound and try to suck out the venom.
3. If bitten by a rattlesnake, DO NOT use a tourniquet. This will cut off blood flow and the limb may be lost.
4. Avoid rattlesnakes altogether. If you see one, don't try to get closer to it or catch it.
5. Keep your hands and feet away from areas where you cannot see, like between rocks or in tall grass where rattlesnakes like to rest.



If you are bitten by a rattlesnake, stay calm and get to a doctor as soon as possible. The National Poison Control Center advises:

1. **Stay Calm**
2. Wash bite area gently with soap and water.
3. Remove watch, rings, etc. that may constrict swelling of the limb or area.
4. Immobilize the affected area.
5. Keep the area of the snake bite lower than the heart.
6. **Transport immediately to nearest medical facility!**

Spiders are common, and they can be found indoors any time during the year. Their numbers usually peak during late summer. Just like snakes, they can be found in the field on the guiderail, bridge structures, drainage, sign post, stockpiles or anywhere they can find an ideal location to set up their home protected from the weather and predators.



Fortunately, extremely few of these spiders are dangerous though. In the Pennsylvania, just two species of spiders are poisonous enough to cause harm. They include the **Black Widow Spider** (*Latrodectus mactans*) and the **Brown Recluse Spider** (*Loxosceles reclusa*).

It is important to remember than even dangerous Black Widow and Brown Recluse Spiders aren't wandering trying to attack. They usually like to live in places where they won't be disturbed. Here are a few simple safety tips to help identify spider bites, symptoms.

16-8 Spider Bite Symptoms

Surprisingly, most spider bites aren't that painful. It may feel like a pin prick and they are often unnoticed when the spider actually bites you. Common spider bite symptoms can include a single bite mark with:

- Swelling
- Redness
- Itching
- Pain

In fact, most spider bites will resemble a bee sting. You may also develop hives and other allergy symptoms if it turns out that you are also allergic to the spider bite.

Symptoms of a Black Widow Spider bite might also include severe muscle pain and cramps, which develop within a few hours of the bite. Other symptoms may include weakness, vomiting, trouble breathing, abdominal pain, and high blood pressure.

Brown Recluse Spider's bite can be painful. In addition to pain, these spider bites may cause burning and itching. Another characteristic finding is that the spider bite may look like a bull's eye, with a red ring around a white center that turns into an ulcer.

Spider Bite Treatments

You should seek medical attention if you think you were bitten by a Black Widow Spider or Brown Recluse Spider!

For most [non-poisonous] spider bites, you can follow some simple first aid treatments, including:

- Washing the spider bite with soap and water.
- Apply an ice cube to the bite for about 20 minutes.
- Take an over the counter pain medicine, such as acetaminophen or ibuprofen.
- Apply a topical antibiotic ointment to the bite two or three times a day.
- Apply a topical steroid cream to help control itching and redness a few times a day.
- Continue treatments for one or two days, the typical time that it takes a spider bite to go away.



	BLACK WIDOW	BROWN RECLUSE
Identifying feature	Yellow/Red Hourglass on belly	Brown fiddle on cephalothorax
Venom	Neurotoxin	Cytotoxin
Clinical effects	Severe muscle cramping and CNS excitation	Local tissue destruction
Treatment	Mainly supportive (opioids and benzodiazepines)	Mainly supportive (local wound care)
Antivenin	Yes, but reserved for severe symptoms	No

16-9 Preventing Tick Bites

As a PennDOT worker, you are outside nearly every day. You work in all kinds of weather and come in contact with insects that are a hazard to your well-being and over-all health...Ticks!

Ticks can attach themselves to you year-round, but they are most active during the warmer months between April and October. It seems obvious that you want to avoid contact with ticks. Unfortunately, that is not always possible, but there are some ways to help prevent ticks from hitching a ride on you.

Avoid Direct Contact

You work in wooded areas along the side of the road and unfortunately, this is where ticks live too. If you can you should:

- Avoid tall grass
- Avoid walking through brushy areas
- Avoid leaf litter

Repellent

There are repellents that you can apply to your skin and clothes.

- You can get some repellents from the stock room, such as DEET which can be applied to your skin or clothing.
- If you purchase products with permethrin, this can ONLY be applied to your clothing. Most applications will last for six washes. You can also apply products with permethrin to your boots for increased protection.
- If walking through tall grass is unavoidable, tuck your pants into your boots and pull the strings tight. Wear a light colored, long sleeved shirt. You'll be able to spot a tick quicker on light colored clothing.

Find Ticks and Remove

After a day of exposure to the possibility of ticks you should:

- Bathe or shower as soon as possible after coming indoors.
- Conduct a full-body tick check using a hand-held mirror. Parents should check their children for ticks looking under arms, in and around ears, in the belly button, behind knees, between legs and especially in the hair.
- Examine gear and pets. You can unknowingly carry these pests inside with you on your clothing, on your gear or on your dog. Ticks can affect your dog the same as they can you. So be sure to check Fido.
- After you've showered, tumble dry your clothes for 10 minutes on high heat. This will kill any tick that may have come home with you.
- If you're clothes require washing first, use hot water. Cold and medium water temperature will not kill ticks. If you cannot wash your clothes in hot water, tumble dry them for 60 minutes on high heat after they come out of the washer.

16-10 Protect Yourself from MRSA

What is MRSA you may ask? MRSA or Methicillin-Resistant Staphylococcus Aureus Bacteria is a staph infection that can be spread from person to person through touch. Simple hand-washing often eliminates the threat.

The MRSA bacteria is resistant to methicillin, penicillin, Amoxicillin and oxacillin. MRSA can be transported and contracted by anyone who had skin to skin contact with someone who was infected. Something as simple as a hand-shake can spread the bacteria. You can also catch the bacteria by touching a contaminated item or surface and then by not thoroughly washing your hands.

Anyone can get MRSA. The risk becomes greater in larger crowds where you'll experience a lot of skin to skin contact. You can also get MRSA by sharing equipment or supplies.

The symptoms of MRSA depend on where you're infected. Most MRSA cases are mild infections on the skin that produce sores, boils or abscesses. More serious cases can infect wounds, the bloodstream and the lungs which are very hard to treat and can in some cases be fatal.

Symptoms can be:

- Skin swelling
- Redness
- Warmth to the touch
- Painful, full of pus or drainage
- Usually accompanied by a fever

If you have these symptoms, see a physician as soon as possible. You cannot tell if an infection is a staph infection without testing it. Once tested, a doctor can give you the proper anti-biotics that will get you on the road to recovery.

Prevention is the key. To avoid contracting MRSA you should:

- Cover all wounds.
- Do not pick or pop the sore.
- Wash your hands often.
- Throw away bandages and tape in the trash.

16-11 Protect Yourself from Wild Parsnip

Wild parsnip is an invasive weed that should be avoided at all costs. It is a tall yellow plant that grows along the roadways from late spring to mid-late summer. The juice from the stem of wild parsnip will cause burns to the skin that resemble sun-burns.

In mild cases, affected skin reddens and feels sunburned. In more severe cases, the skin reddens, then blisters. Some blisters will become very large and for a while the skin will feel as though it has been scalded. Places where your skin is most sensitive like your face, neck, underarms, legs and torso are most vulnerable. Moisture from your perspiration will speed the absorption of the poison from this plant.

Blisters appear a day or two after the sun exposure. Soon after, the blister ruptures and the skin begins to heal. One of wild parsnip's signature effects is a dark red or brownish discoloration of the skin in the area where it occurred. This hyper-pigmentation can persist in the skin for as long as two years.

Wild parsnip burns often appear as streaks and long spots. They reveal where a juicy leaf or stem drags across the skin and is then exposed to the sun. Wild Parsnip burns are often misdiagnosed and are usually treated like poison ivy.

If you get a Wild parsnip burn, relieving the symptoms comes first. Cover the affected area with a cool damp cloth. If blisters are present, try to keep them from popping as long as possible.

The skin of a blister is the body's natural bandage. The blister will keep the skin below it protected, moist and clean while healing. When blisters pop on their own, try to leave the skin in place. To avoid infection, keep the area clean and apply an antibiotic cream.

Wild Parsnip is often misidentified. The plant looks like yellow Queen Anne's Lace or Wild Dill. The plant stands 2 – 5 feet tall. The plant spreads quickly and can be found along roadsides, playgrounds, sports fields and on residential property.



PPE

If mowing or brush cutting around wild parsnip, wear goggles, a face mask, rubber gloves and boots.

The easiest way to not get Wild Parsnip burns is to know how to identify the plant and avoid it at all costs.

16-12 Rabies – Precautions and First Aid

Rabies is a viral disease that can be transmitted through the bite of an infected animal and can affect all warm-blooded creatures, including humans.

Although a bite from an infected animal is the most common transmission source, you can also get rabies if you touch the saliva of an infected animal and that saliva gets into an open wound, scratch or abrasion or into your mouth or nose.

A rabid animal exhibits abnormal behavior.

- Some animals become very quiet and then have an erratic, angry outburst.
- Some animals show no fear of humans or other larger animals.
- Domestic animals will exhibit uncontrollable behavior.
- Nocturnal animals such as raccoons move around during the daylight.
- Foaming at the mouth can be present but isn't always.

How to protect yourself from rabies at work or at home:

- Avoid contact with all live warm-blooded wild animals.
- When removing a dead animal from the roadway, always wear gloves and use a shovel or other tool.
- Consult with your supervisor for proper disposal of dead animal carcasses.

- Wash your hands, even if you've been wearing gloves.
- Decontaminate the gloves and any tools you were using by mixing 1 quart of bleach with 1 gallon of water.

If you've been bitten:

- Wash the wound with soap and water.
- See a doctor immediately.

16-13 Snakes

PennDOT does a lot of brush cutting throughout the summer. In addition to the dangers of falling limbs and branches workers also have to be on the lookout for a hazard that is a bit less obvious...Snakes.

Just to be clear, not all snakes are bad, in fact in Pennsylvania there are only three types of snakes that are venomous. Those three are the Timber Rattlesnake, the Eastern Massasauga and the most common, Copperhead. These three snakes all have triangular heads, very fancy markings and live in places where you might be cutting trees or removing brush.

Other than the big three, you could encounter all kinds of other snakes. Pennsylvania is home to 21 species of snakes, nearly all of them (except for the three mentioned above) are non-venomous, but they still might strike if frightened or provoked.

Snake bites are rare, but they do happen. According to the Pennsylvania Fish and Boat Commission there are some things you should do if bitten and some things you should not do if bitten.

Do's

- Calm and Reassure the victim – and keep the victim immobile. The more they walk the more the poison will be transported through the body.
- Call 911 immediately.
- Transport the victim to a medical facility as soon as possible.
- You can put a light constricting band above the bite area. Make sure you can fit two fingers between the band and the limb.

Do Not's

- Do not use ice, cold packs or sprays.
- DO NOT attempt to suck the poison from the bite area. This is a myth and should never be done!
- Do not use a tourniquet.
- Do not give alcohol or drugs.
- Do not wait to see if symptoms develop.

One of the most common injuries that occur when someone sees a snake is an injury from falling as they are trying to get away from the snake. Snakes are as frightened of you as you are of them. If you see a snake, remain calm, move away from it and let it go on its merry way. Both you and the snake will be happy you did.

16-14 Spotted Lanternfly

Last year, the Pennsylvania Department of Agriculture issued a quarantine zone in southeastern Pennsylvania to battle the invasive and destructive Spotted Lanternfly and recently added Dauphin County to the quarantine zone.

What is the Spotted Lanternfly?

The Spotted Lanternfly (*lycorma delicatula*) is an invasive and destructive planthopper originating from Asia and is native to China, Bangladesh and Vietnam but has been invading North America in recent years. The Spotted Lanternfly is harmful to many of our state's most valuable exports such as grapes, apples, stone fruits, hops and hardwoods. Adult insects can be seen as early as July and into the fall months where they lay eggs (30-50 eggs) on trees, vehicles and other outdoor surfaces.



Prevent Spreading and Removal:

If employees locate a Spotted Lanternfly or nest, they must report it to their supervisor or foreman immediately. Nests must be removed immediately and should be scraped off any surface on which they are found using a downward motion. Once they are scraped off, they should be placed in a plastic bag with a small amount of rubbing alcohol or hand- sanitizer. If observed in a vehicle or on any surface, the Spotted Lanternfly can be squished or swatted with a fly swatter.

Quarantine Zones:

The following counties are under quarantine:

- Berks
- Bucks
- Carbon
- Chester
- Dauphin
- Delaware
- Lancaster
- Lebanon
- Lehigh
- Monroe
- Montgomery
- Northampton
- Philadelphia
- Schuylkill



Spotted Lantern Fly Nest

Quarantine does not mean people or employees cannot move items or conduct business in or out of the quarantine zone, it means that employees must **INSPECT** before moving items out of the quarantined area.

Employees and organizations operating in this 14-county area of southeastern Pennsylvania or who come into the area to work, move vehicles or other conveyances, must be permitted.

A permit demonstrates that the organization has been trained to identify and remove the Spotted Lanternfly to avoid spreading it outside the existing quarantine zone.

PennDOT employees working in the counties listed above are responsible to carry a permit in their commonwealth vehicle and record the inspection on the M-805 form or on their payroll if they do not use the M-805.

Training:

All employees are strongly urged to complete the web-based training **Spotted Lanternfly** if not already completed. Those in affected counties are mandated to complete the training.

16-15 Tick Bites and Lyme Disease

Summer is here, weather is heating up, and ticks are out! Ticks are very small (as you see in the illustrations below), but thirsty for blood! Some tick-bites can result in Lyme disease, which is a chronic and debilitating condition. If untreated, symptoms may include loss of the ability to move one or both sides of the face, joint pains, and severe headaches with neck stiffness, or heart palpitations. This safety talk includes information about ticks, steps to take to help prevent tick bites, symptoms of Lyme disease, and what to do if bitten by a tick.

Where do ticks hang out?

Ticks are very small. They live in the woods, brush, bushes, and high grass. They are especially common at the edges of wooded areas. They can also be found in the yards of urban homes.



Blacklegged tick (*Ixodes scapularis*)



How to prevent of Tick bites?

People may be exposed to ticks and tick-bites while working outside or walking in wooded areas. The most common methods of protection from tick bites include:

- 1) Wearing long sleeves, long pants, and long socks and keeping pants tucked into socks/boots will help keep ticks off of your body.
- 2) Using light-colored clothing will make it easier to spot ticks that have latched on in search of a meal.
- 3) Using insect repellent with 20% - 30% DEET on exposed skin and clothing could prevent tick bites.
- 4) Using permethrin on clothing helps prevent bites. Permethrin kills ticks on contact! One application of 0.5% permethrin to pants, socks, and shoes typically stays effective through several washings.

DO NOT APPLY PERMETHRIN DIRECTLY TO SKIN.



What are the symptoms of Lyme disease?

Lyme disease is transmitted to humans by the bite of an infected blacklegged tick (*Ixodes scapularis*), commonly referred to as a deer tick. Usually, the tick must be attached for 36 to 48 hours before the bacteria can spread. The most commonly noted symptom of Lyme disease is the red rash in the form of a bullseye (illustrated here). In most cases, this rash appears within 3 to 30 days (on average, in about 7 days). It begins at the site of the tick bite and gradually expands. It isn't itchy or painful. Within a few hours to a few days after the rash appears, flu-like symptoms including fever, headache, fatigue, and muscle and joint aches may also occur. Other symptoms include sweating, swollen glands, chills, and a sore throat.

Occasionally, people develop shooting pains or tingling in their arms and legs. Months to years later, some people may have repeated episodes of joint pain and swelling. Despite appropriate treatment, about 10 to 20 percent of people develop joint pain, memory problems, and fatigue for at least six months.



What to do if a tick is found?

An attached tick feels like a small scab. Ticks often hide in head or pubic hair, on the neck, and in or behind the ear. Using a comb with fine teeth will help find adult ticks in the scalp and hair. Ticks also crawl into the underarms, between the legs, behind the knees, and onto the lower legs and arms. After engaging in activities in areas where ticks tend to live, careful inspection of your body is encouraged so that ticks can be found and removed promptly.

1. An embedded tick should be removed as quickly as possible by using tweezers, rubber gloves, or even leaves to provide grip.
2. Gently pull the tick straight up. Do not crush the body or leave the head intact in the wound. Ticks can continue to live and transmit disease even after being dismembered.
3. If possible, save the tick on a wet paper towel and store it in a closed container. Remember or document the date that the bite occurred.



4. If Lyme disease is suspected (see symptoms above), take the tick to the doctor and inform the physician of the symptoms and bite date. This will assist in pin-pointing whether or not you have been infected.

16-16 Ticks

The weather in Pennsylvania is warming up, and as we spring into longer days, care should be taken because tick season has arrived. For a third season with the start of the spring, PennDOT employees have reported an increase tick bites across the Commonwealth. While none of these cases have developed Lyme disease, it is vital to take preventative and after action measures while working outside.

Where do ticks hang out?

Ticks live in the woods, brush, bushes, and high grasses. They are common where wooded areas and nearby grasslands come together. They also can be found in the yards of city homes. The most common safeguard is wearing long sleeves and long pants tucked into boots if possible.

Light-colored clothing will make it easier to spot ticks that have latched on in search of a meal.

Protect Yourself

- Know where to expect ticks. Ticks live in moist and humid environments, particularly in or near wooded or grassy areas.
- Use a repellent with DEET (on skin or clothing) or **Permethrin** (on clothing). Repellent may be purchased through your normal purchasing procedures for first aid supplies. DEET repellent may need to be reapplied after a couple of hours.
Permethrin repellent can last through several clothing washes.
- Wear long-sleeved shirts and long pants tucked into your socks or boots. Ticks do not jump, fly or drop from trees; they are on the ground and crawl up to find a place to attach.
- Wear light colored clothing so that ticks are easily spotted.



Check Yourself Daily

Especially in the following areas: under the arms, in and around the ears, inside the belly button, back of the knees, in and around the hair, between the legs and around the waist.

What to do if a tick is found?

- An attached tick feels like a small scab. Ticks often hide in the hair and scalp, on the neck, and in and behind the ears. Using a comb with fine teeth will help find adult ticks in the scalp and hair. Ticks also crawl into the underarms, between the legs, behind the knees, and onto the lower legs and arms. Use a mirror to check your back or have someone else look for you.
- An embedded tick should be removed as quickly as possible by using tweezers, rubber gloves or even leaves to provide grip.
- **Gently pull the tick straight up and do not crush the body or leave the head intact in the wound. Ticks can continue to live and transmit disease while dismembered.**
- Clean the bite and your hands with rubbing alcohol or soap and water.
- You may get a small bump or redness that goes away in 1-2 days, like a mosquito bite. **This is not a sign of Lyme disease.**
- **If an unattached tick is found, a trip to the doctor is not needed.** Ticks can take from 10 minutes to 2 hours to find a place to feed. Once they attach to the skin, they will typically remain attached for several days. According to the Center for Disease Control and Prevention (CDC), a tick must be attached for 24 hours in order to transmit Lyme disease. Look for signs of Lyme disease which include fever, rash (typically in the shape of a bull's eye), severe fatigue, facial paralysis, or joint pain within 30 days of being bitten by a tick.



- If it is likely the tick has been attached for 36 hours, it is recommended that the employee sees a panel physician. In this case, a single dose of antibiotic can be given if less than 72 hours have elapsed since removal of the tick.
- If possible, save the tick on a wet paper towel and store it in a closed container. Remember the date that the bite occurred. If Lyme disease is suspected, take the tick to the doctor and inform the physician of the symptoms.

Symptoms of Lyme Disease:

The most commonly noted symptom of Lyme disease is the red rash in the form of a target that appears shortly after being bitten by a deer tick. Fever and flu-like symptoms, along with headaches, muscle aches, and a severe fever may occur. Other symptoms include sweating, swollen glands, chills, and a sore throat.

Note: Avoid folklore remedies! Applying petroleum jelly, “painting” the tick with nail polish or using heat to make the tick detach from the skin is not the proper way to remove it. Your goal is to remove the tick as quickly as possible, not wait for it to detach.

*Should the employee require treatment, please seek treatment with a Panel Physician. Emergency care is not necessary. If symptoms develop overnight, it is advisable to wait until the next day to see a panel physician.

**Information concerning the above guidelines was obtained via the CDC website.



16-17 Open Season on Ticks

Protect yourself from tickborne disease this hunting season

Ticks feed on the blood of animals (such as rodents, rabbits, deer, and birds), but will bite humans too.

Ticks live in grassy or wooded areas, or on the animals themselves. Hunting brings you in closer contact with the ticks, so take the proper safety precautions to reduce your chances of being bitten.

- Treat your clothing and gear with permethrin before your hunt (always follow product instructions).
- Tuck your pants into your socks or boots to prevent ticks from crawling up pant legs.

Ticks can transmit serious and potentially fatal diseases like Lyme disease, ehrlichiosis and tularemia. Many of these illnesses can be treated effectively when caught early, so see your doctor right away if you have a fever, rash or flu-like symptoms after being in tick-infested areas. Frequent tick checks increase the likelihood of finding a tick before it can transmit disease.

- Shower after returning from the outdoors.
- Perform daily tick checks.
- If you see a tick, remove it immediately using tweezers.

If you are feeling ill, or have developed a fever or rash following a potential tick bite, call your doctor immediately.

Perform daily tick checks after returning from tick-infested areas

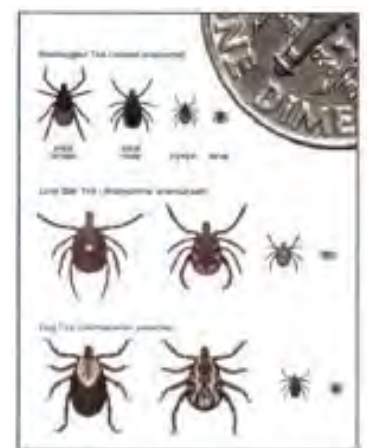
How to safely remove a tick:

The best method for removing ticks is to grasp it with tweezers as close to the skin as possible and pull up gently. Never use gasoline, kerosene, petroleum jelly, fingernail polish, or matches to kill or drive a tick out once it has been embedded.

Ticks and tickborne diseases in the United States:

The most common ticks in the United States are the black legged ticks (which can carry the organisms known to cause Lyme disease, anaplasmosis, babesiosis, and Powassan disease), Lone Star ticks (which can carry the organisms that cause ehrlichiosis, tularemia and the Southern Tick-Associated Rash Illness (STARI), and American dog ticks (which can carry the organisms which cause Rocky Mountain spotted fever and tularemia).

Many tickborne diseases, such as Lyme disease, babesiosis, ehrlichiosis and Rocky Mountain spotted fever can be treated effectively if caught early. Be sure to mention to your doctor any history of tick bites, or outdoor activities where you might have been exposed to ticks. Many people who become ill do not even remember seeing a tick.



Remember ...on your next hunt, Target the Tick

- Treat your clothing with permethrin
- Tuck pants into boots or socks
- Shower when you return from a hunt
- Perform daily tick checks



16-18 Ticks - How to Keep Yourself Safe

The weather in Pennsylvania is heating up, and as we spring into longer days, care should be taken because tick season has arrived. Since April 2012, PennDOT employees have reported twenty-one tick bites across the Commonwealth. While none of these cases have developed Lyme disease, it is vital to take preventative and after action measures while working outside.

Where do ticks hang out?

Ticks live in the woods, brush, bushes, and high grasses. They are common where wooded areas and nearby grasslands come together. They also can be found in the yards of city homes. The most common safeguard is wearing long sleeves and long pants tucked into boots if possible. Light-colored clothing will make it easier to spot ticks that have latched on in search of a meal.



What to do if a tick is found?

An attached tick feels like a small scab. Ticks often hide in the hair and scalp, on the neck, and in and behind the ears. Using a comb with fine teeth will help find adult ticks in the scalp and hair. Ticks also crawl into the underarms, between the legs, behind the knees, and onto the lower legs and arms. Use a mirror to check your back or have someone else look for you.

- An embedded tick should be removed as quickly as possible by using tweezers, rubber gloves or even leaves to provide grip.
- Gently pull the tick straight up and do not crush the body or leave the head intact in the wound. Ticks can continue to live and transmit disease while dismembered.
- If possible, save the tick on a wet paper towel and store it in a closed container. Remember the date that the bite occurred. If Lyme disease is suspected, take the tick to the doctor and inform the physician of the symptoms and bite date. This will assist in pin-pointing whether or not someone has been infected.



Symptoms of Lyme Disease:

The most commonly noted symptom of Lyme disease is the red rash in the form of a target that appears shortly after being bitten by a deer tick. Fever and flu-like symptoms, along with headaches, muscle aches, and a severe fever may occur.

Other symptoms include sweating, swollen glands, chills, and a sore throat.

16-19 Ticks

Working along the roadway in the summertime brings with it a whole host of pests that can endanger your life. Pests like ticks and spiders, rodents that spread disease and poisonous snakes that can strike without notice all bring with them a potential for injury.

Ticks

Over the last few years, Pennsylvania has become ground zero for Lyme Disease. Deer Ticks carry Lyme Disease which can affect the joints, heart and nervous system. If left untreated, Lyme Disease can be debilitating. A person will usually know they have Lyme Disease when they find a Bulls Eye somewhere on their body. This mark is not always at the point of the insect bite, and it doesn't always present itself in this manner. If you find a tick embedded on your body, use a tick puller to remove it. Make sure you get the whole head out because this is the part that carries the poison.

- If you've been working outside all day make sure you do a tick check of yourself. If you find a tick, take it out with a tick puller.
- Use DEET on your clothes before your shift.
- Tuck your pants into your boots and wear light colored clothing – this helps you see the tick if they get on you.
- Avoid high weeds or wooded areas where there have not been any other signs of someone walking.

Ticks are carried by deer and other small rodents such as white footed mice and eastern chipmunks. The smaller the tick, the more likely they are to harm you. According to the Pennsylvania Game Commission, Lyme Disease is typically transmitted to humans by nymphs.

Signs of Lyme Disease

- Bulls eye or dark red rash
- Joint stiffness or lameness
- Fever and chills
- Fatigue
- Headache

If you have found a tick embedded or suffering from the above symptoms, seek medical treatment immediately.

Section 17 - Ladders

- 17-1 Be Safe Using a Ladder
- 17-2 Ladder Safety
- 17-3 Ladders are Killers
- 17-4 Portable Ladder Safety
- 17-5 Safe Use of Step Ladder

17-1 Be Safe Using a Ladder

Ladders are an essential tool on many jobsites and at home across the United States. Because of their wide-spread use and the inherent danger of working at heights, they are responsible for many injuries both on and off the job.

Ladder Injury Facts and Statistics

- According to the World Health Organization (WHO), the United States leads the world in ladder deaths.
- Most ladder deaths are from 10-feet or less.
- Falls from ladders are one of the leading causes of injury at construction sites.
- Fractures are the most common type of ladder-related injury.

Common Causes of Ladder Falls

- Standing on the top step of a ladder.
- Carrying objects or tools while climbing.
- Not using three points of contact.
- Leaning beyond the ladder.
- Trying to move the ladder while on it.
- No inspection prior to use.
- Using the wrong ladder for your work purpose.

Ladder Safe Work Practices

- Never stand on the top step if it is not designed to be a step.
- Do not lean or reach to grab something while on a ladder. Climb down and reposition the ladder closer to the object or area you were trying to reach.
- Do not carry objects up the ladder in your hands. Use a tool belt or a retrieval system to bring tools up to you once you have climbed the ladder. Always have your hands free when climbing so you can have three points of contact with the ladder.
- Always inspect a ladder before use. If there are any problems with it, immediately tag it out of service and find a properly functioning ladder.
- Use the correct ladder for the job. There are many types of ladders to work in different situations. Check weight ratings to ensure you do not overload the ladder during use.
- Always secure the ladder. Make sure the ladder is stable on the ground before climbing up. Tie off the ladder to the structure you are next to. Have someone hold the ladder to secure it.

17-2 Ladder Safety

Climbing up and down a ladder is simple and common both at work and at home. Most people never give climbing up a ladder a second thought, but perhaps they should. According to the American Academy of Orthopedic Surgeons, there are over 500,000 ladder related injuries annually. PennDOT's Protocol 14, found in the Manual for Employee Safety and Health (MESH), specifies rules for using ladders to keep you safe.

Type and Design

We've all heard the term "use the right tool for the job." That statement could not be any truer than with a ladder. You don't want to use a step ladder when you need an extension ladder.

You'll want to look at your ladder and make sure it is the correct type. For instance, a Type I Industrial ladder is the type used in most PennDOT operations. A Type II can be used in office environments for painting and light duty operations and a Type III is the kind you'll most likely use at home. You can use a Type I at home, but you can't use a Type III at work.

Selection

The type of job you're doing will help determine the kind of ladder you'll need.

- Portable ladders must be properly selected based on their size, construction and type for the work being performed.

- Portable ladders must be properly labeled and used according to the manufacturer's rating (duty rating, highest standing level, maximum working length).
- Metal ladders cannot be used in areas that may come in contact with electrical sources (electrical panels, transformers, power lines, equipment).
- Ladders must be of sufficient height and in the proper position to do the work. It is unsafe to use a ladder that is too long or too short.
- You must use a straight ladder to gain access to a platform, roof or other elevated area.

Inspection

Inspection is the key to all ladder use. Look over the ladder prior to climbing on it. You'll need to look for the following:

- Free from sharp edges, splinters or burs.
- Broken, dented, loose or missing rungs – don't use the ladder.
- Rungs are free from excess dirt or slippery substances (if they're dirty – clean them before use).
- Side rails are cracked, split, bruised, have dry rot, dents or loose nails – if any exist, don't use the ladder.
- Hardware, fittings, and rivets for secure attachment are damaged – don't use the ladder.
- Frayed or badly worn rope – don't use the ladder.
- Proper operation of locking devices or safety feet – if broken, don't use the ladder.
- Damaged or worn non-slip bases – don't use the ladder.
- Safety and rating labels are illegible – don't use the ladder.

There are inherent dangers associated with ladder use. Ladders must only be used according to the purpose for which they were designed. Please keep the following in mind when climbing on a ladder.

- Never use a damaged or defective ladder.
- Consider the weight of the person and all the tools they are carrying when determining the load limit on a ladder.
- Use a fiberglass or dry wooden ladder around electricity.
- Make sure your shoes and the rungs of the ladder are not greasy, muddy or slippery before climbing.
- Do NOT use a ladder in high wind.
- Allow only one person at a time on a ladder.
- Always face the ladder when going up or coming down.
- Never attempt to move or adjust a ladder while you're standing on it.
- Never overstretch too far to the sides of the ladder. You'll want to keep your belt buckle even with the side rails.
- Never slide down, jump off or climb more than one rung at a time.
- Never splice two ladders together.
- ALWAYS USE THREE POINTS OF CONTACT!

17-3 Ladders are Killers

This is a true story, only the first name of the victim has been changed.

An employee wrote: "I lost a good friend September 15, 1997 from a fall from a roof. It seems that my friend Leroy went to help a neighbor with a leaking roof problem."

The leak was on a low-pitched single-story home. The roof was about eight-foot from ground to eaves' height. From family reports, Leroy borrowed a ladder from the neighbor to go up and temporarily fix the leak problem. However, it was just the top half of an extension ladder without safety feet on the bottom.

Leroy placed the ladder on a painted concrete patio, leaning it against the house, with just one rung above the landing surface. Carrying a large rock to hold down the felt for the roof, Leroy went up the ladder.

While going up the ladder, the friend on the ground continued his conversation with Leroy. When Leroy made it to the top and got ready to step off the ladder, the ladder at the ground, slipped and fell away. Leroy dropped the rock as he fell backwards, about nine

feet. The rock bounced on the patio; Leroy hit the back of his head on the rock. He died later that night never having regained consciousness. He left four children (two of whom are contractors) and four grandchildren.

Leroy was an experienced concrete finisher, framer, finished carpenter, and roofer. He was also a skilled woodworker, according to his obituary. He was careless. I will miss Leroy. His children and grandchildren will miss him more; our sympathies go to the family.

What lessons can you learn from this?

- How could this accident have been prevented?
- Was Leroy using the correct ladder for the job?
- Did Leroy inspect the ladder before use?
- Should Leroy have been carrying a rock up the ladder?
- Are there other ways this accident could have been prevented?

Remember: Tragedies remind us that falls from ladders or roofs are serious and can be fatal. We need to be reminded why we have safety rules and why they need to be followed. Don't take unnecessary chances, always have three points of contact, never carry anything in your hands while climbing a ladder, always inspect a ladder before use, and always follow the safety rules.

17-4 Portable Ladder Safety

Falls from portable ladders (step, straight, combination and extension) are one of the leading causes of occupational fatalities and injuries.

- Read and follow all labels/markings on the ladder.
- Avoid electrical hazards! – Look for overhead power lines before handling a ladder. Avoid using a metal ladder near power lines or exposed energized electrical equipment.
- Always inspect the ladder prior to using it. If the ladder is damaged, it must be removed from service and tagged until repaired or discarded.
- Always maintain a 3-point (two hands and a foot, or two feet and a hand) contact on the ladder when climbing. Keep your body near the middle of the step and always face the ladder while climbing (see diagram).
- Only use ladders and appropriate accessories (ladder levelers, jacks or hooks) for their designed purposes.
- Ladders must be free of any slippery material on the rungs, steps or feet.
- Do not use a self-supporting ladder (e.g., step ladder) as a single ladder or in a partially closed position.
- Do not use the top step/rung of a ladder as a step/rung unless it was designed for that purpose.
- Use a ladder only on a stable and level surface, unless it has been secured (top or bottom) to prevent displacement.
- Do not place a ladder on boxes, barrels or other unstable bases to obtain additional height.
- Do not move or shift a ladder while a person or equipment is on the ladder.
- An extension or straight ladder used to access an elevated surface must extend at least 3 feet above the point of support (see diagram). Do not stand on the three top rungs of a straight, single or extension ladder.
- The proper angle for setting up a ladder is to place its base a quarter of the working length of the ladder from the wall or other vertical surface (see diagram).
- A ladder placed in any location where it can be displaced by other work activities must be secured to prevent displacement or a barricade must be erected to keep traffic away from the ladder.
- Be sure that all locks on an extension ladder are properly engaged.
- Do not exceed the maximum load rating of a ladder. Be aware of the ladder's load rating and of the weight it is supporting, including the weight of any tools or equipment.

17-5 Safe Use of Step Ladders

Many of have used a portable step ladder. This is most common type of ladder and most likely we even have one at home. When we are using these types of ladders the upmost care must be taken to ensure that we are using them correctly and safely.

According to OSHA, the most common accidents that occur when we use a portable step ladder can be avoided by using the following tips:

Do These Things to Stay Safe While Using a Portable Step Ladder

- Always inspect your ladder prior to use. If you find something wrong with the ladder, take it out of service and make sure you tag it so no one else uses it.
- Make sure ALL FOUR FEET of the step ladder are set and level on a stable surface. Make sure both ladder spreaders are extended and locked.
- Keep your ladder, your body and all tools at least 10-feet away from energized electrical conductors.
- Always use three points of contact when climbing up or down the ladder. Two hands and a foot or two feet and a hand.
- Maintain your balance and center of gravity on your step ladder by keeping your belt buckle between the side rails.

To Stay Safe on your Portable Step Ladder, DO NOT do These Things

- Do not use a portable step ladder for purposes for which it was not designed. For example, do not lean a closed step ladder against a wall for purposes of climbing, or stand on a closed step ladder that has been placed across objects in a horizontal position.
- Do not use a metal step ladder around energized electrical conductors.
- Never climb up or down a portable step ladder while carrying any object that prevents you from firmly grasping the ladder with at least one hand, or could cause you to lose your balance.
- Do not place any tools or materials on the top cap or on any step of your ladder that might fall on someone below if the ladder were to be bumped.
- Never stand on the top step of a portable step ladder. Always follow the manufacturer's rules and warning sticker for proper standing surfaces.

For more rules and guidelines to staying safe on a portable step ladder please access PennDOT's Manual for Employee Safety and Health - Protocol 14.

Section 18 - Near Misses

18-1 Near Misses

18-2 Proper Shoveling

18-3 Taking Safety Back to Work With You After an Absence

18-1 Near Misses

A near miss is an event that could have the potential to be categorized as an incident or accident but did not result in property damage or an injury or illness requiring professional medical attention or a fatality.

What is Heinrich's Safety Pyramid?

In 1931, Herbert William Heinrich developed a theory explaining accident prevention showing a relationship between serious accidents, minor accidents and near misses; and proposes that if the number of minor accidents is reduced then there will be a corresponding fall in the number of serious accidents or fatalities.

Examples of Near Misses:

This may include, but is certainly not limited to:

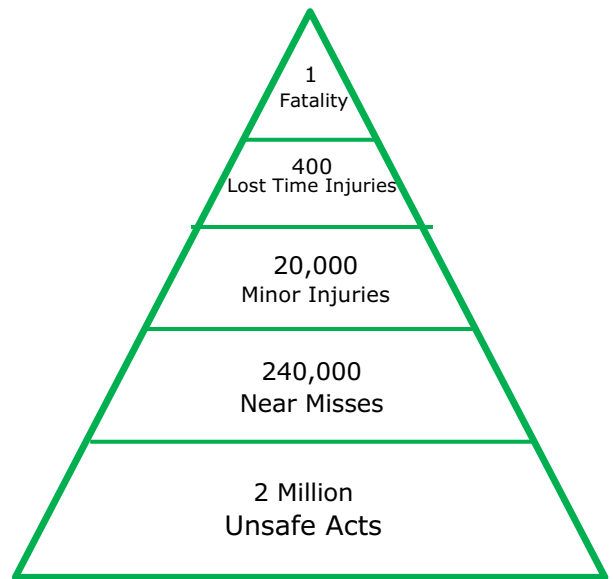
- Work zone intrusions that do not result in an property damage or injury. Work zone intrusions are defined as an unauthorized vehicle(s) or pedestrian(s) entering a designated work zone due to speed, distraction, alcohol, drugs, confusion, etc.
- Nearly hitting underground or overhead utilities or lines
- An employee trips but does not fall or become injured

Key Points to Remember:

- Near misses are leading indicators to serious incidents or injuries. Don't laugh off near misses, next time it could be very serious.
- Employees witnessing a near miss must report it to their supervisor immediately. The reporting supervisor must complete the P-25 Accident Investigation Report form. Checking the "near miss" box on the form is very important.
- Documented and completed near misses are inputted into the Accident Tracking System (ATS). The Employee Safety and Talent Development Division (ES&TDD) along with safety coordinators can then review and evaluate reports to determine proactive measures or trends to reduce the possibility of the near miss from reoccurring.

Foreman Discussion Starters:

- Review recent accidents or near misses that have occurred since the last safety meeting/talk.
- Discuss any hazards that may be encountered in the workplace each day.
- Create "What If" scenarios and discuss how to handle them from a safety perspective.



18-2 Proper Shoveling

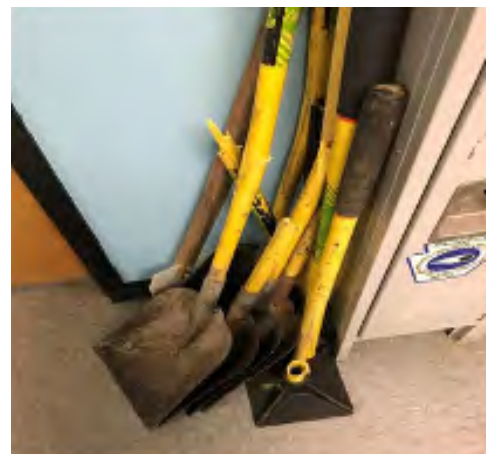
Strains and sprains are a leading cause of injury among PennDOT employees. A strain is caused by overstretching or overexerting while a sprain is caused by wrenching or twisting, injuries that can easily occur while shoveling and/or digging.

Causes of Strains/Sprains:

- Failure to follow correct lifting techniques
- Poor posture
- Using improper equipment

Choose the Right Equipment for the Task:

- Long-handled shovels are best used for digging.
- Short-handled shovels are best used for spreading/laying material.
- Smaller-blades (shovel heads) should be used for heavier materials to limit the load.
- Rounded or flat bladed shovels are best for loose materials such as sand or dry earth.



- Square bladed shovels are best for coarse-grained materials such as gravel.
- Blades with a rolled edge/step on the top are needed for digging impacted earth.

Best Practices for Shoveling:

- Keep feet wide apart.
- Place front foot close to the shovel.
- Put weight on the front foot.
- Use leg to push shovel.
- Shift weight to rear foot.
- Keep load close to body.
- Turn feet in direction of throw

Best Practices for Digging:

- Push spade down using leg muscle.
- Slide load close to body.
- Ensure load is loose from ground before lifting.

Additional Points to Remember While Shoveling:

- Take breaks to prevent over exertion.
- Drinking water to prevent dehydration.
- Wear all appropriate personal protective equipment like work gloves and proper footwear.
- Ensure PA One Call (811) has been contacted and utility lines have been marked.

18-3 Taking Safety Back to Work with you After an Absence

After being away from work – on weekend, vacations, holidays, or other reasons - it is important that safety goes back to work with you!

Injury data shows more injuries occur on a Monday than any other day of the week. Think about how you feel about Monday morning. How focused are you? How often do you feel overwhelmed/ stressed? Take that and compare it to returning to work after the holidays or a long vacation. Employees are often not focused on the job after being away from work; therefore, it is critical to evaluate safety when returning from an absence. Here are some tips to use to get your behaviors and mind back on SAFETY.



Ideas for Supervisors/Managers:

- Use Tool box talks to discuss any new hazards or review an area of concern.
- Take 4 Seconds for Safety: Do you understand what to do? Are there immediate hazards? Do you have the right tools? Are there specific safety rules or procedures?
- Review applicable job safety analysis (JSA) with employees to help familiarize them with any potential hazards associated with current operations. Refer to Pub 517 Job Safety Analysis Manual for existing JSAs.
- Discuss common operational tasks and safety measures.
- Remind employees about required personal protective equipment (PPE), hazardous chemicals (if any), safe driving practices and proper lifting techniques.

Ideas for Employees:

- Check the weather the night before returning to work and prepare accordingly.
- Get a good night's sleep.
- Be alert and pay attention to your surroundings during your commute.
- Assess for hazards, you may have forgotten about areas of concern while away or there may be new hazards present. If you notice any areas of concern report them to a supervisor/manager immediately.
- Take time to get settled and put necessary materials nearby and where they don't pose a hazard to others.
- Review critical information such as emergency evacuation information: where to go and what to do for emergencies, emergency exits, locations of fire extinguishers, alarms, the location of first aid kits and the list of first responders (if any), etc.
- Concentrate on the job to avoid distractions. Consider talking about your time off during breaks and lunch so you can focus on the job, its risks and its hazards.

Daily Safety Tips to Always Keep in Mind:

- See something unsafe? Fix it or report it to a supervisor/manager immediately.
- Avoid wearing any items that could cause an injury if it became caught on something. (Rings, bracelets, chains, etc.)
- Keep exits, walkways and fire extinguishers unobstructed.
- Clean up spills right away.
- Don't twist while carrying loads. Get assistance if an object is too heavy.
- Remain focused on what you're doing.
- Obey safety signs, labels and tags.
- Never take shortcuts.
- When in doubt, contact your supervisor/manager for instructions.
- Safety is everyone's responsibility.

Thank you for your commitment to safety!

Section 19 – Office Safety

- 19-1 Office Safety
- 19-2 Good Office Safety Practices
- 19-3 Office Safety with Pictures
- 19-4 The Office – Danger Zone!
- 19-5 Tips for Working Safely

19-1 Office Safety

Offices seem like they should be a safe place to work. Right? Compared to industrial work environments that is probably true, but believe it or not, offices can carry with them their own set of safety issues. Let's explore some of those issues .

The leading cause of injury in Pennsylvania and the nation is slips, trips and falls. This type of injury can occur anywhere. When you're in field production, plowing snow or walking across the room to pick up a copy, you can be injured by a fall.

Office workers are subjected to and can be injured by falls, fires, electric shock, cuts, and bruises. They can develop long-term injuries and disabilities from repetitive work such as keyboarding.

There are things you can do to make your office space safer.

- Watch for tripping hazards like cords or cables.
- Keep purses, computer bags, brief cases and backpacks out of the travel path.
- Keep desk drawers and cabinets closed while not in use.
- Load file cabinets from the bottom. Keep the heavy items on the bottom so the cabinet is not top-heavy.
- Clean up any spills right away. If a spill cannot be cleaned up right away, arrange for a barricade to warn people of a potential slipping hazard.
- Floors that are wet from cleaning should also be barricaded to warn people of a potential slipping hazard.
- Materials should be stored in designated areas not in boxes on the floor or on top of filing cabinets.
- Use safe lifting techniques. Back injuries are very common in office settings. To pick up a heavy item, squat down beside it and use the strength of your legs to lift the object. Bend your knees, not your back. You can hurt your back lifting as little as five pounds if you don't like it properly.
- Store sharp implements such as scissors, paper knives and letter openers separately to prevent cuts and puncture wounds.
- Repetitive strains are increasing in offices. When doing any repetitive work, take a break and frequently switch to other tasks to give yourself a rest.

19-2 Good Office Safety Practices

Safety is an individual commitment to incorporate safe work practices into every area of their job operations. However, unsafe conditions and procedures must be identified before they can be corrected. This means every employee must work safely and immediately report and help correct unsafe conditions or procedures. The following rules and guidance will help you identify and correct unsafe conditions to reduce accidents and injuries.

General Safety Rules

- Never do anything unsafe to get a job done.
- Use the handrails on steps and other elevated areas.
- Obey warning signs and tags. They are posted to point out hazards.
- Never work under the influence of alcohol or illegal drugs, (using them at work is prohibited).
- Do not engage in horseplay.

Office Safety

- Keep desk and file drawers closed when not in use.
- Do not open file or desk drawers above or behind someone without warning them.
- Use only step stools and ladders- do not climb on counters or chairs.
- Push chairs up to desk or under counter when not in use.
- Do not carry loads which obstruct your view, are too heavy or without a prepared place to set them down.
- Get help to move heavy objects.
- Approach blind areas cautiously.
- Know location of emergency exits and keep aisles clear to them.

Housekeeping

- Wipe up spills and pick up all objects that should not be on floor.
- Keep work areas and storage facilities clean, neat and orderly.
- All aisles, stairways, exits and access ways should be kept clear.
- When piling materials for storage, make sure the base is level and firm.
- Lay extension cords and hoses in such a way as to minimize tripping.
- Dispose of all packaging material immediately.

19-3 Office Safety with Pictures

- Never overload extension cords or electrical sockets.
- Know the location of fire extinguishers and evacuation routes.
- Clean up spills immediately, and block off the area in the meantime.
- Never stand on desks or chairs.
- Close desk and file drawers when not in use.
- Keep sharp objects in the front part of desk drawers where they are visible, and separate from other objects.
- Remove or secure hanging items like ties and jewelry when working around copiers and other office equipment.

The chart below notes many other safety practices for the office.



19-4 The Office – Danger Zone!

Compared to an industrial work environment, an office can seem like a safe place to work. However, many serious accidents and injuries occur regularly in offices everywhere. Office workers are injured by falls, fires and electric shock. They receive cuts and bruises from office tools and furniture. They develop long-term injuries from repetitive work such as keyboarding. Use the following safe work practices as you go through your day to avoid the danger zone!

- Watch for obstructions which can cause tripping accidents. Cords and cables should not be placed across traffic areas.
- Materials should be stored in designated storage areas, not in boxes on the floor.
- Briefcases, handbags and other personal items should be stored where someone will fall over them.
- Keep desk drawers and cabinets closed.
- Clean up any spills right way. If a spill cannot be taken care of immediately, arrange for a barricade and a sign to warn people. Floors wet from cleaning should also be blocked off and marked by warning signs.
- Load file cabinets from the bottom up. Top-heavy filing cabinets can fall over.
- Use safe lifting techniques. It is just as easy to receive a back injury in the office as it is in the warehouse.
- Store sharp implements such as scissors, paper knives, and letter openers separately from other items to prevent cuts and puncture wounds.
- Be alert to electrical hazards, which can cause fires and electrocution. Check for any frayed or damaged cords or plugs, and don't overload extension cords or electrical circuits.
- Don't use makeshift scaffolds such as a chair balanced on a desk when you are reaching for something overhead. Take the time to get a stepladder or stepstool.
- When doing work such as computer keyboarding, keep your hands and wrists straight and relaxed. Frequently switch to other tasks to give your hands a rest.

The office doesn't have to be dangerous. If you see a co-worker doing something unsafe let her know and offer to help. Employees working together can help make the danger zone a safety zone!

19-5 Tips for Working Safely

All workers can prevent themselves from getting hurt. The easy way to avoid pain is to observe how others have taken risks and been injured rather than learning the hard way from your own injury.

Experts say at least 80 percent of industrial accidents are caused by unsafe acts on the part of employees, not by unsafe conditions. Although an employer is required by law to provide a safe and healthful workplace, it is up to you to be aware of your work environment and follow safe work practices. By avoiding unsafe acts and practicing common sense, your work will go smoother with less chance for accidents.

Most accidents are caused by unsafe acts including:

Being in a hurry- Sometimes there is more concern for completing a job quickly instead of safely. Take time to do a good and safe job!

Taking chances- Daring behavior or blatant disregard for safe work practices can put the whole work team at risk. Follow all safety rules and procedures and watch out for your fellow employees. Remember, horseplay is never appropriate on the job and can lead to disciplinary action.

Being preoccupied- Daydreaming, "drifting off" at work, thinking about the weekend and not paying attention to your work can get you seriously hurt or even killed. Focus on the work you are paid to do. If your mind is troubled or distracted, you're definitely at risk to have a mishap!

Having a negative attitude- Being angry or in a bad mood can lead to severe accidents because anger nearly always rules over caution. Flying off the handle at work is potentially dangerous! Keep your bad moods in check, or more than one person may be hurt. Remember to stay cool and in charge of your emotions.

Failing to look for hidden hazards- Sometimes unexpected hazards develop on the job, so always be alert for changes in the environment. Hidden hazards include spilled liquids that could cause slips and falls, out-of-place objects or power cords across the walkway that can be tripped over, low overhead pipes that could mean a head injury and machinery that is not locked out while being serviced.

Remember these tips so you won't become one more accident statistic!

Section 20 – Personal Safety

- 20-1 Attitude
- 20-2 Be Observant!
- 20-3 Cause and Effect
- 20-4 Good Enough Mindset
- 20-5 Horseplay
- 20-6 Horseplay at Work
- 20-7 No Shortcuts to Safety
- 20-8 PennDOT Memorials
- 20-9 Rationalizing Unsafe Choices
- 20-10 Recognizing Unsafe Conditions
- 20-11 Risk Takers
- 20-12 Safety is Common Sense
- 20-13 The Hazards of Shortcuts
- 20-14 Tips for Working Safely
- 20-15 What Can Hurt Me Today?
- 20-16 What Does an Accident Cost?
- 20-17 Why Accidents Happen?

20-1 Attitude

How does attitude affect your work and safety on the job? What is your attitude today? We all have days where our overall attitude could improve, but how is yours towards your coworkers, boss or safety on a day to day basis? If you are generally an active person, what effects would a more positive attitude have on your life and on your work?

Attitude and Health

There are many reasons to strive to have a positive attitude. Outside of the obvious reasons, having a positive attitude will improve your mood and make work more enjoyable. Researchers have also been studying how a positive outlook can improve your health. The Mayo Clinic suggests that a positive attitude can:

- Increase your lifespan.
- Lower rates of depression.
- Have better resistance to the common cold and give a better physical well-being.
- Give you better coping skills during high stress events.

Attitude and Safety on the Job

A negative attitude can often lead to carelessness, complacency and shortcuts. A negative attitude toward safety can result in unsafe behaviors which can lead to incidents and accidents occurring on the job. Do you have a negative or positive attitude as it relates to safety?

How to Improve your Attitude

There are four steps to take to get on the road to a healthy attitude.

1. Recognize

The first step in improving your attitude is to recognize what is causing you to have a negative attitude in the first place. Ask yourself how you feel and how you think your attitude is today? Then ask yourself why? If you're feeling negative, try to talk yourself up and make a commitment to being safer and happier.

2. What is the source of your issue(s)?

After you have determined the state of your attitude, you must then find the source of your issue and what is causing you to be negative. Basically, what's bothering you? Is it too many rules? Your boss? A co-worker? A family situation? No matter what the source, make a mental note of the source.

3. Address the Issue(s)

Take time to address whatever is having a negative effect on your attitude. For example: If it's a co-worker or supervisor, have a conversation with them. Most issues can be resolved with an adult, constructive conversation. If the issue cannot be resolved with a conversation, you may need to go to the next higher level of supervisor.

4. Remain Aware of your Attitude

It is important to do a daily self-check of your attitude. A good way to do this is to monitor your thoughts or conversations that you have with others. If you have more negative conversations than positive, then it is a good indicator that you may need to improve your attitude. It is easy to allow a negative attitude to creep into your daily life as stress builds. There will always be issues in your life, but it is important not to let them have a negative effect on you for an extended period of time.

20-2 Be Observant!

How many times have you tripped over something that you didn't see or have been startled by someone who was near you that you weren't aware of? It happens to many of us, all too often. Depending on what is occupying your mind or working with your emotions can dictate how observant you are at any given moment.

We live in a world of distractions. From cell phones to back-up beepers, we are constantly being bombarded with noise. The more noise we have surrounding us, the less observant we are. Unfortunately, in the jobs we do, we must be observant 100% of the time. The less observant we are, the higher the chance we have to be injured.

Here are few simple ways to become more observant:

- Eliminate distractions from your area. This means turning the cell phone off or to silent.
- Before you start working, look around and make sure you know all the hazards. Identify them and then try to eliminate them.
- Focus on your task and only your task.

By focusing on your work and eliminating hazards and distractions you won't miss important details and will be able to stay safe on the job.

20-3 Cause and Effect

Have you ever heard or said, "It was just an accident"? There are no "just accidents", every accident has a cause; if you remove the cause, you remove the accident. Accidents are caused by one of two things. You can have an accident because of an unsafe act or an unsafe condition. By recognizing an unsafe act or condition, we can often create a corrective action that reduces or completely removes the exposure to these issues.

Here are some examples of unsafe acts:

- Unauthorized use or operation of equipment
- Failure to secure or tie down materials to prevent unexpected movement
- Working, driving or operating equipment too fast
- Knowingly using a defective tool
- Removing safety guards from tools and equipment
- Improperly using tools or equipment
- Standing in an unsafe place
- Servicing moving equipment
- Riding on equipment not designed for passengers
- Horseplay
- Failure to wear proper PPE including seat belts and fall protection

Here are some examples of unsafe conditions:

- Lack of proper warning systems
- Lack of proper guarding
- Fire and explosion hazards
- Poor Housekeeping
- Protruding objects such as nails, wire or other metals
- Improper clearance or congestion in aisles and passageways
- Poor placement, storage or arrangement of materials
- Poor lighting or high noise levels
- Hazardous atmospheric conditions (Bad air – confined space)
- Improper personal attire (not dressing for the weather)

Now that you are able to recognize unsafe acts and conditions you will be better equipped to correct them or avoid them to reduce your personal exposure to the risks that are associated with these causes.

20-4 Good Enough Mindset

No matter if you've been doing your job for 30 years or 30 minutes you probably know the right way to do your job – the safe way to do your job. You also probably have figured out the shortcuts and the Good Enough way to do your job. Unfortunately, when it comes to safety, good enough doesn't cut it. When you address hazards, having a good enough mindset will lead to exposure and additional risk. This exposure can lead to accidents and injuries.

What Leads to a Good Enough Mindset?

There are many factors that can lead anyone to a good enough mindset, but here are a few that have been found to be the leading causes:

- **Complacency:** People who do the same job everyday for a long period of time become very comfortable with that task. They tend to take shortcuts and not pay as much attention to their job as they did when they first started. Staying attentive to your job will prevent complacency.
- **Lack of Training or Understanding:** Some workers, especially those less experienced may not understand the importance of taking certain steps to protect themselves and those around them while completing their work. Older workers should help to explain the necessary steps and lead less experienced workers in safety.
- **The Safety Culture of the Supervisor:** When supervisors or co-workers do not follow safety rules and procedures, then others around them are more willing to take risks and not follow the rules. They will settle for Good Enough.
- **Lack of Energy or Fatigue:** There are many times when we don't feel 100%. Lack of energy and feeling tired is a huge problem when it comes to your personal safety. Working winter shifts contributes to being tired and can cause accidents. When we're tired, we're more likely to take shortcuts and make mistakes.

How to Avoid the Good Enough Mindset.

Always aim to do your best. We usually know what's expected or the proper way of doing our jobs. Don't allow yourself to be brought down by other workers who want to be good enough. Not only will doing your best help to ensure less chance of injury but it also builds a good reputation for you.

- Recognize when you're not feeling your best or when you're tired and your energy levels are low. If you find yourself leaning towards taking the shortcut or the easy choice instead of the right choice, then take a step back and fight the urge to cut corners.
- Remind yourself why safety policies and best practices are place. There are safety rules because someone got hurt doing this job at one time or another. Don't get hurt, stay safe and follow the rules.
- Have others who have more experience in their job check your work if you feel you need a second set of eyes. Ask for feedback. If you don't fully understand the task and the subsequent hazards associated with those hazards ask your supervisor to explain it again. When you fully understand your job and the hazards associated with it, you'll be safer and a better worker.

Remember: Good Enough is a mindset that plagues individuals both at home and at work. When we aim lower than what we know our potential is we are opening ourselves to potential injury. When it comes to safety at work, aiming lower than what is expected can lead to serious injuries.

20-5 Horseplay

You've heard the old adage "It's all fun and games until someone gets hurt." Right? Well that is true at home and at work.

Horseplay or pranks that can cause someone to get hurt is no laughing matter. Horseplay can involve joking, pushing, shoving, playing around, racing, grabbing, foolish vehicle operation and contests that can cause someone to get hurt. These all will be viewed as unsafe acts and will be written as a safety violation.

Although the perpetrator will say things like, "It's all just harmless fun," Or "We were just joking around." When someone gets hurt it's too late to take back the harmless part and suddenly the joke is no longer funny. Workplace horseplay includes property damage, slips, trips and falls and vehicle accidents. All of these incidents can lead to serious injury and even death.

Some example of horseplay are:

- Scaring someone
- Making a loud sound next to someone to see them react
- Grabbing
- Boxing
- Wrestling
- Pushing/Shoving
- Throwing Water

- Shooting an air hose at someone

Unfortunately, horseplay and practical jokes invite risk and a very real danger of being hurt. It really benefits no one and often builds resentment and fosters retaliation. This type of behavior is not permitted and will not be tolerated.

Remember, you have a responsibility to yourself, your family and your co-workers to be as safe as possible. Adding risk to your daily activities just isn't a good idea.

20-6 Horseplay at Work

Horseplay is rough or rowdy play or pranks that occur at the workplace. It can involve joking that includes physical contact, playing around, racing, grabbing, foolish vehicle operation, social pressure to participate in unsafe acts, harassment and unauthorized contests.

What's the harm?

On-the-job horseplay is not just harmless fun. Workplace horseplay incidents may lead to serious injuries at work, divide the workplace and prevent employees from getting their jobs done. Horseplay can also cause humiliation, embarrassment, anger, hurt feelings and distrust. In some states, horseplay-related incidents that result in injuries can lead to criminal prosecutions – some courts have determined these incidents to be deliberate acts.

Prevention

Make it known that workers are responsible for each other's safety. It should be clear to employees that they are to refrain from engaging in unsafe behaviors on the job, follow all workplace rules and regulations, and ensure equipment is used properly. Supervisors and managers have a responsibility to keep their employees' work environment safe and free of harassment by monitoring for and preventing horseplay.

- Don't play into horseplay. Don't initiate it. Don't get pressured into participating in it.
- If you see someone behaving in an unprofessional or unsafe way at work, report it to a supervisor.
- Follow instructions and obey the safety rules designed for your protection.

20-7 No Shortcuts to Safety

We've all heard it. Something worth doing is worth doing right the first time. Safety is no different. Honestly, there are no shortcuts to being safe. Not only is it your responsibility to be safe, but it is also your employer's responsibility (The Commonwealth) to make sure you are being provided the safest means possible to work safely.

Taking a shortcut to get the job done faster isn't always the best idea. Don't confuse the fastest way to get a job done with the most efficient way. Fast usually involves a shortcut which usually does NOT involve safety. Efficiency will account for safety and will be included in the amount of time it will take to get a job done.

Even if a job only takes a few minutes, don't sacrifice your personal safety for a rapid turn-around. Always wear your PPE, use safe guards, make sure you're using the right tool and the proper equipment for the job. Do not improvise just to save a couple minutes.

Remember, the safest way isn't always the shortest way, but it's always the surest way.

20-8 PennDOT Memorials

On Sunday April 28, 2019 several organizations, unions, private employers and agencies around the world will observe Workers' Memorial Day to remember those who have tragically lost their lives while on the job. Sadly, since

1970 there have been 91 fatalities within PennDOT that have touched our lives indefinitely. Memorials have been constructed around the state to pay tribute to those employees.

PennDOT Memorial Locations:

- Statewide memorial in downtown Harrisburg at Riverfront Park, at the east end of the Harvey Taylor Bridge.



- Traveling memorial based out of Bradford County Maintenance Office in District 3. For scheduling information please contact the Safety Press Officer in District 3.
- District 4 Monument permanently honors the employees who died in the line of duty. The monument is located outside the main entrance of the District office and can be visited anytime of the day.
- For details on individual employee memorial locations, contact your local Safety/Press Coordinator.

Combating Complacency

Complacency:

It is often said that the majority of injuries, regardless of severity, are caused by complacency within the workplace. Complacency occurs when we become too comfortable in our jobs and we take safety for granted.

When you are performing a task that is repetitive, or when you are performing regular job duties that have become second nature, your mind can wander. When you are not concentrating on the task at hand, you open the door to mistakes that can cause accidents and injuries. Your mind is your most important safety device.

Prevention:

- Statistics show that taking four (4) seconds to pause and think about safety before completing a task can reduce injuries by up to 90%. When you are pausing for safety, ask yourself the following:
 - Do I have a clear understanding of the task to be done?
 - Are there any immediate hazards to be aware of?
 - Is my path clear before walking?
 - Will I need assistance?
- Focus on process instead of outcome.
- Speak up when witnessing a co-worker taking a shortcut.

20-9 Rationalizing Unsafe Choices

Making the decision to follow every single safety rule doesn't come natural to us. We must constantly work towards making the right decisions to be safe. Ultimately, it's up to us to be as safe as possible. Many times, individuals find ways to rationalize not working safely. It is important for each employee to recognize this trap and address it when it happens.

Why We Rationalize Unsafe Choices

For the most part, we all know what the right choices are when it comes to safety during a specific work task. We've learned from safety trainings, Safety Stand Down Days, policies, procedures, labels, supervisors and even other workers. All these ways communicate what needs to be done to eliminate hazards and work safely. Yes, we all still make choices to not wear a hard hat or leap into a deep ditch. The problem is, there are many factors that affect whether we want to make the right decision or not at any given moment. Here are few reasons:

- Time pressure
- The feeling of getting away with something
- Lack of enforcement of the rules
- Fatigue/energy levels
- Mood
- Peer Pressure

People facing one or more of these factors will use them to rationalize to themselves why a certain safety rule doesn't need followed or why it shouldn't apply to them. For example: "I forgot my fall protection in the truck – but it's okay – I'm only going up there for a second. Besides, I've never fallen!" Everyone has done this, just like looking at the top step of the ladder and reading the sign that says don't step here, yet we step there. Sometimes we fall. Safety is a choice!

Make the Decision to be Safe

When there are other people on your crew who are not making the decision to be safe and go home at the end of the day, it becomes difficult to make the safe choice. In fact, going along with the crowd long enough will start to feel normal. Unfortunately, when normal includes taking chances and working unsafely it puts not only you but your entire crew at risk. DO NOT rely on your

Supervisor or your Safety Coordinator to tell you to be safe, it's up to you to do the right thing and work in the safest way all the time. Make the choice to be safe every day.

20-10 Recognizing Unsafe Conditions

Recognizing unsafe conditions or hazards in the workplace is not just a Safety Committee responsibility. It is everyone's responsibility from the newest employee to the county manager. Everyone must get in the habit of identifying hazards and helping to correct the problem.

Unsafe conditions:

- Poor housekeeping
- Confused material storage
- Careless handling of materials
- Improper or defective tools
- Lack of or failure to wear proper personal protection equipment
- Failure to plan and prepare for the job
- Failure to follow instructions

Steps to take once an unsafe condition is found:

- If possible, correct the condition yourself immediately.
- Report any major unsafe condition or action to the appropriate authority.
- Follow-up - report the condition again if it is not corrected.

Remember: There are two steps to follow in recognizing unsafe conditions. Recognize the unsafe condition and correct it and/or report it.

Discussion: What are some potential unsafe conditions to look for in today's work? How could you correct them?

20-11 Risk Takers

Are you a risk taker? Do you like to see how far you can push the limits? Sometimes being a risk taker is okay. Times like asking someone out on a date for the first time or applying for a better job. These are good risks. But being a risk taker and pushing the limits of safety on the job can often cause yourself or a co-worker to get hurt or worse.

Occasionally people will say "It was only a matter of time." Indicating that someone was doing something for a long time and now "it" finally caught up with them. This saying can have both positive and negative connotations, such as "It was only a matter of time until Joe got that promotion. He has always worked so hard." The saying can also have a negative spin such as, "It was only a matter of time until Joe had an accident, he's always texting and driving."

Do you know people at work who take unnecessary risks and for whom it will only be a matter of time until they get hurt?

Normally, when you make a statement like "it was only a matter of time" the risks that person was taking have been going on for a long time. If you see a co-worker taking unnecessary risks say something. Ask them to change their risk-taking behavior. If they don't do it for you, tell your supervisor. Remember, just because you are not doing the risk-taking behavior, doesn't mean you are not exposed to it. Keep yourself and your co-workers safe by reporting unnecessary risks.

20-12 Safety is Common Sense

How many times have you heard, "That's just common sense"? Well if sense was common, everyone would have it – right? Not only is safety not Common Sense, but it's also often difficult and requires extra effort.

If you were to say that you know and understand the safety rules but choose not to follow them, then we might say you aren't being sensible, but that's still not Common Sense.

Safety and being safe require each employee to make an effort to follow the safety rules and to want to be safe.

For instance: If you were climbing a ladder and you got to the top step where it says, DO NOT STEP HERE what decision will you make? Will you make a decision that could potentially harm you (because it's easier than getting a taller ladder)? Or will you make the safe decision and not step there?

It's easy to say don't be complacent or have common sense when it comes to safety, but ultimately it is up to each individual to want to be safe and to want to follow the safety rules to have the ultimate outcome of going home at the end of the day.

Safety and being safe is difficult, but not nearly as hard as having a broken leg, losing a hand or telling the spouse of your best friend that they won't be coming home.

20-13 The Hazards of Shortcuts

Humans have been looking for the better, quicker way to do things since the cavemen first started hunting. They found it difficult to hunt with just their hands, so they developed tools. Even today, we are developing faster computers to expedite our work tasks. We have computers at every work station, foremen have tablets and even at home you can ask the little box to turn off the lights in the morning.

We look for shortcuts to make our lives easier, unfortunately, when it comes to safety there are no shortcuts that work.

Safety Hazards

When you shortcut safety, you don't get a better, faster way to do your job. Instead, you get more hazards and risks.

Take a look at this list and see if you have done any of these shortcuts. Please discuss in the group the outcomes of the shortcuts and what could have been done differently.

- You went into the garage without your safety glasses – a hydraulic line popped as you were walking by and you got fluid in your eye.
- You talk and text while driving.
- You walked by an unsafe condition without correcting it or telling someone about it.
- You walk on an unprotected bridge deck without guardrails or fall protection.
- You drove while you were sleepy.
- You cross the street between intersections instead of using the crosswalk.
- You allowed your five-year-old to ride in the car without a car seat or seat belt.
- You forgot your hard hat in the crew cab, so you went without it.
- You hitched a ride on a piece of equipment that wasn't meant for passengers.

It's human nature to think shortcutting can be done without ever having a problem. Shortcuts nearly always increase your risk and if you continue to take shortcuts someone (you or a co-worker) will pay the price with an injury, property damage or loss of life. The seconds you're trying to save will cost you hours of paperwork, time off work or even the rest of your life.

20-14 Tips for Working Safely

Experts say at least 80 percent of work-related accidents are caused by unsafe acts by employees. This statistic indicates that at 80 percent of work-related accidents can be avoided. The Commonwealth of Pennsylvania is committed to providing a safe and healthy workplace but requires you to follow those safe work practices. By avoiding unsafe acts and following safety protocols, your work will go smoother with less chances for accidents.

Statistically, most accidents are caused by unsafe acts including:

- **Being in a Hurry** – Sometimes there is more concern for completing the job quickly instead of safely. Take time to do a good job SAFELY.
- **Taking Chances** – daring behavior or the blatant disregard of safe work practices and protocols can put the whole crew at risk. Follow all safety rules, procedures and protocols and watch out for your co-workers. Remember, horseplay is NEVER appropriate on the job and can lead to disciplinary action.
- **Being Pre-occupied** – Daydreaming, drifting off at work, thinking about the weekend or even just answering a text can get you seriously injured or even killed. Focus on the work you are being paid to do. If you're troubled and can't focus, or distracted, you're at risk for an accident.

- **Failing to Look for Hidden Hazards** – Sometimes new and unexpected hazards develop on the job, so always be alert for changes in the environment. Hidden hazards include slipped liquids that could cause slips, trips and falls, out-of-place objects or power cords lying across a walkway can cause a tripping hazard. Low overhead pipes could lead to a head injury and machinery that isn't locked out while being serviced could lead to death.
- **Having a Negative Attitude** – Being angry or in a bad mood can lead to severe accidents because anger nearly always rules over caution. Flying off the handle at work is potentially dangerous! Keep your bad moods in check, or more than just you could get hurt. Remember to stay cool and in charge of your emotions.

Remember your real job is to return home safely every day. Don't become an accident statistic. You can do quality work without rushing through it. Maintain a positive attitude and keep your mind on your work.

20-15 What Can Hurt Me Today?

Have you stopped to think of the things on the job that can hurt you? Some of things are really easy to identify like poor drivers. While other things are a bit harder to pin point. Doing a hazard assessment at the beginning of every shift should be something we all do every day.

Although it's usually a supervisor's job to point out hazards, the process can also include a self-check of the work area, any tools you may be using or the truck you may be driving. During this process your main objective should be to identify hazards so you, your co-workers and your supervisor can take steps to eliminate the hazards you've found. The easiest way to start is to ask yourself, "What can hurt me today?"

When you ask yourself this question it should trigger a process for you to look around and see what hazards exist in your work area. When you identify hazards in your work area it makes you more aware and you'll be looking for ways to avoid those hazards. Once identified, tell your supervisor, tell your foreman or take ownership of the hazard yourself and find ways to eliminate or mitigate the problem.

Sometimes it will be your responsibility to see the hazard through until it's fixed, sometimes it will be as simple as marking. No matter how complex the hazard be sure to see the solution through to the end to help yourself and others avoid being hurt on the job.

20-16 What Does an Accident Cost?

Every personal injury accident has Direct and Indirect costs associated with it. Let's take a look at some of each.

Employee Direct Costs:

If you have been injured at work you know that Workers Compensation will pick up the tab for your medical bills and give you about two thirds of your gross salary to help you pay your bills. But remember, Workers Compensation only pays the medical bills associated with your work-related injury and will not begin until the claim is approved which can take up to 21 days from the first day of injury. If you have other health issues, not related to your work-related injury, you will still be responsible for those. If you can't work, you are still responsible for your health insurance for yourself and your family.

Employee Indirect Costs:

The indirect costs to the employee are not as cut and dried and affect different people at different times. After an injury many people go through a withdrawal period. They worry, they most likely are in pain and are suffering. For many people, being hurt causes a decrease in activity with family and friends. This decreased social interaction can lead to depression and mental anguish.

Sometimes, depending on the severity of the injury, employees can be in pain for years and years which can affect your children, your marriage and your friends.

The indirect costs far outweigh the direct costs and can last for years. Please remember these costs the next time you decide to take a short cut or do something too quickly. Always try to follow the rules and to stay safe. Report injuries immediately, and take every precaution not to be hurt.

20-17 Why Accidents Happen?

Have you ever seen an accident or even been involved in one ask, Why? Why did this happen?

Did you know that over 80 percent of all accidents are the fault of the person involved? Unsafe acts cause four times as many accident and injuries as unsafe working conditions.

Accidents happen for lots of different reasons and most supervisors look for “things” to blame instead of looking for the root cause like taking shortcuts or being distracted. It’s just easier to look for some THING to blame. But take a minute and consider looking at some of the underlying reasons that an accident might happen.

- **Taking Shortcuts:** Have you ever taken a shortcut on the job and had a near miss? Shortcuts sound good in theory, but once there is an accident that short cut just cost you many more hours of paperwork and possibly the life of a friend. Slow down and follow procedures.
- **Ignoring Safety Procedures:** Since we’re talking about procedures, have you or do you know someone who failed to observe a safety procedure and then got hurt? Purposely failing to follow safety procedures can endanger you and your crew. Frankly, you’re being paid to follow the safety rules, not make up your own. Being casual about safety can lead to a casualty.
- **Starting a Job Without Complete Instructions:** When doing a job safely, you need to know your expectations and safety procedures. If your supervisor went over things too quickly – don’t be shy, raise your hand and ask the boss to go over it again. Trust that if you didn’t understand, someone else on the crew probably didn’t either.
- **Failure to Pre-Plan Work:** Part of pre-planning should include a look at the JSA (Job Safety Analysis) for that particular job. Not looking at the JSA prior to work is like leaving your house without pants.
- **Mental Distractions:** Distractions come in all shapes and sizes. You can be distracted by an insect on your windshield or by your cell phone buzzing in your pocket. Maybe you have an issue at home that is weighing heavy on your mind. Dropping your mental guard can pull your focus from working safely. Focus on your task and never take your eyes off the road or the machine, even for just a minute.
- **Poor Housekeeping:** The number cause of injury in the Commonwealth is a category known as Slips, Trips and Falls. Poor housekeeping can lead to these types of injuries as well as many other hazards. Having a well-maintained stockpile, garage, office or desk sets a standard for others to follow and involves both pride and safety.
- **Being Over-Confident:** Confidence in your work is great. It shows that you understand your job, but having too much confidence can make you sloppy, using improper safety procedures and taking shortcuts which can all lead to injuries.

Section 21 – Pinch Points

- 21-1 Protecting Yourself from Amputations
- 21-2 Amputation Hazards
- 21-3 Hand Injuries
- 21-4 Hand Protection
- 21-5 Know Your Pinch Points
- 21-6 Case Study - Pinch Point
- 21-7 Guard Against Pinch Points
- 21-8 Protect Your Hands

21-1 Protecting Yourself from Amputations

Nationwide, thousands of workers lose fingers, toes, hands and feet annually through compression, crushing or getting a body part stuck in a moving part of a machine.

Amputations occur when workers ignore or bypass safeguards put in place to keep their extremities safe. Safeguards like the seat switch in a tandem or the auger disconnect coupling, chain saw chaps or the guard on a table saw. These safeguards enable a worker to perform duties around the machine without getting hurt. Removing those safeguards puts you, the worker, at unnecessary risk.

PennDOT has many machines that can cause a worker to lose a finger, hand or foot. Some of the most common machines to be aware of and use extra caution around are:

- Wood-chippers
- Augers
- Chain saws
- Table Saws
- Belt Sanders
- Lawn Mowers

Workers should also use caution when working with or around:

- Tailgate chains
- Tailgate latches
- Hitches
- Portable signs

PennDOT has put many safeguards in place to keep you from getting hurt. Always wear your PPE and don't bypass the any safeguard. They were put there to ensure your safety.

21-2 Amputation Hazards

Amputations are some of the most serious and debilitating workplace injuries. They are widespread and involve a variety of activities and equipment. Amputations occur most often when workers operate unguarded or inadequately safeguarded mechanical tools. These injuries also happen during materials handling activities and when using forklifts and doors as well as trash compactors and powered and non- powered hand tools. The following activities involving stationary machines also expose workers to potential amputation hazards: setting up, threading, preparing, adjusting, cleaning, lubricating, and clearing jams.

The following types of mechanical components present amputation hazards:

- Point of operation-the area of a machine where it performs work on material.
- Power-transmission apparatuses-flywheels, pulleys, belts, chains, couplings, spindles, cams, and gears in addition to connecting rods and other machine components that transmit energy.
- Other moving parts-machine components that move during machine operation such as reciprocating, rotating, and transverse moving parts as well as auxiliary machine parts.

What kinds of mechanical motion are hazardous?

- Rotating-circular movement of couplings, cams, clutches, flywheels, and spindles as well as shaft ends and rotating collars that may grip clothing or otherwise force a body part into a dangerous location.
- Reciprocating-back-and-forth or up-and down action that may strike or entrap a worker between a moving part and a fixed object.
- Traversing-movement in a straight, continuous line that may strike or catch a worker in a pinch or shear point created between the moving part and a fixed object.
- Cutting-action generated during sawing, boring, drilling, milling, slicing, and Punching-motion resulting when a machine moves a slide (ram) to stamp or blank metal or other material.
- Shearing-movement of a powered slide or knife during metal trimming or shearing.
- Bending-action occurring when power is applied to a slide to draw or form metal or other materials.

What types of machine components are hazardous?

- Point of operation-the area of a machine where it performs work on material.
- Power-transmission apparatuses-flywheels, pulleys, belts, chains, couplings, spindles, cams, and gears in addition to connecting rods and other machine components that transmit energy.
- Other moving parts-machine components that move during machine operation such as reciprocating, rotating, and transverse moving parts as well as auxiliary machine parts.

Work practices, employee training, and administrative controls can help prevent and control amputation hazards. Machine safeguarding with the following equipment is the best way to control amputations caused by stationary machinery:

- Guards provide physical barriers that prevent access to hazardous areas. They should be secure and strong, and workers should not be able to bypass, remove, or tamper with them. Guards should not obstruct the operator's view or prevent employees from working.
- Devices help prevent contact with points of operation and may replace or supplement guards. Devices can interrupt the normal cycle of the machine when the operator's hands are at the point of operation, prevent the operator from reaching into the point of operation, or withdraw the operator's hands if they approach the point of operation when the machine cycles. They must allow safe lubrication and maintenance and not create hazards or interfere with normal machine operation. In addition, they should be secure, tamper resistant, and durable.

21-3 Hand Injuries

Are you right-handed or left-handed? If you're right-handed, have you ever tried signing your name with your left-hand? If you're left-handed, have you ever tried using scissors with your right-hand? Using the opposite hand from what we're used to, can be difficult. Sometimes, we use the other hand when we want to challenge ourselves, but sometimes we are forced to use the other hand because of an injury to our dominant hand.

There are three common types of hand injuries that could force you to use your other hand.

- Lacerations, cuts and abrasions are the most common. Sharp objects, inadequate gloves and distractions cause us to cut our hands. Lacerations can be minor resulting in the use of a bandage or major resulting in amputation.
- Crushing injuries occur because of pinch points. A pinch point will happen anytime you encounter a hinge or closure.
- Fractures come from a sudden blow to the fingers or hand. Some common ways to break the bones in your hands are from vehicle accidents or catching yourself from a fall.

Prevention of Hand Injuries

- Wear proper gloves for the job you're doing. For instance, you wouldn't put on latex gloves to cut wood. No matter what your task, you need to understand the limitations of your gloves.
- Avoid using a fixed open blade knife. There are safety knives that limit the length of the exposed blade.
- Don't put your hands in places where you cannot see them.
- Use tools to remove your hands from the line of fire. For instance, if you are working with a table saw, use a push stick. If you are cleaning an auger, use a piece of wood and not your hands.
- Always practice Lock Out/Tag Out procedures and never work on energized equipment until it has been turned off. Take the keys or unplug the equipment to avoid unintentional start up while you're working.

The next time you're doing a simple task at home, try doing it with only a couple fingers, or try using only one hand. Remind yourself daily how important your hands are to your everyday life.

21-4 Hand Protection

Hand injuries account for about 80 percent of all occupational injuries because we do a lot of things with our hands. Can you think of one job you do that you don't need your hands to do it? Believe it or not, hands, as tools, are so versatile that they can perform more intricate functions than any other tool known tool developed by humans.

Unfortunately, there are a lot of hazardous conditions for which we use our hands which puts them in harm's way. Sharp edges, pinch points, protruding objects, splinters, exposed blades, belts and fans or unguarded machinery can all cause you to hurt your hands.

Pinch points are the most common cause of injury. You can find a pinch point just about anywhere you look. Being aware of their presence helps you to avoid them. Basically, anything with a hinge is a pinch point.

Cuts, lacerations, bruises, burns and punctures are also very common causes of hand injuries. Handling sharp objects, hot objects or rough materials without gloves are invitations for a hand injury. Obviously, gloves are the best way to protect your hands, but not all gloves are the same. Check the type of glove you're using compared to the work you're doing. Gloves must be worn whenever there is a risk of abrasions, blisters, lacerations, burns or punctures.

You should still take precautions before putting your hands in danger. Be sure to lockout machinery and power before reaching into a machine.

Machines are guarded to avoid accidental exposure to moving parts. Never remove guards from saws or other machines intended to have guards. Do not wear rings or wedding bands when working with machinery. Do not pick up broken glass or spilled machine parts with your bare hands.

Your hands are an important part of your daily life. Protect them and avoid putting them in danger.

21-5 Know Your Pinch Points

Every year over 100,000 workers are injured when body parts are caught in a machine or crushed by a machine or material. These hazards are referred to as pinch points and should be taken very seriously. Pinch points can cause a variety of injuries ranging from cuts and bruises to amputation and death.

As you change seasons, please remember the tips below on how to stay safe around pinch points.

- Dress appropriately for work with pants and sleeves that aren't too baggy or too long. Shirts should be tucked in or fitted. Do not wear jewelry – especially jewelry that can get caught on moving parts. If you have long hair – tie it back. Tuck the ponytail or braid into your shirt when you're around moving parts. Wear gloves that fit and are made for the job you are performing.
- Look for possible pinch points before you start your task. Take the time to plan your actions and decide on the necessary steps to work safely. Read and follow warning signs posted on equipment. If you value all that your hands can do, THINK before you put them in a hazardous spot.
- Machinery can pose a hazard with moving parts, conveyors, rollers and rotating shafts and augers. NEVER reach into a moving machine. Properly maintain and always use the machine and tool guards provided with the equipment. Never override a machine or tool guard. These guards act as a barrier between you and the moving parts. Don't reach around or through the guard and always report missing or broken barriers to your supervisor. REMEMBER: Turn equipment off and use out of service tags and procedures before adjusting, repairing or servicing a machine or clearing a jam.
- Door, traffic control devices (sign legs), tailgates and heavy objects can pinch fingers and toes. Take care where you place your fingers. Test the weight before lifting, carrying and placing boxes; An awkward or heavy load can slip and pinch your hands or feet. Get help or use tools or machines to move large and/or heavy items.

21-6 Case Study - Pinch Points

Incident: After completing their work for the day an employee returned to the stockpile to unload their tools from the crew cab. As the employee tried to reach over the tailgate, they realized that they could not easily reach their tools with the tailgate in the up position. The employee then began to relocate their hands and feet to better reach the tools. While doing this, the employee lifted up on the tailgate handle and pinched their thumb on the opposite hand between the tailgate and the side of the truck. The employee required transport to a medical facility for treatment.

Discussion Questions:

What was the hazard?

- A pinch point hazard (tailgate handle) was present at the time of the accident.
- Poor placement of tools.
- Possible poor housekeeping in bed of crew cab.
- Strain hazard for employee reaching for tools.

What may have contributed to this accident?

- Unlabeled pinch point.
- Lack of training on recognizing pinch points.
- Poor hand placement.
- Not asking for assistance.
- Not maintaining 3 points of contact.

What are possible corrective actions?

- Recognizing pinch points.
- Take your time and not rush.
- Organize the bed of the crew cab for easier access to tools.
- Maintain 3 points of contact.

What did we learn?

- The best protection from pinch point hazards comes from awareness of potential hazards.
- Report any hazards you identify to managers/supervisors.
- Housekeeping issues and placement of tools is crucial.

Additional Points to Consider:

- What are the most common sources of pinch points in your work area?
- What improvements can be made to eliminate pinch points?
- How long would it take to organize the crew cab for better and easier access to tools?
- Situational awareness needs to be applied to every task at work.

21-7 Guard Against Pinch Points

Have you ever smashed your finger in a car door? It hurts doesn't it? By doing this, it means you have experience with pinch points, even though you might not know it.

Pinch points are everywhere. You can find pinch points in your everyday life. At home you can find a pinch point on every door in your home, yes even the refrigerator. At work, you get even more pinch points. You'll find them on equipment, on the tailgate of your truck, on plows and even on your toolbox.

Even though pinch points are very common there are some simple way to avoid them and guard against getting hurt.

- Wear gloves to protect your hands and fingers.
- Never remove equipment guards. Afterall, they are there for your protections!
- Take your time and make sure your hands are clear before closing doors and tailgates.
- Keep your hands and feet away from moving pieces of equipment (like augers).
- Operate equipment in the proper manner, being mindful and using handholds that are provided.

21-8 Protect Your Hands

Have you ever thought about what you would do without your hands? Your hands are your most valuable tool. Without your hands you would have a very difficult time eating, drinking or driving. You would never be able to waive to your friends or yell while driving. Without your hands, you wouldn't be able to hold your new baby or grandbaby, and never again would you be able to hold your sweetheart's hand in yours. For all these reasons and many more you need to protect your hands.

Causes of Hand Injuries

Be honest now, how many times have you grabbed a sharp object, touched a hot surface, come close to getting your hand or finger caught or crushed, or had your skin come in contact with a chemical material? If you can think of even one time, it's one time too many.

- Punctures, cuts or lacerations – caused by contact with sharp, spiked or jagged edges on equipment, tools or materials.
- Crushed, fractures or amputations – caused by contact with gears, belts, wheels, rollers and falling objects. Or rings, gloves or clothing getting caught and putting your hand in harm's way.
- Strains and Sprains – Caused by using the wrong tool for the job, or one that is too big or too small for your hands.
- Burns – caused by direct contact with a hot surface or a chemical.
- Dermatitis and other skin disorders – caused by direct contact with chemicals in products and materials.

Protect Your Hands

Follow the safe work practices and use the equipment and gloves provided for you. **Please note: Gloves and safety procedures will NOT work if they are NOT used or followed.** Be aware of the job tasks, equipment and materials that can create a risk for a hand injury or put your skin in contact with a chemical and know the steps that should be taken to prevent exposures and injuries.

Section 22 – Power and Hand Tool Safety

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22-1 Air Compressor Safety

Air compressors are used in many types of operations including crack sealing, bridge repair and box culvert installation. However, employees can be unaware of, or complacent about, the dangers of these systems. **Air compressors must always be drained prior to operation. Serious injury can result if this is not done.**

Follow these start-up and shut-down steps to ensure safe operations:

Start-up: When starting the compressor, make sure the system is drained. The valves don't always hold the air back and the line may still be full of air even with the valve closed. The system could be charged from previous use or air may have seeped back into the unit.

1. Drain the main valve and leave open
2. Make sure gate valves are closed
3. Unhook the hoses (regulator) from the system
4. Close the main valve to pressurize the lines
5. Hook up the tool
6. Open the gate valve for whichever line you are using

Shut-down: When the work is finished, follow these steps every time to ensure the next operator is not working with a charged system.

1. Turn off compressor and make sure gate valve is closed
2. Drain the main valves
3. Drain the tool hooked to the air hose
4. Unhook hose

Finally, always remember that accidents can still happen even with the best of intentions, therefore: **Don't assume the line is drained unless you did it yourself!**

Optional- Have employees share details of accidents or near misses they've experienced, and/or use PennDOT examples below:

- An employee was removing the air hose from jack hammer. He did not drain the system beforehand. When he removed the hose, built-up pressure blew the hose apart. The force threw the employee's hand into the steel side wall of the bridge, fracturing his thumb. He was off from work for months recovering from the injury.
- An employee unhooked two lines that connected to the compressor. The compressor was shut off, but the system had not been drained and it was fully pressurized. When he unhooked the lines, they shot back and narrowly missed his face.

22-2 Electric Power Tools

Electric power tools come in all shapes and sizes and are designed to do almost anything. However, there are some things that they all have in common: Rules for safe and proper use. The most important of these are select the right tool and know how to use it. However, there are many more rules that you must follow to work safely.

Appropriate personal protective equipment such as safety goggles and gloves must be worn to protect against hazards that may be encountered while using hand tools. Workplace floors shall be kept as clean and dry as possible to prevent accidental slips with or around dangerous hand tools. Power tools must be fitted with guards and safety switches; they are extremely hazardous when used improperly. The types of power tools are determined by their power source: electric, pneumatic, liquid fuel, hydraulic, and powder-actuated.

To prevent hazards associated with the use of power tools, OSHA recommends that workers observe the following general precautions:

- Never carry a tool by the cord or hose.
- Never yank the cord or the hose to disconnect it from the receptacle.
- Keep cords and hoses away from heat, oil, and sharp edges.
- Disconnect tools when not using them, before servicing and cleaning them, and when changing accessories such as blades, bits, and cutters.
- Keep all people not involved with the work at a safe distance from the work area.

- Secure work with clamps or a vise, freeing both hands to operate the tool.
- Avoid accidental starting. Do not hold fingers on the switch button while carrying a plugged-in tool.
- Maintain tools with care; keep them sharp and clean for best performance.
- Follow instructions in the user's manual for lubricating and changing accessories.
- Be sure to keep good footing and maintain good balance when operating power tools.
- Wear proper apparel for the task. Loose clothing, ties, or jewelry can become caught in moving parts.
- Remove all damaged portable electric tools from use and tag them: "Do Not Use."

22-3 Five Warning Signs from Your Power Tools

Like most heavy-use equipment, power tools fall victim to wear and tear, malfunctions and electrical issues. Even when the best tool maintenance is carried out, tools can stop working and need immediate inspection and possibly repair. However, with some careful examination, you can diagnose the cause of the issue and determine the next course of action. Check out these five red flags and how to properly inspect your tools for repair.

Remember, always make sure your power tool is disconnected from the power source before you try to diagnose any potential problems.

1. It Won't Start

If your tools won't start, it could hint at some larger electrical problems including a short or part malfunction.

- Start by checking the power switch and its assembly to make sure there is no damage as heat and water damage can be the culprits of a tool that won't start. Using a multimeter can test the voltage on your tool to assess if power is moving through the cord, switch and to the parts of the tool.
- Dust and dirt accumulation within a tool can prevent a tool from working so brushes and springs are where you should look next. Brush channels—enclosures consisting of brushes and springs located at the end of a motor where electricity is routed—can become worn and shorten over time. Check your brushes for wear and replace accordingly.
- A bad power cord can also stop a tool in its tracks and is a visible issue that can be replaced. Kinks, tears or cuts in cords can stop the flow of electricity to the power switch and can be assessed using a multimeter which will tell you if a wire is broken.

2. Weakened Power

Your tool starts but the power level is so weak that you'd probably be better off with a manual screwdriver. Or handsaw. Or bicycle pump. When your power tools lose their oomph (and it's not a low battery), the most likely cause are old, worn carbon brushes that need replacing. The carbon brushes are the small carbon blocks that transfer the electrical current from your power source to the tool's motor itself. These wear out through use. If your tool is losing power and doesn't have the speed or strength it should, it could be an indicator that it is time to replace these parts.

- Similar to a tool that won't start, check your carbon brushes for any heavy wear or signs of damage.
- If your brushes are clear, there may be damage to your tool's commutator or the rest of the assembly. Discoloration, buildup and even melted insulation are signs that these parts are the root cause.

3. Burning Smell

Malfunctioning motors tend to give off a very recognizable burning smell when something is wrong. Everything is still spinning but the tool is no longer working, and it just stinks.

- Diagnosing this smell could change depending on the age, type and design of your power tool. If your tool has a drive belt—like a sander or a planer—that is the first place to check.
- When the drive belt breaks you will get that tell-tale burning smell, and your tool will stop working even though the motor is still running.
- For other tools, such as power saws, you may want to check if the capacitors need replacing.
- It could also just be a case of the tool overheating. Motors generate a lot of heat when in use. If the tool has been running too long or too hard, the tool can overheat and cause a burning smell. For best power tool safety, immediately turn off any power tool that is emitting a burning smell and let it sit for about 30 minutes before attempting to diagnose the problem.

4. High-Pitched Screeching Noise

Using power tools can be pretty loud. However, sometimes a power tool starts making a high- pitched screeching noise, or screaming; that goes above and beyond the loud hum of your electric hammer drill.

- If your tool starts making this noise, first make sure that it is properly lubricated. Check the manufacturer's specifications for maintaining your tool to find out the best method to keep your tool lubed.
- Another easy tip for a squealing tool is to check the gears. If your tool has a forward and reverse control (as most power drills do), your gear switch may get stuck between the gears. Gently move the switch back and forth and try running the drill again.

5. Sparks and Smoke

If your power tool begins to emit smoke or sparks, turn it off immediately. You should never continue using power tools that are smoking or sparking. Set your tool aside and allow it to cool down before attempting to diagnose or fix an issue.

- Once the tool is cooled, check to see if any dust or debris has gotten into the tool. Sawdust or other particles that frequently fly through the air in heavy work areas can get into your tool's vent and cause that sparking or smoking.
- If your tool is free of burning debris, you may need to take apart the tool's casing and check for heat damage.

Power Tool Maintenance

The best way to address issues with your power tools is to avoid them in the first place. Always check the manufacturer's recommendations for the best ways to maintain your power tools.

Following a regular maintenance plan is usually the best way to head off potential problems before they start.

22-4 Hammers and Chisels

One of the most common causes of hand injuries is from the improper use of hammers and chisels. Both are responsible for a high number of eye injuries from flying nails, metal or concrete chips. Follow these rules when using hammers and chisels to stay injury-free.

Chisel Use

- Never use a chisel with a mushroomed head.
- Hold the chisel between the thumb and forefingers - don't make a fist around the chisel.
- Do not grip a chisel if your hands are numb.
- If another worker is nearby, place yourself between the other worker and the chipping area.
- Always use sharp chisels.

Hammer Use

- Use the right type of hammer for the job.
- Only use hammers in good condition.
- Use only hammers to drive objects.
- Always grip the hammer close to the end and grip it tightly.
- Always concentrate on the striking point. Strike blows as squarely as possible.
- Be sure there is an unobstructed back swing.
- Don't strike blows with the side of the hammer.
- Never strike a hammer or tempered tool with another hammer.
- Always keep your hammer free of grease and oil.
- Never allow someone else to hold a nail or chisel while striking it.

In addition to using common sense and following the techniques above, wear safety glasses or goggles when chiseling around metal, concrete or shooting nails. This will decrease the chance of eye injuries.

22-5 Hand Tool Hazards

Hand tools are tools that are powered manually and include anything from axes to wrenches. Hand tools are such a common part of our lives that it is difficult to remember that they may pose hazards. Tragically, a serious incident can occur before steps are taken to identify and avoid or eliminate tool-related hazards. When it comes to hand tools, workers must take care of them, select the right tool for the job AND use it properly.

The greatest hazards posed by hand tools result from misuse and improper maintenance. Some examples include the following:

- If a chisel is used as a screwdriver, the tip of the chisel may break and fly off, hitting the user or other employees.
- If a wooden handle on a tool, such as a hammer or an axe, is loose, splintered, or cracked, the head of the tool may fly off and strike the user or other employees.
- If the jaws of a wrench are sprung, the wrench might slip.
- If impact tools such as chisels, wedges, or drift pins have mushroomed heads, the heads might shatter on impact, sending sharp fragments flying toward the user or other employees.

To Avoid Accidents:

- Keep all tools in good condition with regular maintenance.
- Use the right tool for the job.
- Examine each tool for damage before use and do not use damaged tools.
- Operate tools according to the manufacturers' instructions.
- Provide and use properly the right personal protective equipment.

Employees and employers should work together to establish safe working procedures. If a hazardous situation is encountered, it should be brought immediately to the attention of the foremen or supervisor.

22-6 Hand Tool Safety Checklist

Without the use of hand tools, the completion of a construction project would be nearly impossible. Yet, as vital as they are, they are often the cause of serious accidents. All too frequently, hand tools are used improperly or used when they are defective. Since we use them continually, it is important they be used properly. Follow the inspection procedures and general rules below when using these hand tools.

Chisels

- Be sure the heads are safe ended or dressed.
- Be sure the cutting edges are sharp and square.

Files

- The tangs should be protected with handles.
- The teeth should be sharp and clean.

Hammers

- Be sure the handles are tight, unbroken and clean.
- The face of the head should be smooth and not mushroomed.

Screwdrivers

- Be sure handles are smooth and clean.
- Be sure all bits should be sharp and square.

Saw Blades

- Keep blades sharp and oiled.
- Handles should be smooth and continuous.

General Hand Tool Rules

- Always use the right tool for the right job.
- Use only tools in good condition.
- Keep tools sharpened.
- Store tools properly.
- Never throw tools to co-workers.
- Never use a tool in such a way that you will be injured if it slips.

Remember: Each tool is designed to perform a specific function. As long as you use the right tool and keep it in good operating condition, the various hand tools will serve you well. When you begin to improvise, expect the unexpected- injuries.

22-7 Handheld Circular Saws

Circular saws are used for straight sawing. Depending on the blade, they cut either across (crosscut) or with (rip) the grain of the wood.

Operator Involvement

The operator adjusts the height of the blade and, while holding the stock, pushes the blade through the work-piece to perform the cut.

Potential Hazard:

- Contact with the turning blade.

Solutions:

- Portable circular saws must have an upper guard that covers the entire blade of the saw and a retractable lower guard.
- Hand-held circular, reciprocating, saber, scroll, and jig saws with blades greater than one-fourth inch must be equipped with a constant-pressure control.

Additional Safety Measures

- When using a hand-held saw, the blade should be directed away from the aisle and any people who are in close proximity to the saw.
- Use the proper blade for the material being cut.
- Maintain sharp blades.
- Always wear eye and face protection.



22-8 Handheld Jig Saws

Handheld jig saws are useful for precision-cutting, intricate curves and patterns in thin stock. They have thin blades that move rapidly up and down. The blade is held in upper and lower chucks that pull it tight and keep it from bending.

Handheld jig saws are generally not considered to be as dangerous as other saws, however, contact at the point of operation can cause hand and finger injuries. Contact with the blade can also occur below the stock being cut. All portions of the blade must be guarded.

The operator is responsible for holding the jig saw with one hand while the other hand is used to secure the stock. A trigger is depressed and the saw is moved over the stock as the blade cuts through the material. The trigger must be held throughout the entire cutting process.

Potential Hazards

- Contact with the moving blade may occur.
- Solution: Guard the blade with an adjustable or self- adjusting guard above and below the stock being cut.

- Wood chips and splinters may be thrown by the cutting action.
- Solution: Guard the blade with an adjustable or self-adjusting guard as necessary.

Additional Safety Measures

- Use the proper size of blade for the work being done.
- Maintain sharp blades.
- Make turns slowly. Do not make sharp turns with a wide blade; use a narrow blade for sharp turns.
- Always wear eye and face protection.
- Wear guard (for example, mesh gloves, metal guards) on the free hand to protect it from flying particles.

22-9 Lockout Tagout- Seven Steps for Shutdown

Lockout/Tagout is more than just putting a yellow lock on the main electrical disconnect to a tool, machine or part of a machine. There are seven very important steps you must do when putting Lockout/Tagout in place:

SEVEN STEPS FOR SHUTDOWN

1. NOTIFY – Notify all affected employees that you are going to be conducting a lockout/tagout.
2. PREPARE – Before you begin, be sure you know all the types of energy involved, hazards presented by energy, and how to control the energy.
3. SHUTDOWN – Turn off machine or equipment.
4. ISOLATE - Isolate machine or equipment from its energy source(s). (For example, turn off main circuit breaker).
5. LOCKOUT – apply your lock. Be sure that it holds the isolating device in the “off” or “safe” position.
6. RELEASE - Release stored energy. Relieve, disconnect, restrain, block, or otherwise ensure, that all energy sources – electrical, mechanical, hydraulic, compressed, etc. – are de- energized.
7. VERIFY – Try the on-off switch or other controls to be sure the machine won’t start. Return the switch to the “off” position.

YOUR LOCKOUT IS COMPLETE

22-10 Nails Are Dangerous Too

You wouldn’t think talking about nails is important safety-wise. However, by one industry estimate, about 20% of all minor injuries on the job are a result of punctures, scrapes, and cuts resulting from nails that were not properly removed from lumber and other debris. We all recognize what can happen if a nail is not properly set before driving it, yet we often forget about how dangerous a nail is once it becomes a part of scrap lumber or job debris.

Driving Nails:

- Be sure your hammer is in good condition.
- Always hit the nail squarely, especially on the first blow. Always hit with the blow's 90 degrees to the nail head.
- Make sure the back swing is unobstructed; claws can hurt. Be consistent.
- Concentrate on the head of the nail.

Pulling Nails:

- Always pull or bend nails when stripping. Use the right pulling device for the job.
- If needed, use a block of wood as a fulcrum. It will make the job much easier.
- Keep scrap materials in neat piles and out of walkways.
- Carefully discard used nails.

Remember: Nails can become "snake fangs" if used improperly. Always treat nails with the respect they are due. Otherwise you may end up with puncture wounds, scrapes, cuts or potentially the loss of your eyesight.

22-11 Oxy-Acetylene Torch Safety Inspection

Use of a cutting torch is not something that just anybody should do without training. The first 4- steps below will talk about putting a new tank on your oxyacetylene set and starting with step 5, how to use a cutting torch set. Steps are listed in the order they should be done:

- Remove protective cap from cylinder and inspect for evidence of grease and/or oil.
- Blow out cylinder valve seats to remove dust and moisture.
- Inspect regulator for grease and/or oil.
- Make sure regulator key is turned OFF, then connect regulator.
- Stand away from regulator key or handle, then open valves:
 - o Oxygen-completely open.
 - o Acetylene-partially open (1/4 to ½ turn).
- Purge system:
 - o Open oxygen valve on torch.
 - o Turn 'ON' oxygen regulator and adjust to 40 PSI (50 PSI maximum).
 - o Close oxygen valve on torch.
 - o Open acetylene valve on torch.
 - o Turn 'ON' acetylene regulator and adjust to 3-5 PSI (15 PSI maximum).
 - o Close acetylene valve on torch.
- Light torch with flint striker:
 - o Open acetylene valve on torch.
 - o Light flame (striker should be about ¼ to ½ inch from tip).
 - o Adjust acetylene to bring flame back down to almost touching the tip.
 - o Open oxygen valve slowly on torch and adjust flame.
- Turn off torches after use:
 - o Close oxygen valve on torch.
 - o Close acetylene valve on torch.
- Valves on cylinders shall be closed when the cylinders are being moved, if the torch and hose are left unattended, and when the task is completed.
- After closing, you need to purge the system again:
 - o Open oxygen valve on torch.
 - o Bleed off oxygen and close oxygen valve.
 - o Open acetylene valve on torch.
 - o Bleed off acetylene and close acetylene valve.

22-12 Pry Bar Safety

Employees don't always think about injuries that can happen when using a pry bar. For example, trips and falls have occurred when employees use a prybar to remove frozen material from the bed truck. Using a pry bar can be dangerous if the task is not handled with care.

Follow these guidelines when using a pry bar:

- Ask yourself: Is this the correct tool for the job? Could another tool achieve the same result?
- Be aware of your surroundings. Keep your hands and feet free of the flow of the tool.
- Know the environment and equipment around you. Are your feet stable and is the area free of tripping hazards?
- Plant your feet securely and make them as level as possible. Loose debris under your feet can easily cause a fall.

- Use smooth, regular movements to avoid back injury. Use the tool as the driving force.
- Use the right end of the tool for the job. If you are unsure, ask.
- Keep a firm grip and maintain your footing. When something you are trying to dislodge breaks free, there is a danger of falling backward or forward into the equipment or onto the ground.

Questions for Discussion:

1. What jobs or tasks require using a pry bar?
2. How should we hold the bar to reduce risk?
3. Has anyone here had an accident or near miss with a pry bar?
4. Is there a better tool that could be used?
5. Are we inspecting the pry bar before use?

22-13 Safety Guards and Switches

Guards

Hazardous moving parts of a power tool need to be safeguarded. For example, belts, gears, shafts, pulleys, sprockets, spindles, drums, fly wheels, chains, or other reciprocating, rotating, or moving parts of equipment must be guarded if potential for employee contact exists.

Guards, as appropriate, must be provided to protect the operator and others from the following:

- Point of operation.
- Pinch points.
- Rotating parts.
- Flying chips and sparks.

Safety guards must never be removed when a tool is being used. For example, portable circular saws must be equipped with guards. An upper guard must cover the entire blade of the saw. A retractable lower guard must cover the teeth of the saw, except when it contacts the work material. The lower guard must automatically return to the covering position when the tool is withdrawn from the work material.

Safety Switches

All hand-held powered drills, tappers, fastener drivers, horizontal, vertical, and angle grinders with wheels greater than 2 inches in diameter, disc sanders with discs greater than 2 inches in diameter, belt sanders, reciprocating, saber, scroll, and jig saws with blade shanks greater than a nominal one-fourth inch, and other similarly operating powered tools shall be equipped with a constant pressure switch or control and may have a lock-on control provided that turnoff can be accomplished by a single motion of the same finger or fingers that turn it on.

All hand-held powered circular saws having a blade diameter greater than 2 inches; electric, hydraulic or pneumatic chain saws and percussion tools without positive accessory holding means shall be equipped with a constant pressure switch or control that will shut off the power when the pressure is released. All hand-held gasoline powered chain saws shall be equipped with a constant pressure throttle control that will shut off the power to the saw chain when the pressure is released.

22-14 Screwdrivers

The screwdriver is one of the most commonly misused hand tools. While it is designed to tighten or loosen screws, you can also find it being used as a pry bar, punch or chisel. When that happens, the screwdriver can slip. When it slips, it can cause an injury.

Inspection and Care

- The handle should be tight, smooth and not slippery.
- The shank should be true and straight.
- The bit should be flat, with the end at a right angle with the shank.
- Keep the bit square edged.
- When sharpening, be use not to remove the bit temper. Keep the bit and handle clear and free of grease and oil.

Proper Use

- Always use the proper size bit to fit the screw head. Keep the bit square to the screw head.
- Never use pliers on a screwdriver; if possible, use a vise. Never use as a pry, chisel, punch or lever.
- Use only a standard screwdriver on a standard screw; Phillips head on a Phillips head
- Select the right length for the job; don't try to improvise.
- Always use a screwdriver with an insulated handle for electrical work.

Remember: The screwdriver is a valuable tool when used properly. When used improperly, it becomes a hazard to your safety.

22-15 Table Saws

We all recognize how important our hands are to our employment. However, every year hundreds of fingers and hands are lost to table saws. Table saws are the surest and cleanest way to lose a finger or a hand. Much of this is a result of getting used to operating a table saw and then losing respect for it. That is why it is so important that we review the common safety rules pertaining to the operation of table saws.

General Operating Rules:

- Never operate without all guards in place, especially the blade guard.
- Be sure you stand in the correct position.
- Maintain good footing.
- Never allow other workers to work or rest when they are exposed to kick back.
- Maintain good housekeeping in the saw area.
- Never use your hands to run lumber through the blade or to clean off sawdust.
- Never use a saw with a dull blade. (Note: When you go to change a blade, make sure the power is disconnected and you control the switch).
- Don't crowd (i.e., pinch) a blade especially when cross-cutting.
- Don't wear loose clothing around a saw.
- Always wear eye protection. Be wary of warped lumber.
- Be wary of "fly back" (also called kick back) when ripping. Keep the blade set so it just barely makes the desired cut.

Remember: The use of table saws can greatly increase productivity, but if improperly used, they can greatly handicap the user.

22-16 Wrenches

Wrench is a very good name for this tool, because all too often it is what workers do to their backs while using one. And it is not only a person's back that can be injured. Follow the advice below to avoid injury.

Proper Care

- Inspect on a regular basis.
- Replace sprung jaws, cages and faces.
- Replace all bent handles.
- Keep the jaws sharp so they can bite the nut.
- Keep the wrench clean and free of grease and oil.

Proper Use

- Always use the proper size wrench for the job.
- Never use a shim to make a wrong size wrench fit a nut.
- Never use a piece of pipe on the handle to increase your leverage. (Slip hazard).
- Don't use a wrench as a substitute for a hammer.

- Don't pound on a wrench to try to loosen a frozen bolt. Use penetrating oil.
- Always pull a wrench toward you-never push away. (Slip hazard).

Also: Avoid possible falls - be sure you have firm footing. NEVER use a wrench on moving equipment!

Remember: After you have banged up knuckles or a busted finger because of improper use of a wrench, you have learned the hard way. Bottom line: If you fail to maintain this tool and use it improperly, it can cause painful injuries.

22-17 Power Tool Precautions

Power tools can be very dangerous if not used properly. Be aware of the type of power tool that is being used (electric, pneumatic, liquid fuel, hydraulic, or powder-actuated) and follow these general precautions every time you use them.

1. Never carry a tool by the cord or hose.
2. Never yank the cord or the hose to disconnect it from the receptacle.
3. Keep cords and hoses away from heat, oil, and sharp edges.
4. Disconnect tools when not in use, before servicing, and when changing accessories such as blades, bits and cutters.
5. Keep observers at a safe distance away from the work area.
6. Secure work with clamps or a vise, freeing both hands to operate the tool.
7. Avoid accidental starting. Do not hold a finger on the switch button while carrying a tool that is plugged in.
8. Maintain tools and keep them sharp and clean for the best performance. Follow instructions in the user's manual for tool maintenance.
9. Keep good footing and maintain good balance.
10. Wear proper PPE. Additionally, loose clothing, ties, or jewelry can become caught in moving parts.
11. Remove damaged power tools and tag using the Out-of-Service Tag/Lockout-Tagout Process.

Section 23 - PPE

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23-1 Be Seen – Stay Safe

Working around heavy equipment is dangerous! If you're the person on the ground, you may think the driver of the much larger machine can see you but depending on your location and blind spots in the machine, that isn't always true. As a ground person you run the risk of being pinched between machines, crushed beneath overturned vehicles, hit by a swinging backhoe, or run over. Your best course of action is to be acutely aware of where you are in relation to where the vehicles are and to also to be seen!

Hi-Vis Clothing

As a PennDOT employee, you are issued a hard hat and a vest. Some employees are also issued ANSI Class 2 t-shirts and ANSI Class 3 sweatshirts. Employees involved in flagging operations are also given an ANSI Class 3 vest and ANSI Class E chaps. These garments are designed to give you the maximum amount of reflectivity so you can be seen even in the worst of conditions.

Be Seen

Worker visibility is important in all levels of light and all of your safety garments should have the highest amount of reflectivity. If your safety vest or chaps become faded, torn, dirty or worn through, you should take it to your stock-clerk, and you will be given a new garment to replace the worn one.

ANSI Standards

ANSI (American National Standards Institute) created the standard for high visibility safety apparel and in 2009 incorporated it into the Federal Highway Administration's Manual on Uniform Traffic Control Devices (MUTCD). The MUTCD requires all workers, including construction, maintenance, utility, first responders and volunteers to wear high-visibility safety apparel. More importantly, wearing high-visibility safety apparel will help you to be seen by the traveling public and your co-workers.

PennDOT uses ANSI type R (roadway) Class 2 and Class 3 garments. An ANSI Class 2 garment is required to have 201 inches of reflectivity incorporated into it. An ANSI Class 3 garment is required to have 310 inches of reflectivity incorporated into it. These reflectivity requirements are only met when the vest is closed on your belly and chest area. Leaving your vest hang open causes you and the department to be out of compliance with Federal Regulations and causes you to not be as easily seen. Always wear your PPE correctly.

23-2 Chainsaw PPE

Keeping the roadways safe for the traveling public is the primary mission of the Department of Transportation. Part of that maintenance is making sure dead or dying trees are removed from the right of way in a timely manner, fallen trees are taken off the roadway and daylighting is done to keep roads as ice free and dry as possible in the winter.

When you're on a brush cutting crew, you are required to wear your standard PPE such as your hard hat, vest and above the ankle boots. But if you are operating a chainsaw additional protection is required to keep you safe.

Chain saw operator

When you are the chain saw operator or even if you're servicing a chain saw, you are required to wear the following in addition to your hard hat, vest and above the ankle boots:

- Eye Protection: To eliminate flying or falling objects from hitting your eyes.
- Face Protection: Logger-type mesh screens.
- Hand Protection: The style of glove must provide adequate protection from puncture wounds, cuts and lacerations.
- Chain Saw Chaps: This leg protection must cover the full length of the thigh to the top of the boot on each leg to protect against contact with a moving chain.

If you happen to have an accident with a chain saw and the chain hits your chaps, they must be disposed of and replaced with new chaps.

Chaps should be washed according to the manufacturer before use.

There is one exception for a chain saw operator wearing chaps. If the chain saw operator is operating the saw from an aerial lift or using a pole saw, then and only then, they do not have to wear chaps.

23-3 Concrete Construction PPE

PennDOT employees working on the roadways encounter many hazards daily. Employees in the Construction and Maintenance departments can be exposed to an additional hazard from a material they are using or removing concrete.

There are many dangers associated with concrete. Although most of it comes from when the concrete is disturbed after it has dried there are hazards associated with wet concrete as well.

Anytime concrete is disturbed it creates a concrete dust that contains respirable silica. Inhaling even a small amount of this silica dust causes irritation to the nose, mouth and throat. It can also cause difficulty breathing. Long term exposure can cause a disease called silicosis, which causes a scarring of the lungs and some cases cancer.

Lung Protection

Workers exposed to concrete dust will need to wear an air purifying respirator the type and size will depend on the amount of exposure. There are other methods to keep yourself safe from respirable silica dust. Wet cutting is recommended to eliminate dust. Avoiding dust – stand upwind from the dust so you don't breathe it in.

Eye Protection

Anytime you're around wet or dry concrete, you must protect your eyes. Obviously dry concrete presents a dust hazard and wet concrete splashes when it's being poured. Goggles would be the preferred method to protect your eyes from concrete hazards.

Skin Protection

Wet concrete can cause skin irritations, and even first or second-degree chemical burns. If you are near a cement pour make sure you're wearing gloves, long sleeves, waterproof boots and don't forget your safety glasses.

No matter which part of the concrete job you are performing always be sure to have your hard hat and vest on as well as all other appropriate PPE.

23-4 Crack Sealing PPE

Crack and joint sealing operations are very important to the maintenance of our roadways. By filling the cracks in the pavement, we can prevent water from seeping into the asphalt and circumvent the freeze/thaw cycle that creates potholes. Crack sealing helps to strengthen and lengthen the lifespan of the highway.

Because of the temperatures of the tar used in crack sealing, employees operating the wand, squeegee, or working as the loading operator are at risk for thermal burns. The operator using the compressed air gun is at risk for blow back from debris from the high-pressure hose. Each of these employees are required to wear specialized PPE to prevent injuries associated with the crack sealing operation.

PennDOT currently uses several different types and brands of machines for this operation. Note: to keep PPE consistent PennDOT is identifying the wand operations for ball valve- controlled equipment as older equipment. The wand operations for trigger-controlled equipment is in reference to new/newer equipment in which employees can remove themselves from areas where there is a potential for splashing of hot liquid.

Wand Operator (Ball Valve-Controlled)

- Operators shall wear a hard-hat with full face shield attached in the down position, long-sleeved shirt, long pants, leather gloves with gauntlets that extend above the wrist, safety footwear and ANSI Class-2 outer garment (Night operations require ANSI Class-3 outer garment), flame-retardant hood and a welding apron.

Wand (Trigger-Controlled)

- Operators shall wear a hard-hat with full face shield attached in the down position, long-sleeved shirt, long pants, leather gloves with gauntlets that extend above the wrist, safety footwear and ANSI Class-2 outer garment (Night operations require ANSI Class-3 outer garment).

Squeegee Operator

- Squeegee operators shall wear a hard-hat with full face shield attached in the down position, long-sleeved shirt, long pants, leather gloves with gauntlets that extend above the wrist, safety footwear and ANSI Class-2 outer garment (Night operations require ANSI Class-3 outer garment).

Loading Operator

1. For machines requiring manual loading, the loading operator must wear a hard-hat with full face shield attached and in the down position, a flame retardant hood, loose fitting coveralls or welder's apron, long-sleeved shirt, long pants and leather gloves with gauntlets, safety footwear and an ANSI Class-2 outer garment (Night operations require an ANSI Class-3 outer garment)
2. For machines with a conveyor loading mechanism, the loading operator must wear a hard hat, Safety Glasses, a long sleeved shirt, leather gloves, safety footwear and an ANSI Class-2 outer garment (Night operations require ANSI Class-3 outer garment).

Compressed Air Gun Operator

- The Compressed air gun operator must wear goggles – safety glasses alone will not prevent dust and debris from entering the eyes. Only goggles will prevent this. Safety footwear and an ANSI Class-2 outer garment (Night operations require an ANSI Class-3 outer garment).

Wearing this amount of PPE can cause heat exhaustion in some employees.

- Be sure to hydrate the night before the operation and throughout the day.
- Rotate employees in these various operator positions PPE for all positions is outlined in this chart.

PPE for all positions is outlined in this chart.

Crack Sealing- PPE Chart						
	Hard Hat & Outer Garment Must Meet or Exceed ANSI Class 2 Reflectivity	Solid Face Shield in Down Position	Safety Goggles (rated ANSI Z87+ for fine dust/mist)	Long Sleeved Shirt	Leather Gloves with Gauntlets that Extend Above the Wrist	Flame-Retardant Hood and Welding Apron
Employee starting or operating the tar kettle	X	X		X	X	
Loading Operator(s) Manual Loading	X	X		X	X	X
Loading Operator(s) Conveyor Loading	X		X	X	X* (see #2)	
Wand Operator(s) – Ball Valve-Controlled	X	X		X	X	X
Wand Operator(s) – Trigger-Controlled	X	X		X	X	
Squeegee Operator(s)	X	X		X	X	
Compressed air-gun operator(s)	X		X			

23-5 Evaluation Guide for High-Visibility Work Zone Safety Apparel

High-visibility safety apparel is personal protective safety clothing that is intended to make the wearer more visible during both daytime and nighttime usage and meets the Performance Class 2 or 3 requirements of American National Standards Institute (ANSI)/International Safety Equipment Association (ISEA). There are three categories you should use when evaluating high-visibility safety apparel. Similar information can be found in Pub 213. Here are the three examples:

Acceptable

New high-visibility safety apparel is characterized by having vivid color contrast and high reflectivity. Apparel that is used, but is in like-new condition is characterized as having excellent color contrast, excellent reflectivity and is not faded or soiled. The typical service life of high-visibility safety apparel depends on the type of work an individual performs while wearing the apparel. High-visibility safety apparel that is worn on a daily basis normally has a service life expectancy of approximately 6 months, although apparel that is not worn on a daily basis may have a useful service life of up to 3 years.



Marginal

The safety apparel has good reflectivity although there may be some soiling and light fading. These can quickly become unacceptable. If you think your safety apparel is questionable, notify your supervisor. The solution may be to wash your apparel. Refer to the label inside the apparel for proper care instructions. Keep close tabs on any apparel that may be in marginal condition. Notify your supervisor when your safety apparel is nearing the end of the serviceable life so that new apparel can be ordered and available when replacement is necessary.



Unacceptable

The safety apparel has little or no reflectivity, soiled and faded material, and/or has deteriorated reflective strips. At no time should apparel in unacceptable condition be used. Your apparel should be replaced if it is torn or altered. Contact your supervisor immediately if your apparel is in an unacceptable condition to request immediate replacement. PennDOT will only replace vests and rain wear. If other safety apparel, including T-shirts, sweatshirts, or jackets, is in an unacceptable condition, a vest in acceptable condition must be worn over the garment.



23-6 Eye Protection

Every day, approximately 2,000 U.S. workers have a job-related eye injury that requires medical attention. Workers in our field have one of the highest eye injury rates. Department employees experienced numerous eye injuries in the past few months. Keep the below information in mind when exposed to eye hazards.

Your eyes are important in almost everything you do. They deserve all the care and protection you can give them. This is especially true on the job. If you lost your sight or had your vision severely impaired, could you do your job as you do today? Could you enjoy your hobbies as you do today?

Several of the reported eye injuries were caused by an air-borne object coming around or under the safety glasses. These types of injuries could be avoided by wearing safety goggles instead of safety glasses. In some cases, safety glasses with side shields could have prevented these injuries.

Safety goggles are, in most cases, the best option for eye protection. It is understood that it may not be the most desirable option depending on the operation but does offer the best protection. If the operation involves exposure to chemicals or liquids (example: pipe flushing), where there's a likelihood of air-borne matter coming around or under safety glasses, unvented safety goggles are required. One example of where safety goggles would have been a better option was an employee pouring cement into a containment tank when cement splashed into his eye.

In an operation where walking or continuous movement is involved (example: brush cutting), safety glasses may be a better option as safety goggles can restrict peripheral vision. In one case, an employee was driving with both windows down and something blew into his eye.

Safety glasses are not required while driving PennDOT vehicles, but for the safety of your eyes, could be worn if driving through dusty areas.

Eye injuries have resulted from employees being under equipment making repairs. In these instances, debris fell into the employee's eye. Two eye injuries resulted from employees being sprayed in the eye with fluids while repairing equipment.

When selecting the most suitable eye and face protection for employees, one should take into consideration the following elements:

- Ability to protect against specific workplace hazards.
- Protection should fit properly and be reasonably comfortable to wear.
- Protection should provide unrestricted vision and movement.
- Protection should be durable and cleanable.
- Protection should allow unrestricted functioning of any other required Personal Protective Equipment.

Standard sunglasses and prescription glasses are not eye protection. Industrial safety glasses are special glasses that can withstand a certain impact without shattering. Safety Glasses and Safety Goggles will have an ANSI designation of Z87. Ask your Safety Coordinator for questions regarding prescription strength eye protection.

23-7 Protection from Falling Objects

Being struck by a falling object is the second leading cause of fatalities on construction sites. Even a small object falling from a height can cause serious injury or death.

The most obvious places to find falling objects is from work being performed from an elevated position such as bridge projects, tree trimming/felling and elevated sign installation. Something gets kicked off the side of the bridge onto the crew below, a dead limb breaks off and falls unexpectedly, a sign installation bolt gets dropped, etc. Another situation that we may find ourselves exposed to falling/flying objects is during material handling operations. For instance, if you're walking through the garage and the forklift operator is traveling through at the same time with a tall unsecured load. The operator swerves to avoid someone or something and the load on the forklift shifts or falls where you could be hurt. Also recognize during pipe installation operation where pipe sections or precast inlet boxes are being hoisted into the air and set into place in an excavation.

One of the most common injuries from falling objects occurs along the roadway when a passing vehicle kicks up a rock or debris. The rock/debris then becomes a falling/flying object that also has propulsion and velocity. Even the smallest rock/debris can cause serious injury.

The following are a few ways to protect yourself from falling objects.

- Wear your hard hat anytime you're outside of your vehicle or if you're on a vehicle like a paver or chipper that does not have a roof.
- Do not pass loads or material overtop of people.
- Toe boards should be placed on scaffolding or on any open elevations to protect workers who are below from falling objects such as lumber, cement or tools.
- Materials should be stacked appropriately.
 - o Pipes should be stacked no more than eight feet high in stockpile yards.
 - o Shelving units should be fastened to a wall if they are higher than six feet.
- Inspection of standing trees to be cut for dead limbs and vines that could alter the fall of the tree.
- Inspection of lifting devices (i.e. slings, chains, hooks, clevises) each time prior to use for damage and defects.
- Identification of "safe zone" when felling trees or where other elevated work is being performed.

23-8 Flying Objects and Eye Protection

There is a story of a one-eyed carpenter that goes like this: A carpenter asked his employer to pay for damage that was done to his glass eye at work. It seems that his glass eye was damaged when a nail he had been pounding flew up and struck it. When he was asked by his boss how he lost his eye in the first place he responded, "The same way, I was hit in the eye with a nail." Can you imagine what would have happened if he would have been hit in the other eye? Had he only been wearing his safety glasses the first time, his outlook would be completely different.

PennDOT requires you to wear safety glasses if you work in a garage, but there are other jobs that also require safety glasses. Jobs like bridge flushing and brush cutting just to name a few, also require safety glasses.

Foreign particles can get into your eyes. These particles can be carried by the wind or can be thrown by equipment. Usually smaller particles are transported by wind. These particles can usually be removed from your eye using eye wash or saline solution.

The larger objects are more difficult to remove and can cause more damage. These high-speed chips can cause serious eye damage or blindness. Some examples are:

- Concrete chips being broken by a jackhammer
- Drilling, scaling or reaming steel
- Masonry products being cut by a power saw
- Wood chips being thrown by a chain saw

There are also molten materials that can be thrown, such as:

- Soldering or welding materials
- Socketing wire rope and connections

Eye protection comes in many shapes and styles. You can wear:

- Safety Glasses (prescription or non-prescription)
- Safety Goggles
- Face Shields

Each has a different use depending on the job you're performing at the time. For instance, safety glasses will not keep liquid out of your eyes, while safety goggles most likely will. No matter what style of eye protection you're wearing make sure it fits snugly and correctly. Proper ventilation and de-fogging sprays can help reduce fogging. Remember, it's easier to clean a pair of glasses than to clean your glass eye.

23-9 Hard Hats – Policy and Maintenance

Hard Hats are a necessary part of every PennDOT employee's day. No matter what department an employee works in, he or she is issued a hard hat on the first day of work.

Hard hats reduce serious head injuries and save lives. Head injuries can be deadly or result in permanently life-altering injuries. For this reason, all employees are required to wear a hard hat when engaged in or entering any field operation involving Maintenance, Construction, Design, Surveying, or Inspections on or off the state right-of-way. A hard hat must also be worn when there is a clear and present danger of falling objects, when exposed to falling or flying material, when exposed to overhead electrical conductors, and any other time one of directed to do so by a supervisor. Hard hats may be removed by employees while operating vehicles or equipment from within an enclosed cab, or underneath a canopy that is integral to the design of the vehicle or equipment, offering overhead impact protection (NOT A ROLL BAR).

Decals and Accessories

Only PennDOT issued decals, approved by the Employee Safety Division, may be applied to the hard hat. No writing or markings are permitted on the outside of the hard hat.

Chin straps are available and provided by the Department. These are recommended for employees that perform work that involves looking down frequently or frequent exposures to gust of wind and are to be used to help maintain the proper position of the hard hat and to prevent it from falling off.

Neck shades, sweatbands, hard hat coolant pads and skull caps are permitted to be worn under the suspension of the hard hat, as long as they are worn smoothly on top of the head.

Accessories like these, that are designed to protect from extreme climatic heat or cold, are not issued by the Department. Sweatshirt hoods shall not be worn under the hard hat, because they cannot be worn smoothly on top of the head. Nothing is permitted to be in the space between the suspension and the helmet, while the hard hat is worn. When an impact occurs, any object in this space can transmit significant forces to the head and neck that could result in serious injury or death. Wearing a baseball cap under a hard hat is prohibited, as it may interfere with the suspension's capability to work properly during an impact.

Care and Replacement Cycles

The replacement cycle of hard hats and hard hat suspensions may vary based on hours of use, the conditions they are exposed to, environmental factors, and the quality of care by the person wearing them. The manufacturer's specifications recommend that the suspension be replaced annually and hard hats every 5 years for hard hats worn daily. More frequent replacement may be necessary and is based on visual inspection. The District Safety Coordinator shall establish procedures to ensure these are visually inspected at least annually.

The hard hat shall be replaced anytime they are observed to be cracked or faded, and anytime it has been subjected to a significant impact. The hard hat suspension shall be replaced if it is visibly worn or damaged. Prior to re-issuing hard hats that are returned in good condition they shall be washed by the Bureau/District/County in accordance with manufacturer specifications. Hard hat suspensions shall always be replaced before reissuing a hard hat. Again, make sure the suspension size matches the helmet size.

23-10 Hard Hats for Your Protection

Hard hats have been around since 1919 when the first hats were made of leather. Today's hats are made of much more durable materials like yours that is made of rigid plastic that can take a hit and still protect your head.

OSHA regulation 1910.135 states that an employer shall ensure that each affected employee wear a protective helmet when working in areas where there is a potential for injury to the head from falling objects.

You may have heard this argument against hard hats: "I'm working in the middle of the road, what's going to hit me, a falling bird?" Although, it seems as though this argument has a valid base, it doesn't follow through with logic. When you are working on the road, especially with other traffic passing you, any number of objects could fly off the road, from someone's tires or, believe it or not, from the sky and hit you. It's even more important when you are performing work like tree felling or brush cutting.

There are two types of hard hats available:

- ANSI Type 1 which meets vertical impact and penetration requirements.
- ANSI Type 2 which meets both vertical and lateral impact and penetration requirements.

There are three classes of hard hats:

- Class E (Electrical) which provides dielectric protection up to 20,000 volts.
- Class G (General) which provides dielectric protection up to 2,200 volts.
- Class C (Conductive) provides no dielectric protection.

PennDOT provides to all employees an ANSI Type 1/Class E hard hat. These hard hats come in three colors. White for supervisors and Construction employees, Yellow/Green for rank and file and Blue for operator instructors.

Employees are expected to wear their hard hat when:

- Engaged in or entering any field operation involving Maintenance, Construction, Design, Surveying and Inspections – on or off the State right-of-way.
- When there is a clear and present danger of falling objects
- When exposed to falling or flying material
- When exposed to overhead electrical conductors
- At the direction of their supervisor.

Your hard hat should be replaced anytime it's been damaged, is starting to crack or is at least five years old.

23-11 Hearing Protection

Do you find yourself asking others to repeat themselves because you can't hear them? As we grow older, one of the first things to go is our hearing. This safety talk isn't just for those over 30, because all employees who are exposed to hazardous levels of noise are at risk for developing noise-induced hearing loss. This type of hearing loss is 100 percent preventable. Unfortunately, if you don't take it seriously when you're young, once your hearing's gone...it's gone for good.

Noise

- Permanent hearing loss (nerve damage) can occur whenever you're exposed to 85 decibels (dB) or higher, averaged over an 8-hour day.
- If you must shout to get a co-worker to hear you and you're standing shoulder to shoulder, this is a good indication that the noise level is over 85 dB.
- Symptoms of noise induced hearing loss are ringing of the ear (Tinnitus) and difficulty understanding voices (sound distortion) or sometimes both.
- Hearing loss usually goes unnoticed for years because it's painless and gradual.
- If you are exposed to noise that causes pain, then you know the noise level is too high.
- Any exposure to noise over 140 dB or higher can cause immediate and permanent hearing loss.

Here are some examples of sound levels (Courtesy of Cornell University)

- Normal Conversation 60 dB

- Vacuum Cleaner 85 dB
- Push Lawnmower 95 dB
- Table saw 100 dB
- Chain saw 105 dB
- Woodchipper 110 dB

PennDOT uses several control measures to reduce noise and exposure to noise by employees.

- The best way to reduce noise exposure is to avoid noise exposure. Employees are encouraged to get away from loud machines whenever possible. Supervisors are encouraged to rotate employees who are doing loud jobs about every two hours.
- PPE – PennDOT provides two forms of hearing protection
 - o Ear plugs that are inserted directly into the ear canal.
 - o Earmuffs that cover the entire ear and form an airtight seal, thus reducing noise. Employees are responsible for taking hearing loss seriously and for using PPE that is provided.

23-12 High Visibility Apparel Requirements for PennDOT Employees

The purpose of this safety talk is to clarify what is expected of employees to comply with PennDOT policies regarding high visibility apparel. The current policies for high visibility apparel can be found in the Safety Policy Handbook, Pub 445.

All employees are required to wear a hard hat and high visibility safety apparel when engaged in or entering any field operation involving maintenance, construction, design, surveying, inspections, etc. (on or off state right-of-way) or when exposed to moving vehicles and equipment. All high visibility apparel must be Department-issued; the only exception to this is the ANSI Class 2 or 3 high visibility yellow jacket, which is approved, but not provided by the Department. The ANSI classification of the high visibility garment is based on its design when purchased, so if the garment is ever modified in any way, it will be considered non-compliant.

High Visibility Apparel for Daytime Operations

During daylight hours, employees must wear high visibility apparel that meets or exceeds ANSI Performance Class 2

- Class 2 or 3 vest
 - Class 2 t-shirt with 6"
 - Sleeves Class 3 sweatshirt
 - Class 3 rain coat (during inclement weather)
- * Class 2 or 3 jackets are permitted, but are not issued by the Department; no illustration is provided here.



Class 2 t-shirt



Class 2

High Visibility Apparel for Flagging Operations

While performing flagging duties, employees must wear an ANSI Class 3 multicolor vest and Class E chaps.* ANSI Class 3 rain coat and Class E rain bib overalls may be worn instead of the vest and chaps, but only during inclement weather. The ANSI Class 3 sweatshirt is not acceptable for flagging, as it is only issued every two years and has a greater exposure to fading, soiling and wear and tear, than the vest or rain coat.

* Chaps are available in yellow-green or red-orange.

High Visibility Garment Inspection & Replacement

All high visibility garments must be routinely inspected for fading, excessive soiling, stains, and wear and tear. Garments must be taken out of service when the fluorescent and retroreflective qualities of the materials have been compromised to the point that the garment is no longer highly visible. T-shirts and sweatshirts are only issued/replaced every two years. Employees will be required to wear a vest, when a high visibility outer garment is determined to be non-compliant by a supervisor or manager.



ANSI Class 3 Multicolor



Class E

High Visibility Apparel for Nighttime Operations

At night, employees must wear high visibility apparel that meets or exceeds ANSI Performance Class 3 requirements, by wearing one of the following:

- ANSI Class 3 multicolor vest
- ANSI Class 3 sweatshirt
- ANSI Class 3 rain coat (during inclement weather)
- ANSI Class 3 jacket*
- Combination of the ANSI Class 2 vest and an ANSI Class E garment** {leggings or chaps}.

* Class 3 jackets are permitted, but are not issued by the Department; no illustration provided here.

** A Class E garment is recommended, even in combination with a class 3 garment, to help establish the image of a person. Chaps are available in yellow-green or red-orange.



Class 3 Sweatshirt



Class E Chaps

High Visibility Garment Care

Employees are responsible for the proper care of each garment that is issued to them as described on the tag of that garment. Employees must also comply with the following donning and care instructions for the vests:

1. The garment must be worn with the reflective striping facing outward.
2. The front of the vest must be closed always using the Velcro tabs in proper alignment.
3. The sides of this garment are designed to provide some size adjustment. The front panels of the vest must be attached to the back panel of the garment always by overlapping the front tab over the back panel and attaching the Velcro in proper alignment. The gaps between the front panels and back panel on the sides of the garment must always be less than 2 inches in width.
4. All surface area of this garment must be exposed. Nothing is permitted to be worn on top of this garment.
5. The garment must not be modified or decorated.
6. All warning and washing instructions on the tags that are attached (sewn) to the inside of the garment must be followed.
7. Do not store in direct sunlight.
8. Level of Performance cannot be guaranteed if the safety vest is excessively soiled or stained, faded, or worn through on the background material or reflective material.

23-13 Noise

WHAT?

Let's talk about noise and how loud it has to be to lose our hearing. We work around a lot of loud machinery. Wood-Chippers, Chain Saws, Mowers, Screw-guns, Grinders, Pile Drivers, Front End Loaders, Concrete Saws, Compactors, Nail Guns, Generators, Pavers, Wideners, and even our Tandems are loud.

Being in a loud environment for an hour or two won't make a lot of difference, but when you expose your ears to noise eight hours a day, day after day for years and years without wearing hearing protection, after a while, you'll start to notice a difference in your hearing.

The problem with diminished hearing or hearing loss, is that it never comes back. Here's why: In your ear, you have thousands of tiny hairs that move and carry impulses to the brain. These impulses are translated by the auditory nerve that allows you to hear sounds and voices. When noises are so loud, these tiny hairs can be damaged. They never grow back, so once damaged – they stay damaged.

Again, this damage won't happen over-night. Have you ever gone to a concert and when you left you could hardly hear a thing? But the next morning, your hearing was back to normal – right? Most hearing loss is gradual. That next morning after the concert, your hearing was back so you ignored it. Add 30 years, and suddenly you're having a hard time understanding someone talking, or you have to turn the TV up louder and louder.

The best way to fix hearing loss is to prevent it, at an early age.

- Stay away from loud noises.
- PennDOT makes available to you hearing protection. Earplugs and earmuffs. These can be used alone or in combinations together.
- Remember, the louder the noise, the more protection you'll need.

23-14 Take Care of Your Feet

Your ability to walk around started at a very young age, and when you were a baby you parents most likely bought you sturdy shoes that helped you to stand alone. As you've gotten older you may have neglected your shoes and boots, but your footwear remains a very important part of your overall health and is crucial to your safety at work.

As you know, PennDOT employees working in any field operation must wear above the ankle boots with good tread to help prevent slips, trips and falls. Unfortunately, foot related injuries remain very common in the Department.

What can cause a foot related injury?

- Strains and Sprains caused by slips, trips and falls
- Bruises and stubbed toes
- Puncture wounds from sharp objects like screws, nails or rebar
- Broken bones from falling, heavy falling objects or heavy rolling objects
- Amputations caused by machinery or tools
- Crushing injuries caused by pneumatic spade, drill or tamper or other such tools

Additional Foot Protection

- PennDOT does not require steel toed boots, but employees can ask for and receive toe protectors to be worn over their boots.

Things to Remember:

- Your boots should fit comfortably without slipping or pinching your foot or toes
- Be solidly constructed of sturdy materials like leather
- Provide good support
- Have low heels and non-skid soles for good traction
- Be in good conditions with no holes or tears
- Fasten securely without the laces dragging

Stay safe by avoiding slip, trip and fall hazards. Watch where you're walking, always back out of a truck, never run and always pay attention to where you are placing your feet.

23-15 Wear Weather Appropriate Clothing

We've all heard the phrase, dress for success or dressing for the occasion, but when you're working outside in various types of weather, dressing for success lends itself to a completely different meaning. Employees need to dress to stay warm when it's cold, dry when it's raining and cool when it's hot outside. Knowing how to dress is one of the first things you can do to keep yourself safe.

PennDOT provides many different articles of PPE such as a vest, hard hat, safety glasses and for union covered employees a yellow/green t-shirt and a class 3 sweatshirt. But to stay productive, an employee has to do their part to wear the right clothes to stay comfortable and safe.

Cold Weather Dress

When you're dealing with cold weather you need to dress in layers.

- The first layer is called the base layer. It should be close fitting and should move perspiration away from the skin. Good choices are wool and synthetics.
- Layer number 2 is known as the thermal layer and is designed to insulate the body from cold conditions. This layer should assist the base layer with moving excess moisture away from the skin. Good choices are fleece jackets or sweatshirts.
- The outer layer should provide a shield that keeps rain, snow and cold away from your body. Good choices are waterproof jackets, pants or bibs. Some materials can be used for rain, snow and wind.

Warm Weather Dress

When you're dealing with warm weather, wear light-weight clothing

- A light-weight shirt. Good choices are cotton or microfiber.
- Loose fitting shirts will help to keep you cool.
- If you sunburn easily, you can wear a long-sleeved shirt for your protection.
- A sweatband under your hard hat will help to keep the sweat out of your eyes.
- A hard hat coolant pad or neck shade with help to keep your head cool.

Clothing Requirements

You are required to wear shirts with unaltered sleeves that are at least six inches from the shoulder. NO SEE-THROUGH CLOTHING! Wear full length pants/trousers/jeans. Remember: sweatpants, shorts or capris are not allowed.

Your work boots must be above the ankle, have good tread to help prevent slips, trips and falls. You may not wear sneakers of any type while in the field.

Staying comfortable at work is your first step to staying safe. If it's raining when you leave for work bring an extra set of clothes with you. Cold weather may call for an extra coat or jacket and hot weather may require you to bring a change of clothes so you don't over heat.

23-16 Wear Your Safety Glasses!

Do you think you could function if you were blind? This sounds like an extreme statement doesn't it? Think about it this way: How many people have you ever known to have an eye transplant? Probably none, because there is no such thing as a whole-eye transplant. The optic nerve that goes directly into the brain cannot be transplanted, so once it's damaged...you're blind!

On the other hand, protecting your eyes is one of the easiest things you can do. It takes about a second and a half to put on a pair of safety glasses that the department provides for you.

Really, what is your excuse? Yes, there are plenty of excuses like: safety glasses are uncomfortable, they get dirty too fast, they fog up, or you didn't want to take time away from your hazardous task to put them on.

Wearing safety glasses can be difficult and even uncomfortable, but how about losing your opportunity to drive a car, or see the sun rise or see your new-born baby or grandchild's smile? How about not being able to see to cross the street alone or go from your living room to your kitchen without help? Seems like that's difficult and uncomfortable too.

Eye Protection

OSHA's standards indicate that safety glasses, safety goggles, and face shields are designed for and are to be worn to keep flying particles (such as those present when cutting, chipping, drilling, grinding, brushing and blowing with compressed air) molten metal (torch cutting, welding and brazing), liquid chemicals (mixing, cleaning and measuring), acids or caustic liquids (applying cleaners,

filling batteries), chemical gases and vapors (cleaning, mixing, spraying and heating), or potentially injurious light radiation (welding, cutting, brazing or lasers) from getting into and injuring your eyes.

Accidents Happen

The thing is accidents happen all the time. By the true definition, an accident is an unplanned harmful event. Therefore, if you knew something was going to happen, it wouldn't be called an accident – right? We cannot plan accidents. We never know when something is going to happen. What we can plan for are the just in case scenarios by wearing appropriate PPE. Your best way to protect your eyes is to WEAR YOUR SAFETY GLASSES!

23-17 Wearing Proper Footwear Can Prevent Slips and Falls

Choosing the right winter footwear is an important part of preventing slip and fall accidents on the job. Important factors to keep in mind when it comes to footwear include comfort, thermal protection, slip resistance, usability, and cost. Because of the unpredictable and often treacherous conditions that can arise from winter weather, footwear should provide as much stability as possible to avoid slips and falls.

Though the prevention of slips and falls is of particular importance for workers who do jobs outside, it's critical to remember that slips and falls can take place anywhere and at any time, including in parking lots as employees travel to and from buildings. According to OSHA, slips, trips and falls constitute the majority of workplace accidents. They cause many types of debilitating injuries and time away from work. They're also responsible for 15% of all accidental deaths — second only to motor vehicles as a cause of fatalities.

Wearing the right shoe will go a long way in preventing a potential slip and fall.

- Choose shoes or boots with good treads. Water resistant shoes are a good choice when there is snow on the ground.
- The depth and spread of the treads are important since too closely-patterned treads or treads with minimal depth will not allow liquids to be dispersed from the tread pattern and may create a potential hydroplaning effect between the sole and the walking surface.
- It's important to periodically inspect shoe tread for wear and replace shoes when significant wear is noted.
- Flat leather or plastic-soled shoes offer minimal slip resistance between the shoe and the walking surface; therefore, both would be poor choices in snow or ice.

When walking over ice and snow remember to:

- Choose the right type of footwear for winter walking conditions.
- Look for slip hazards and scan the path of travel.
- Maintain a focus on the slip and fall exposures when walking.
- Take shorter, slower steps, keeping the feet shoulder- width apart.
- By utilizing these tips, you will be prepared for walking safely in winter weather.

23-18 Why Wear a Hard Hat?

Have you ever known someone who suffered from a concussion? People who have had concussions have symptoms from the blow to the head for years. The most notable are headaches, but they can also experience, ringing of the ears, nausea, vomiting, fatigue or drowsiness and blurry vision.

The brain is the control center of the body. The slightest damage to any part of the brain will cause malfunction of some area of the body. The skull, under normal circumstances, protects the brain. But when a possibility of injury exists from falling or flying objects the skull needs extra help and protection is required.

Your hard hat reduces the chances of serious injury resulting for falling or flying objects hitting your head. Each hard hat consists of two components: The helmet itself and the adjustable suspension.

PennDOT issues each employee a hard hat that meets ANSI/ISEA Z89.1 Type 1, Class E requirements. Employees can choose from a V-Gard Protective Hat with the brim to the front or a V-Gard Protective Hat with a safari brim. PennDOT hard hats come in three sizes, Small (fits sizes 6-7 ½), Medium (fits sizes 6 ½ - 8) and Large (fits sizes 7 – 8 ½) in some cases, other sizes can be gotten.

You should inspect your hard hat before use each day. Look for gouges, cracks or discoloration. Hard Hats should be replaced every five years unless it's been damaged in some way. The hard hat suspension should be replaced every two years. When replacing the suspension, be sure it is the same size (small, medium or large) as the hard hat.

Hard hats not only reduce your chances of injury from flying or falling objects but they also protect your head when you bump into things like machinery and overhead pipes. Non- conductive hard hats (like those issued by the Department) also protect you from electrical shocks and burns.

Remember: The average hard hat weighs only about 14 ounces. The average head weighs about 14 pounds. Wearing your hard hat is really a small price to pay for protecting the control center of your body.

Section 24 – Proper Lifting

- 24-1 Back Injuries – You are at Risk
- 24-2 Back Injuries and Prevention
- 24-3 Proper Lifting Techniques
- 24-4 Lifting and Carrying Materials
- 24-5 Lifting Guidelines
- 24-6 Overexertion
- 24-7 Proper Lifting
- 24-8 Proper Lifting Techniques
- 24-9 Manual Lifting
- 24-10 Reducing Overexertion Injuries

24-1 Back Injuries – You Are At Risk

Back injuries are the most common injuries in construction. Construction workers report back pain in higher numbers than in all other industries combined. In addition, back injuries are the major cause of disability in middle-age construction workers. Long recovery times and chronic back problems may mean you are no longer able to do the same type of work.

Most back injuries occur due to lifting, carrying, pushing and pulling, and bending at the waist. Think about a bricklayer who lifts an average of 200 thirty-eight lb. blocks per day. That's a lot of lifting. What do YOU lift in a day?

Face it- lifting is a part of the job. However, there are strategies you can use to prevent back injuries.

- Let tools do the work
 - o If materials weigh more than 50 lbs. do not lift them by yourself. Use carts, dollies, forklifts and hoists, not your back, to move materials. You can also get another worker to help you.
- Change your work routine
 - o Re-position your body so that you are not contorted or repeating a motion. Raise your work to waist level. Have materials delivered near to where you work. Take rest breaks; when you are tired you can get injured more easily.
- Think before you move
 - o Lifting while bending and twisting will cause injury. You can prevent that if you step instead of twist. Turn your whole body rather than twisting, and lift and lower in a smooth, steady manner. Try to handle materials between knee and chest level.

Remember, back injuries have consequences including reduced work, lost income, chronic pain, and medical bills. Use these strategies to lift smart and prevent back injuries.

24-2 Back Injuries and Prevention

Back injuries are some of the hardest to prevent and most common injuries to workers. According to the Bureau of Labor Statistics, more than 1 million workers suffer back injuries every year, and back injuries account for one of every five workplace injuries or illnesses. These types of injuries account for a large majority of Worker's Compensation claims annually...plus – they hurt!

Back Injuries can occur when:

- An employee is lifting an object
- Using improper lifting techniques (Lifting with your back and not your legs)
- Lifting something that is too heavy
- Twisting while lifting
- Repetitive lifting during a work task

Ways to Prevent Back Injuries

Engineering Controls – Setup work areas that are “back friendly” to all employees. Use mechanical devices or conveyor belts whenever feasible to limit handling objects. Install shelving and setup storage areas that keeps objects that need lifted at a comfortable range. Keep heavy objects lower to the floor and put smaller/lighter objects higher.

Eliminate: the best way to protect workers from back injuries is to eliminate as many lifts as possible. Use equipment to lift like forklifts, heavy equipment or dollies to move heavy objects. Break down large heavy objects into smaller safer loads whenever possible.

Administrative Controls: Use the buddy system when lifting heavy objects. Never lift anything over 50 pounds alone. Agree on two man lifts and before lifting see if there is an easier or safer way.

PPE: There isn't a lot of evidence to support using PPE like back braces or back belts to prevent a back injury. These devices often create a false sense of security when completing a lift.

Employees should focus on stretching or using proper lifting techniques over using a back belt to keep their backs safe.

Most PennDOT equipment that requires a two-person lift is marked with a sticker similar to this one.

Please ask for help if you see a sticker like this and use two people to make the lift.



24-3 Proper Lifting Techniques

Improper lifting is one of the leading causes of back injuries in the United States. No matter the size or weight of the object, it is important to use proper lifting techniques to keep your back healthy and free from pain. Backs, shoulders and necks are especially vulnerable and be debilitating when injured.

Before you pick something up ask yourself these questions:

- Is this too heavy for me to lift alone?
- How high do I have to lift this?
- How far do I have to carry this once I've lifted it?
- Am I trying to impress anyone by lifting this?

If you believe the lift is beyond your ability to do safely, ask for help! Contact your supervisor and ask for assistance.

The following are safe lifting techniques that should be used:

- Have a balanced stance. Place your feet next to each other, a shoulder-width apart.
- When lifting something from the floor, squat close to the load, bend your knees and lift with your legs.
- Keep your back in its neutral or straight position. Tuck in your chin so your head and neck continue in a straight line.
- Grip the object with your whole hand, rather than just your fingers.
- Draw the object close to you, holding your elbows close to your body to keep the load and your body weight centered.
- Lift by straightening your legs. Let your leg muscles, not your back muscles do the work.
- Tighten your stomach muscles to help support your back.
- Maintain your neutral back position as you lift.
- Never twist while lifting. When you must turn with a load, turn your whole body, feet first.
- Never carry a load that blocks your vision – this could lead to a trip and fall situation.
- When it's time to sit the load down, use the same body mechanics designed for lifting in reverse.

24-4 Lifting and Carrying Materials

A crew was moving bags of calcium from one shed to another. A forklift was not readily available so they were moving the bags manually, lifting them one by one from the pallets and walking them to the new location. One of the workers was in a hurry to get done and forgot to lift with his leg muscles and not his back. The next day he reported serious pain and was taken to a physician who found he had damaged a disc in his lower back.

Does this scenario sound familiar? It probably does. According to OSHA, manual materials handling is the principal source of compensable injuries in the American work force, and four out of five of these types of injuries will affect the lower back.

Back pain and injuries may vary from one person to another. While eliminating back pain entirely may not be possible, there are many approaches to take to help stop work-related back pain.

Preventing Back Injuries from Lifting and Carrying

- Always use equipment, like a dolly, to transport heavy objects if possible.
- Never try to lift an item over 50 lbs by yourself.
- Plan your lift- make sure the path is clear and you are facing the direction of travel prior to lifting.
- Tuck in the chin to keep the back as straight as possible while lifting.
- Lift with the strong leg muscles, not your back. Ask for help with heavy or awkward items.
- Avoid twisting your body while carrying an object.
- Coordinate and practice team lifting prior to the lift.

24-5 Lifting Guidelines

Employees whose job duties involve lifting must follow the guidelines below to prevent back injuries. Keys to preventing back injuries include the following:

- Utilizing mechanical lifting devices
 - o If there is a piece of equipment or assistive device that could move or lift an object over 50 pounds, that should be used.
- Work process planning
 - o Evaluate your jobs and tasks to reduce risk factors.
 - o Adjust your work tasks to allow for the body to be in a neutral position, if possible.
 - o Ensure materials are stored properly to prevent reaching or twisting while lifting.
 - o Ensure there is enough room to make the lift.
- Correct posture
 - o Create good habits by being aware of your posture while at rest and during activity.
- Correct lifting techniques
 - o Know the weight and size of the item to be lifted.
 - o Your feet should be shoulder-width apart with one foot slightly in front of the other.
 - o To lift the object you should squat down, bending with your knees.
 - o Ensure you have a firm grip on the item to be lifted.
 - o Maintain good posture by keeping your back straight.
 - o As you lift the object, slowly lift by straightening your hips and keeping the object close to your body.
 - o If you must change direction with the object, utilize the pivot technique: turn your body by using your feet and not your waist.
- Stretching
 - o Perform stretches before you begin work and periodically throughout the day.
- Getting help
 - o Know your lifting limitations and ask for assistance if the object is too heavy or awkwardly shaped.
- Adequate physical condition
 - o When you are in adequate physical condition, you can lift more, bend more, and do more without overly stressing your muscles.

Working safely is a responsibility shared by all employees. Managers and supervisors are to ensure there is an awareness of these lifting guidelines to educate employees on how their work practices can reduce lifting injuries. Employees are to perform their duties in the safest manner possible and adhere to all established safety rules, procedures and work practices.



24-6 Overexertion

Overexertion injuries were reported account for approximately one quarter of all reported injuries. Listed below are some of the actual activities that lead to these injuries:

- Lifting related injuries (spreaders, auger pans, concrete pipes, tire chains, bagged material, tools, sign posts, etc.)
- Shoveling (salt, snow, material, etc.)
- Removing/installing spreaders and tailgate mounted augers
- Installing/removing plows/blades
- Raising/lowering truck hoods
- Vehicle/equipment repairs (loading old brake drums, changing a hydraulic pump, removing a clutch fan, etc.)

Considering the number of "risky" lifting situations that we encounter daily, we ought to get in the habit of using the following techniques:

- Keep your back straight
- Bend at the knees
- Never bend or twist your back when lifting
- Never lift with arms extend - keep them close to your body and center of gravity
- Ensure your footing is solid with your feet shoulder-width apart
- Lift with your legs, not your back

To help further reduce injuries, keep in mind the tips listed below:

- Size up the load to ensure it is stable and balanced. Test the weight first. Do not attempt to lift anything that feels too heavy, big, or awkward to grasp firmly.
- Plan ahead for the job and consider all possibilities. Ensure assistance or equipment is available for lifting large loads. | Include planned rest stops for frequent or heavy lifting. Fatigue makes one more susceptible to injury.
- Avoid manually moving or lifting vehicle and equipment attachments. Use mechanical lifting devices or blocks/supports to move loads or position equipment/attachments whenever possible.
- Rotate work duties whenever possible to reduce exposure.
- Never overload your shovel with material and stay as close to the target area as possible. Avoid excessively throwing material; carry the load close to the body and walk to its destination. Scoop in a forward motion and push piles when possible to reduce the frequency of lifting.
- Pushing an object is better for your back than pulling it. If you push, you can see over your load and use your legs, not your back.

Take some time to discuss the overexertion hazards you may encounter today. Share your ideas for how you might avoid each these hazards or make them manageable, to stay injury free.

24-7 Proper Lifting

Most of us forget how important a healthy back is, however, the back contains one of the most critical muscle groups in the body, as well as the spinal cord and associated vertebrae and discs.

Everyone working in this industry must lift materials to put them in place or move them from one location to another. And in doing so, everyone is at risk for back injury. These injuries are also cumulative; many smaller injuries lead up to a big one. That's why it's important to remember the key elements of proper lifting.

Prepare for the lift by asking yourself:

- Do you need help- more people or equipment?
- Do you need to stretch?
- Did you determine the load capacity and your ability to handle the load?
- Are you wearing safety footwear- closed toe with good tread?

- Are you wearing gloves to protect your hands?
- Do you have a clear walkway to your destination? Now you're ready to make the lift following these guidelines:
- Center the load between your legs and shoulders. Always bend with your legs.
- Keep your back straight.
- Lift with your legs. You'll feel those muscles doing the work.
- Hug the object you're lifting and keep it close to your body. Finally, move the load using these rules:
- Keep your back as vertical as possible.
- Continue to keep the load close to you.
- Don't twist your body.
- Bend your knees and keep your back straight when lowering the load.

Remember: The only thing you'll prove by lifting more than you should, or lifting improperly, is that your back is a poor substitute for a forklift. Think before you lift and practice good lifting techniques for a healthy back!

24-8 Proper Lifting Techniques

When you were young did you think you could lift anything and do anything? As you've gotten older have those decisions come back to haunt you? Overexertion and back injuries are the leading causes of lost-time injuries. Lost-time injuries are the type of injuries that put you out of work for an extended period of time. In some extreme cases workers are never able to return and become permanently disabled.

No one likes to be hurt, so let's take a look at a few simple lifting techniques that will protect your back for years to come.

Proper Lifting Techniques

- Don't attempt to lift anything that is too heavy, too big or is awkward – ask for help!
- Bend at your knees, not with your back or at your waist.
- Remove any slippery substances from your hands, gloves and footwear prior to lifting.
- Bring the object as close to your body as possible – this will give you more leverage.
- Don't twist your body as you're lifting or carrying a load: Pivot with your feet instead of your spine.
- Plan your walking/carrying path and make sure it's free of debris and obstacles.
- Use a tool (Dollies, carts, two wheeled carts, hydraulic/electric hoists) to move loads whenever possible.
- When lifting, comfortably lower or lift the load by bending your knees and keeping your back straight.
- ASK FOR HELP!

Back Belts: There is no evidence to support the use of back belts to provide a benefit of reducing back injuries. People who use back belts tend to lift more than they should because they are using the back belt as a mechanical aid. Back belts are not meant to be used in this way and if you aren't using proper lifting techniques, the back belt could actually do more harm than good as your back ages.

Stay safe and stay healthy!

24-9 Manual Lifting

This protocol ensures that all employees whose job duties involve lifting receive information on the common causes of back injuries and measures that can be taken to prevent these injuries. Since back injuries represent a large portion of all injuries, PennDOT requires the guidelines in this protocol be followed to provide a safe work environment.

1. Policy

Working safely is a responsibility shared by all employees. Managers and supervisors are to ensure there is an awareness of these lifting guidelines to educate employees on how their work practices can reduce lifting injuries. Employees are to perform their duties in the safest manner possible and adhere to all established safety rules, procedures, and work practices.

2. Resource

OSHA Technical Manual, Section VII, Chapter 1 – Back Disorders and Injuries

3. Keys to preventing back injuries include the following:

- A. Utilizing mechanical lifting devices
If there is a piece of equipment or assistive device that could move or lift an object over 50 pounds, that should be used.
- B. Work process planning
 - 1) Evaluate your jobs and tasks to reduce risk factors.
 - 2) Adjust your work tasks to allow for the body to be in a neutral position, if possible.
 - 3) Ensure materials are stored properly to prevent reaching or twisting while lifting.
 - 4) Ensure there is enough room to make the lift.
- C. Correct posture
Create good habits by being aware of your posture while at rest and during activity.
- D. Correct lifting techniques
 - 1) Know the weight and size of the item to be lifted.
 - 2) Your feet should be shoulder-width apart, with one foot slightly in front of the other.
 - 3) To lift the object, you should squat down, bending with your knees.
 - 4) Ensure you have a firm grip on the item to be lifted.
 - 5) Maintain good posture by keeping your back straight.
 - 6) As you lift the object, slowly lift by straightening your hips and keep the object close to your body.
 - 7) If you must change direction with the object, utilize the pivot technique; turn your body by using your feet and not your waist.
- E. Perform stretches before you begin work and periodically throughout the day.
- F. Know your lifting limitations and ask for assistance if an object is too heavy or awkwardly shaped.
- G. When you are in adequate physical condition, you can lift more, bend more, and do more without overly stressing your muscles.

4. Training

The Employee Safety Division developed and provided a PowerPoint presentation to District Safety Coordinators that was required to be delivered during spring safety stand down day events in 2014.

5. Program Review

This protocol will be reviewed for any changes and updates of the procedures to make sure they are current and relevant. Details of the annual review will be documented under Recordkeeping.

6. Recordkeeping

This protocol was created on May 31, 2017. It contains new and previously existing information as described in the table below. Content that is being introduced for the first time in the MESH is identified as “original”.

24-10 Reducing Overexertion Injuries

Overexertion is a fancy way of saying I pulled a muscle in my back or my leg hurts because I’ve been standing or sitting too long.

There are number of things you can do to prevent overexertion and most only take a couple minutes a day.

- If you’ve been a couch potato all winter and now that’s it warm outside you are doing extra work and you suddenly realize your entire body hurts – that’s overexertion. A simple way to fix this is to stretch for one minute on each leg. Stretching your tendons and muscles will “warm them up” prior to moving muscles that have fallen asleep over the winter.
- If you are trying to lift something that’s too heavy and your back starts to scream in pain; that’s overexertion. Take time to position your body before you lift anything. Don’t twist your body while lifting. Bend at your knees when lifting. NEVER lift with your back.

- If you're carrying something heavy and you twist your back to see what's over your shoulder and suddenly you have searing back or shoulder pain; that's overexertion. Walk in a straight line when possible. Avoid twisting your legs or body to the side while carrying heavy objects.
- If you've been carrying something with arms stretched out and your shoulders start to burn; That's overexertion. Keep heavy objects close to your body. The closer to your body that you carry something, the more control over it you have. This leverage will give you more stability and decrease your chances of being injured through overexertion.

Remember, if you are trying to lift something that is too heavy, ask for help! Have a plan before you lift. Know exactly where you're going and the route you're planning to take. Make sure there are no tripping or slipping hazards in your way.

It is easy to prevent overexertion injuries, you just have to take the time to stop and think before you complete your task.

Strains and Sprains Prevention

Strains and sprains are a leading cause of injury to our workforce. According to the Accident/Injury Tracking (ATS) system, in May of last year brooming, sign truck barricade, paving, loading/unloading equipment and tools, flagging, shoveling and digging were among the several work activities that resulted in strains and sprains to our fellow PennDOT employees. A strain is caused by overstretching or overexerting while a sprain is caused by wrenching or twisting.

Common mistakes leading to strains and sprains include:

- Failure to follow correct lifting techniques
- Poor posture
- Inadequate job planning



Prevention:

- Preventing strains and sprains can be accomplished with a little planning and training. Improved work methods can be determined by using the work process planning method. Evaluate your jobs and tasks to reduce risk factors, adjust your work to allow for the body to be in a neutral position, ensure materials are stored properly to prevent reaching or twisting while lifting, and ensure there is enough room to make the lift.
- Utilize platforms and personnel lifts to raise employees to their work, such as the use of scaffolds or scissor lifts for crews conducting bridge work or inspections. Consider using carts, dollies or equipment to move loads rather than manually lifting them. Such devices when available should be used for objects weighing over 50 pounds.
- Planning out your work ahead of time allows you to place tools and equipment close by, eliminating the need to stretch and reach for items at the last minute.
- Back injury prevention training is available upon request.
- Keeping your muscles and joints limber is an extremely important element in reducing sprains and strains. Consider performing a few stretches before you begin work and periodically throughout the day.
- Having a healthy lifestyle, staying in shape and eating nutritional foods may help prevent strains and sprains.

Correct Lifting Techniques:

- Know the weight and size of the item to be lifted.
- Your feet should be shoulder-width apart, with one foot slightly in front of the other.
- To lift the object, you should squat down, bending with your knees.
- Ensure you have a firm grip on the object to be lifted.
- Maintain good posture by keeping your back straight.
- As you lift the object, slowly lift by straightening your hips and keep the object close to your body.
- If you must change direction with the object, utilize the pivot technique; turn your body by using your feet and not your waist.

Understanding your lifting limitations and asking for assistance if an object is too heavy or awkward will also greatly reduce strains and sprains!

Section 25 – Respiratory Protection

25-1 Respirable Crystalline Silica

25-2 Respirable Crystalline Silica

25-3 Respiratory Protection

25-1 Respirable Crystalline Silica

In 2016 the OSHA standards for respirable crystalline silica changed. The new rule reduced the amount of time a worker can be around crystalline silica dust.

Crystalline Silica dust can be found in sand, rock, concrete, glass, marble, brick, mortar, porcelain, ceramic, artificial rock and many other products that you are probably familiar with. Most importantly, when crystalline silica becomes small enough to breathe it can become very dangerous.

The most common health effect crystalline silica can have is called silicosis. This health condition is incurable and often results in fatal lung disease. Silicosis scars the lung and leads to decreased lung function.

Exposure to crystalline silica often comes from cutting, sawing grinding, sanding or crushing concrete, brick, block or stone products.

When you are exposed to crystalline silica dust you will want to take precautions to avoid breathing the dust particles into your lungs.

- Use a water delivery system for dust suppression.
- Use ventilation systems in equipment for dust filtration.
- Use a vacuum system for dust collection measures to minimize or eliminate the exposure.
- Avoid unnecessary exposure.
- Avoid eating, drinking or smoking where silica dust is present.
- Always use PPE such as an N-95 dust mask or more aggressive respiratory protection if you cannot avoid the silica dust.

The best way to keep yourself safe from crystalline silica is to stay away from it. Use controls such as wet cutting or vacuums to reduce or eliminate the dust at the source before it becomes airborne.

25-2 Respirable Crystalline Silica

Occupational Safety and Health Administration (OSHA) released a final Respirable Crystalline Silica (RCS) in Construction regulation – 29 CFR 1926.1153 on March 24, 2016. This was a change to an existing rule that had not been modified since 1971. The change limits worker permissible exposure limit (PEL) to 50 (previously 100) micrograms per cubic meter of air ($\mu\text{g}/\text{m}^3$), averaged over an eight-hour day.

Crystalline silica is a naturally occurring mineral commonly found in sand, rock, concrete, glass, marble, brick, mortar, porcelain, ceramic, artificial rock, and many other products. Crystalline silica exists in three main forms: quartz (most common), cristobalite, and tridymite.

Inhalation of crystalline silica in the respirable size range (particle diameter of less than 10 microns) can cause a variety of adverse health effects. The most common health condition associated with respirable crystalline silica exposure is silicosis, an incurable and sometimes fatal lung disease. Silicosis results in scarring of the lung tissue and decreased lung function. Silica exposure may also increase the risk of lung cancer and kidney disease.

Exposures typically comes from chipping, cutting, sawing, drilling, grinding, sanding, and crushing of concrete, brick, block, rock, and stone products. Many of the operations that potentially expose employees to RCS currently use some type of engineering and work practice controls to minimize airborne dust.

Types of field operations involving silica-containing materials that may expose employees to RCS include:

- Jackhammering
- Sawing, grinding, and chipping with handheld power tools
- Milling and grinding
- Sawing or drilling with rig-mounted equipment

Excavating and crushing Engineering controls include the following:

- Use of water delivery systems for dust suppression.
- Use of ventilation systems in equipment for dust filtration.
- Use of vacuum systems for dust collection measures to minimize or eliminate exposure.
- Awareness and training of potential exposure to any RCS.
- Avoid unnecessary exposure. Many of these operations do not require direct visual inspection while being performed.

- Plan ahead to control dust at a work site.
- Avoid eating, drinking or smoking in areas where silica dust is present.
- Eliminate the use of abrasive blasting materials that contain more than 1% crystalline silica.
- Use dust control methods such as blast cabinets, approved vacuum systems, and wet methods.
- Maintain dust control systems to make sure they are working properly.
- Wear disposable or washable protective clothing.
- Use respirators when exposure to RCS is likely to exceed the PEL and is likely to persist despite full and proper implementation of the specified engineering and work practice controls.

PennDOT has taken the following steps to protect you:

- Inventory Department equipment that may produce RCS.
- Developed an implementation plan for engineering and administrative controls, and PPE, to ensure RCS exposures remain below 50 micrograms per cubic meter of air (averaged over an eight-hour day).

25-3 Respiratory Protection

Protocol 24a was created by PennDOT to protect workers from airborne exposures created by working with asbestos, lead, respirable crystalline silica and chromium. Respirators protect workers from these hazards, but you must have the right respirator for the job.

Respirator Types

Choosing the right respirator is essential to keeping yourself (and your lungs) safe from airborne contaminants. Different contaminants require different protection. Some of the common types of respirators that you'll be using are as follow:

- Disposable Paper Respirator – used for minimum protection from dust and some fumes.
- Half Mask Air Purifying Respirator – This type of respirator uses a cartridge to purify the air you're breathing and only works if you choose the correct cartridge. These can be used whenever there are particles in the air that should not be in your lungs, such as respirable crystalline silica.
- Full Mask Air Purifying Respirator – Like the half mask, this type of respirator uses a cartridge to purify the air you're breathing but offers additional protection to your eyes and face.
- Supplied Air Respirator – These types of respirators come with an air pack and are used when there is not sufficient oxygen to breathe. Some instances would be a structure fire.

Fit Testing and Seal Check

Before you can wear any respirator (except for the disposable paper type) you must be cleared by a medical professional. Once this is done, then you need to be fit tested to make sure the respirator fits tightly to your face. It would defeat the purpose of the respirator if it had a crack or didn't have a proper seal – right?

The fit test is performed by a competent person who has been properly trained to do so. This person will determine if the respirator is of the correct type, that it fits and is of the correct size. You must have a fit test prior to wearing a respirator for the first time. After that, you will need to have a fit test performed annually.

There will also need to be a seal check performed by the worker wearing the respirator every time it's used, prior to starting work. These regular seal checks are required so you can be sure that contaminated air doesn't sneak into your air supply.

Facial Hair or No Facial Hair?

The biggest issue most men have with respirators is the requirement to be clean shaven. It is imperative that you have a proper seal for your respirator to work properly. Facial hair will prevent an adequate seal and will allow particulates to sneak into your air supply defeating the purpose of you wearing it in the first place. Think of it this way, your beard grows back every day, your lungs won't.



Paper Mask



Half Mask Air Purifying



Full Mask Air Purifying

Section 26 – Roadside Hazards

- 26-1 Bloodborne Pathogens
- 26-2 Dangers in Packages and Cell Phones
- 26-3 Dangers of Roadside Meth Labs
- 26-4 How to Safely Handle Animal Carcasses
- 26-5 Infectious Waste
- 26-6 How to Pick-up Discarded Syringes Safely
- 26-7 PSP Dangers of Methamphetamine Production
- 26-8 Use Caution While Picking up Litter

26-1 Bloodborne Pathogens

Bloodborne pathogens are disease causing organisms that are present in human blood and other potentially infectious materials that can cause humans to contract hepatitis B, hepatitis C and HIV (The virus that causes AIDS). Workers exposed to these bloodborne pathogens are at risk for serious or life-threatening illnesses.

How do you get a bloodborne pathogen?

Bloodborne pathogens are transmitted through blood or other body fluids, i.e. urine, saliva and semen, also known as OPIM's (other potentially infectious materials). Certain work operations increase an employee's potential for an exposure to a bloodborne pathogen. The following PennDOT operations may be most at risk for potential exposure:

- Employees assigned to litter pick-up
- Janitorial/housekeeping staff
- Sewage treatment plant operators
- Pipe flushing crews

A bloodborne pathogen can enter your system through:

- Open sores
 - Cuts and abrasions
 - Acne
 - Any type of damaged or broken skin, even sunburn or blisters
 - Your eyes, nose or mouth
- Different Types of BBP

HIV – This virus does not live long outside the body. Getting HIV is a concern primarily for employees providing first aid or medical care in situations involving fresh blood or other potentially infectious materials.

Hepatitis B & C – These diseases attack the liver. They are transmitted primarily through blood to blood contact, but also through OPIM, sexual activity and mother to newborn. The virus can live in dried blood for more than seven days and there is no known cure.

Prevention

- Treat all blood or OPIM's as if they are contaminated.
- Always wear PPE (Gloves and goggles/safety glasses).
- Gloves should be made of latex, nitrile, rubber or other water impervious materials.
- Replace PPE that is torn or punctured.
- Wash hands immediately after removing PPE.

Litter Pick-up

- Always wear PPE (Gloves and goggles/safety glasses, work boots).
- If you are picking up a needle – use a shovel to pick it up.
- Place needles in a sharp's container or a hard-plastic bottle.
- Do not put open needles in a garbage bag. Many people have been contaminated by a used needle that pokes through a garbage bag.

Hepatitis B Vaccinations

Hepatitis B Vaccinations are recommended for any employee involved in operations where the potential for exposure exists. The Commonwealth's health insurance program provides coverage for the administration of this vaccination. Any additional costs such as a co-pay should be pre-paid or directly billed to the employee's organization.

Employees are eligible for this vaccination after they have completed their probationary period.

26-2 Dangers in Packages & Cell Phones

Recently you may have seen on the news, suspicious packages have been mailed to high ranking government officials and well-known individuals in the US. While all of these packages were intercepted and rendered safe prior to delivery to the intended recipients, employees should remember to be on the lookout for suspicious packages being delivered to Central, District or County

Offices. We do not believe there is a threat or risk to the department; however, we want to ensure all employees are aware and taking precautions in accordance with Commonwealth policy.

Characteristics of suspicious letters or packages:

- Mailed from a foreign country or no return address.
- No postmark or postmark that does not match the return address.
- Excessive postage or no postage.
- Addressed to a title only (such as Director) or has the wrong title associated with an individual's name.
- Excessive weight, rigid, bulky, lopsided or uneven.
- Misspelled words, poorly typed or handwritten.
- Excessive tape or string, restrictive markings, odor, oily stains or discoloration, protruding wires or aluminum foil.
- Ticking sound.



Precautions for opening suspicious letters or packages:

- Do not handle or open mail with your bare hands; wear gloves and use a letter opener or other device.
- Open letters with the top of the envelope positioned away from your body.
- Once opened, turn the envelope upside down over a trash can and pull open one side (if any foreign substance is inside, it should fall out).
- Always wash your hands using soap and hot water after handling mail.
- Do not open mail in areas of high ventilation or in front of a fan.

Handling a suspicious letter or package:

- Do not open, move or smell the item.
- If the item is already being handled, place the item in a plastic bag or other type of container to prevent leakage of the contents (if a container is not available, cover the item with anything that is available, such as a piece of paper, trash can, clothing etc.).
- Immediately notify your supervisor or other manager. Management will determine whether the item should be reported to law enforcement authorities. If management determines that the items should be opened, proceed using the mail opening instructions.

See Management Directive 720.7 Bomb Threats and Suspicious Packages for additional information.

For employees who constantly work around traffic, heavy equipment, machinery, or hazardous substances, cell phone use can become life threatening very quickly.

Distracted Driving:

According to the National Highway Traffic Safety Administration "During daylight hours, approximately 481,000 drivers are using cell phones while driving". That's almost half a billion people on their phones while driving in a single day!

Avoid the temptation looking at your phone when driving by:

- Utilizing hands free devices.

- Turn your phone off or set the ringer to silent before you start driving.
- Make the glove compartment the phone compartment.

Distracted Walking:

Distracted walking can result in anything from spilled coffee to serious injuries. The injuries caused by “distracted walking” are increasing and are probably much higher than official figures, since people are often embarrassed to admit that they were injured while texting.

Avoid distracted walking injuries by:

- Focus on what lies ahead and the task being completed.
- If texting, move out of the way of others and stop on the sidewalk.
- Never cross the street while using an electronic device.
- Do not walk with headphones in your ears.
- Be aware of your surroundings.
- Always walk on the sidewalk if one is available; if you must walk on the street, face oncoming traffic.
- Look left, right, then left again before crossing the street.
- Cross only at crosswalks.



Safety Mindset:

Maintaining a focus on putting safety first will help employees recognize situations where the use of cell phones would interfere in their ability to perform tasks safely. Other ways to avoid cell phone distractions include the following:

- Abide by Department policy that prohibits cell phone use while driving. Only hands-free devices are acceptable to make or answer calls. Refer to Pub 445M Protocol 13 Fleet Accident Prevention.
- Designate safe times and locations for checking in on friends and family.
- Get in the habit of sending and receiving text messages before and after work or during breaks.
- Speak up when you see others putting themselves in harm's way by using their cell phone.

26-3 Dangers of Roadside Meth Labs

Meth labs are often found in remote areas, in the woods and on the sides of our roads. A roadside Meth lab isn't a room with beakers, in fact it isn't in a room at all. More likely you'll find a roadside meth lab in a plastic water jug, or a small cooler. If you find one – don't touch it. Call 9-1-1 immediately and step away.

Roadside meth labs pose not only an environmental hazard but also a very serious personal health hazard to anyone who opens the jug or cooler. Roadside meth labs contain harmful fumes and highly explosive chemical compounds. Acute exposure happens very quickly and cause death in minutes when the levels of toxicity are high.

Meth kills – not only the user but also an unsuspecting worker on litter patrol or a foreman picking up debris prior to shoulder cutting. Meth affects the central nervous system. The fumes from a roadside meth lab can burn your eyes, nose and skin leading to respiratory issues. A portable meth lab is also highly volatile and can explode with a simple nudge from your foot or from a grader blade.

There are simple ways to spot a roadside meth lab. If you come across a dump site you'll find things like plastic tubing, sometimes attached to plastic bottles, sometimes not. Clear bottles (glass or plastic) filled with a substance that resembles urine or weak iced tea. Coffee filters containing a white substance or sometimes a red sludge, or stripped lithium batteries.

Sometimes, a meth cook will discard a jug of meth along the road in hopes of coming back at a later date to pick it up. If you find one any of these items, call 9-1-1 immediately and touch nothing!

If you come across a roadside meth lab or even suspect it to be a roadside meth lab:

- Call 9-1-1
- Do not touch anything.
- Do not touch, open or move any container.

- Try to remain upwind from a potential meth lab.
- Do not try to dilute a meth lab with water. Lithium metal reacts to water and is highly explosive when exposed to water.
- If you think you've been exposed, call 9-1-1 immediately. Wash your hands and your face and wait for emergency care.

26-4 How to Safely Handle Animal Carcasses

As a highway worker you are sometimes asked to remove a dead animal from the highway right-of-way. Careless handling of animal carcasses can create a potentially harmful exposure to serious diseases like rabies and Lyme Disease as well as infections from salmonella, e-coli and other pathogens. Employees should follow established work practices for picking up and removing animal carcasses from the highway. Always wear appropriate PPE, practice good personal hygiene and exercise good judgment.

Personal Protective Equipment

If you have to pick up an animal carcass, please wear disposable latex or nitrile gloves under your regular leather work gloves. The latex or nitrile will protect your hands from any liquids. Gloves should be puncture resistant.

Protect your eyes, nose and mouth by wearing a full-face shield and safety glasses or by wearing goggles especially if the animal is bloated.

Do not smoke, eat, drink, bite your nails or touch your face until you've washed up. This will help you to avoid transferring any disease the animal may have to yourself.

To protect against ticks, wear a long sleeved shirt, tucked into your pants and tuck your pants into your boots. You can also use an insect repellent that contains DEET for extra protection.

Safe Work Practices

Animals that have been injured or are dying should be reported to the police.

If you come across a number of dead or diseased animals (or birds) in one place, report this to your supervisor because other agencies may need to be contacted.

If you cannot achieve proper disposal of an animal immediately, remove the animal from the highway or pavement and leave it in a location within the right-of-way that does not create a public hazard.

Reasonable effort should be made to disinfect any tools that were used to remove the dead animal. Washing with a 10% household bleach solution is recommended.

26-5 Infectious Waste

When it's trash night at home, you normally cart the garbage cans to the curb, separate the recyclables and walk away. The next morning, the trash person comes and you take your empty can back from the curb and all is well.

Not all garbage is equal

Now let's switch gears and suddenly you're on a roadside litter crew. You come across all kinds of garbage. If all you found was paper, you'd probably have no issues, but unfortunately, roadside trash carries with it bloodborne pathogens, diseases, viruses and bacteria that can cause any number of illnesses if you should happen to get it into your blood stream.

What is infectious waste?

Infectious waste can be any type of animal tissue (human or not) bodily fluids including blood, urine and feces and needles/syringes. If you think about it another way, infectious waste is anything that could potentially have blood or body fluids associated with it.

What do you do if you find Infectious waste?

Prevention is the key! Never pick up a dead animal, a needle or anything that may be contaminated without gloves and a shovel. Never use your bare hands and even if you're wearing gloves make sure you wash your hands thoroughly after you've completed your task. Separate your trash, just like you do at home. Keep animal waste in separate bags. Put needles or syringes into a hard-plastic bottle prior to putting them in the garbage bag. This will keep you from getting stuck by a needle that pushes through the bag and catches you in the leg.

If you have any open wounds or sores on your hands or arms, be sure to keep them covered while picking up garbage. Bloodborne pathogens will transport themselves through these avenues.

If you think you've been contaminated by infectious waste, report it to your supervisor immediately and seek medical attention. Take a small part of the infectious waste with you to the doctor so they know and understand how to treat you.

26-6 How To Pick Up Discarded Syringes Safely

The problem:

- Injection drug users can litter syringes on public property. Syringes can also clog manholes and pipes in sewage-treatment plants or along roadways.
- Used syringes can contain blood which can be infected with a bloodborne pathogen.
- Clean-up workers can be exposed to HIV, Hepatitis-C, or Hepatitis-B if they are stuck by a used syringe. Clean-up workers should avoid all skin contact with syringes.

How to pick-up used syringes

- Bring gloves, pliers and a hard plastic bottle or container to the location of the litter.
- Put on puncture resistant gloves.
- Do NOT touch the syringe with your bare hands.
- Use pliers or a litter picker to pick-up the syringe.
- Immediately put the syringe into the hard plastic container – Place the syringe needle first into the container.
- Do not attempt to re-cap the needle. If a syringe is already capped, keep the cap on. Still use the pliers or litter picker to discard the syringe into the hard plastic container.
- Remove your gloves and discard them into a plastic trash bag.
- Wash hands thoroughly or use an alcohol gel to clean your hands as soon as possible.
- Keep your hard plastic container in a secure location until it can be discarded.

Who can do this type of work

- Workers must be trained initially and annually on Bloodborne Pathogens.
- Workers must be provided gloves, pliers, litter pickers, hard plastic container and alcohol gel hand disinfectant.
- Workers must know where and how to seek immediate treatment.
- If a worker gets a cut or needle stick from a used syringe, seek medical attention immediately at the local hospital. The hospital will evaluate the risk for transmission of HIV and Hepatitis and may recommend medication. The medication is most effective within the first 24 hours.



26-7 PSP Dangers of Methamphetamine Production

Pennsylvania has experienced an increase in the manufacturing of methamphetamine over the past three years. This upsurge poses a potential health and safety risk to our communities. Methamphetamine is an illicit drug that is “cooked” using common household ingredients which can be volatile and generate by-products that are harmful to humans.¹ When ingredients used in the manufacturing process are combined, they emit toxic fumes and could cause chemical burns upon contact. The table illustrates the growing number of methamphetamine laboratories and dumpsites discovered in Pennsylvania, as well as seizures of the drug in the past three years.

Type	2012	2013	2014
Laboratories	80	134	183
Dumpsites	47	30	14
Seizures	25	16	30
Grand Total	129	180	227

Toxic residue from the cooking process saturates everything it comes in contact with and can remain hazardous for months or years if not properly sterilized. Since the chemicals can be inhaled, ingested, or absorbed through the skin, anyone coming in contact with instruments or areas that have been used in the manufacturing process is at risk. Acute exposure occurs over a relatively short time and produces symptoms that include: shortness of breath, cough, chest pain, dizziness, lack of coordination, chemical irritation, and burns to the skin, eyes, nose, or mouth. Acute exposure can even cause death in instances where toxicity levels are high or a person is particularly susceptible (i.e. pre-existing breathing problems). Less severe exposure can result in headaches, nausea, dizziness, fatigue, or lethargy, and can lead to other long-term health problems.³



There are several methods used to produce methamphetamine. An increasingly popular process, known as the “one-pot” method, is of great concern as it is easily transported, as well as highly flammable and explosive. This method is so portable that one-pot methamphetamine cooks can produce the drug while driving around in their vehicles, in a retail bathrooms, hotel rooms and storage facilities. This method takes approximately 40 minutes to complete and it leaves a harmful brown or cloudy residue inside a bottle. The remnants of a one-pot lab can resemble urine filled plastic bottles discarded along roadways, in garbage bins or other areas. The presence of solid material inside the bottom of the bottle might indicate that there is a poisonous substance inside the bottle that should be handled by experts.

Not only is the cooking process dangerous, approximately five to seven pounds of chemical waste is generated for every pound of methamphetamine produced. This waste is highly toxic and should be disposed of as hazardous material, but is often buried near the manufacturing site, dumped along roadways or into waterways, poured down drains, or placed in common household garbage. This increases the likelihood that unsuspecting individuals could come in contact with the harmful material. The toxic residue from the cooking process remains on those items and could harm innocent persons who encounter them.



Some common materials discarded include:

- Plastic bottles with plastic tubing attached
- Coffee filters containing a white substance or dark red sludge
- Glass cookware or frying pans containing a powdery residue
- Jars containing a clear liquid with a white or red colored solid on the bottom
- Stripped lithium batteries



So far in 2015, five “dumpsites” were found by road crews, along mostly rural roads. Plastic bottles containing clear liquids, with tubing on the top, were found and still generating dangerous hydrochloric acid. Additionally, a few one-pot laboratories were found under pressure and at risk of exploding.

A particularly dangerous incident occurred when several partially-submerged plastic bags were found in a stream along a rural roadway. When members of the Pennsylvania State Police (PSP) Clandestine Laboratory Response Team (CLRT) responded and moved the bags, the chemicals reacted with the water and air, causing the bags to ignite.

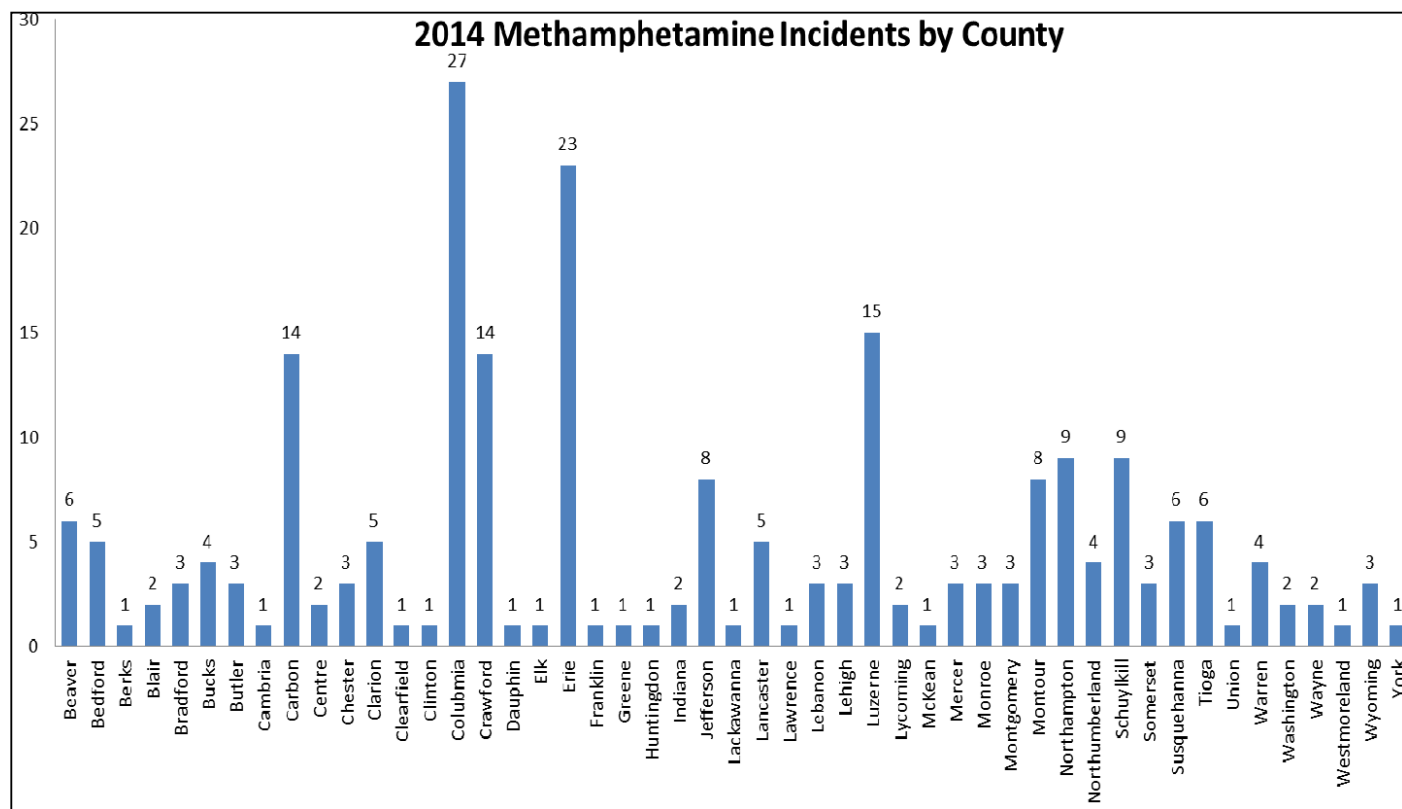
The below chart depicts the number of incidents involving methamphetamine laboratories, dumpsites, and seizures by county.

RECOMMENDATIONS AND CONCLUSION

Citizens should immediately contact 9-1-1 if they discover a possible methamphetamine laboratory or hazardous waste from a laboratory. All necessary precautions should be taken to minimize the risk of exposure, contamination, or physical injury.

- DO NOT touch anything.

- DO NOT turn on/off any nearby electrical power switches or light switches.



- DO NOT eat or drink near methamphetamine lab materials.
- DO NOT smoke anywhere near methamphetamine lab materials.
- DO NOT open or move containers with chemicals or suspected chemicals.
- DO NOT sniff any containers.
- DO NOT attempt to dilute a suspected one-pot laboratory with water (the lithium metal is water-reactive and can ignite or explode when exposed to water).
- DO remain upwind and uphill from hazardous substances to avoid contamination.
- DO decontaminate yourself and your clothing, especially before entering a vehicle.
- DO wash your hands and face thoroughly.
- DO report the incident to 9-1-1.

26-8 Use Caution While Picking Up Litter

The Opioid crisis in Pennsylvania is growing as are one of the most dangerous by-products to innocent bystanders – used needles and syringes.

Many PennDOT crew's pick-up litter to improve the Commonwealth's roadside appearance. Many crews have reported finding used needles and syringes. If you encounter a syringe, use extreme caution if you must pick it up for disposal.

Used needles and syringes can carry blood-borne infectious diseases like hepatitis or HIV. There could also be deadly poisons left-over in the syringe like heroin, fentanyl or a synthetic opioid that can cause death.

If you encounter a used needle or syringe while doing litter pick-up, there are few things you can do to protect yourself.

- Wear leather gloves while picking up any type of litter.
- Make sure you have good boots that can withstand a needle puncture and not go into your foot.

- Place any needle or syringe into a hard plastic bottle (like a water or soda bottle) before putting it into a plastic garbage bag. People have been stuck with needles poking through garbage bags.
- If you find a large stash of needles or syringes – don't touch them and call the police. The police may want or need to put the syringes into evidence.

It is very important you know how to handle used needles. Never touch a sharp end of a needle. Always wear leather gloves and always thoroughly wash your hands after picking up trash.

Section 27 - Safe Driving Practices

- 27-1 Avoiding Sideswipes
- 27-2 Avoiding Struck-by Accidents
- 27-3 Dangerous Distractions
- 27-4 Dealing with Unhappy Motorists
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- 27-25 Towing Equipment
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27-1 Avoiding Sideswipes

According to the National Safety Council, motor vehicle accidents are the number one cause of occupational fatalities.

Research shows that Angle/Sideswipe accidents had the highest occurrence rate of any other accident type. None of the reported incidents had serious injuries connected with them, but it's still a cost to the Department and could result in injury in the future.

What can be done to avoid sideswiping?

- Use pre-planned, approved routes. Check your planned route ahead of time for any possible hazards. If possible, use this route as much as possible.
- When changing lanes, check mirrors and blind spots, and always use turn signals.
- Always follow the posted speed guidelines.
- When plowing, make sure plow wing is always in sight.
- Clean mirrors and windows often. Adjust mirrors, as necessary.
- Avoid driving in other drivers' blind spots.
- Avoid turns that require you to stop and back-up.

Many angle sideswipe accidents occurred while plowing snow. During rainy days or down-time, operators should practice driving around cones, so they become accustomed to the extra width of their truck with a plow attached before heading out to the road.



27-2 Avoiding Struck-by Accidents

One of the leading causes of injury at PennDOT is because of an accident known as a struck-by accident. Workers can be victims of struck-by accident and can also cause struck-by accidents by hitting mailboxes, other vehicles and people with their trucks and plows.

There are four types of struck-by accidents that are recognized by OSHA. They are:

- Struck-by a flying object
- Struck-by a falling object
- Struck-by a swinging object
- Struck-by a moving object

Today's focus will be on Struck-by a moving object, specifically a motor vehicle. As a highway worker, you must be alert to moving objects and vehicles at all times.

- Watch out for moving vehicles especially at intersections and blind corners.
- Never assume that a driver sees you. Remember, if you're in a collision as a pedestrian, the pedestrian nearly always loses.
- Always wear your high visibility PPE and hard hat to help avoid injury from moving objects.

As a driver, you also have a responsibility to prevent struck-by moving object accidents. Be aware of your vehicle and others around your vehicle.

- Inspect your vehicle before each shift to ensure safe operating condition. If you find a defect – report it immediately and write it on the 614.
- Take particular care on steep grades or ramps that could cause a tip-over of your truck and load.
- Never drive a vehicle in reverse with an obstructed rear view unless you have a spotter and the back-up alarm is operational.
- Set the parking brake when the vehicle is parked and don't forget to chock the wheels if the vehicle is parked on an incline.
- Never exceed a vehicle's rated load or lift capacity.
- Do not carry other workers unless there is a passenger seat and the riders are using a seat belt.

27-3 Dangerous Distractions

Distractions have become a dangerous part of our everyday lives and a leading contributor to workplace injuries. There are many workplace distractions, but the one that is the most concerning is cell phone use.

For people who work around traffic, heavy equipment, machinery or hazardous substances, cell phone use can become life threatening. PennDOT employees have reported near misses and injuries because of cell phone use. You don't want to be that person who is remembered as the one who was backed over because you were on your phone. Right?

- Billions of texts are sent daily. Many them are now being sent during work hours.
- Most of us are aware of the hazards of distracted driving but using a cell phone while performing other work can be just as dangerous.
- Just like other workplace distractions such as horseplay and daydreaming, being distracted by cell phones causes loss of focus on the task at hand.
- Texting while biking and walking has resulted in injury and death. The injuries caused by distracted walking are increasing and are probably much higher than official figures, since people are often embarrassed to admit that they were injured while texting.

We must adopt an attitude that our primary goal is to do every job as safely as possible. Maintaining this attitude will help us recognize situations where the use of cell phones would interfere in our ability to perform our tasks without injury. Other ways to avoid cell phone distractions include the following:

- Abide by Department policy that prohibits cell phone use while driving. Only hands-free devices are acceptable to make or answer calls. Refer to Protocol 13 of the Manual for Employee Safety and Health for more information.
- Designate safe times and locations for checking in on friends and family.
- Resist the desire to have instant access to information that can truly wait for a more appropriate time.
- Take a little time to identify work tasks for which cell phone use could result in injury and property damage and resolve to turn off or ignore your cell phone while performing those tasks.

If you are on the receiving end of personal texts or calls at a bad time, don't respond. Get back to the sender when it is safe to do so, and let the sender know that contacting you at work may be unsafe.

Get in the habit of sending and receiving text messages before and after work or during breaks. Speak up when you see others putting themselves in harm's way by using their cell phone.

27-4 Dealing with Unhappy Motorists

With warmer weather comes more road work – with that road work comes the potential for aggressive, distracted and angry drivers. We have had several incidents in which drivers become impatient and angry with our flaggers and workers.

Our goal is to keep our workers safe. While media events, school visits and press releases help reduce some situations, not all drivers either hear, see, or pay attention to these messages or to our work zone signs.

We are tasked with proper work zone set-up to provide ample warning to drivers. However, distractions and other issues often cause those drivers to be less than attentive and less than courteous.

Some examples are:

- A driver decided to go around a flagger in a work zone. When stopped by the Foreman, the driver threatened to release his pit bulls from the back of his pick-up truck. Fortunately, that didn't happen. The police were called and the driver was cited.
- A driver became impatient while being stopped in a work area. He began screaming at the flagger and reached for a club from the backseat of his car. The driver neglected to put his car in park and nearly hit the car in front of him. Fortunately, without harming our employee.
- A driver was upset because of a detour. While turning, he struck an employee on the arm with his side mirror. Police were called and that driver was cited.

Working on the highway is a dangerous job. Therefore, it is important to always be observant and aware of your surroundings.

What can you do to protect yourself from angry motorists?

- Before the start of any work zone activity or any exposure to live traffic, the crew should meet to discuss the daily safety talk that is relevant to the Day's work. Discuss the dangers and the communications between the crew.

- During the safety talk, workers should mutually understand the procedure for set-up and take-down. Every crew member should know what is expected of him or her. Crew members should discuss the traffic control plan for the project. Any modifications to the plan must be noted by the supervisor.
- At the work zone, position yourself so if threatened, you have a route of escape. Get away from the situation... move quickly toward other employees, there is strength in numbers.
- Call 911. Get the police rolling toward the scene as quickly as possible. Note the license plate number, make, model and color of the vehicle and a description of the driver.
- Do not yell back nor in any way reciprocate the poor behavior of the offending persons, you do not know what they are capable of plus you are the face of PENNDOT.

No-one deserves to be threatened for doing their job and everyone wants to go home at the end of the day. Do not escalate a bad situation, allow the police to handle the situation, walk away and be safe.

27-5 Defensive Driving

The highway can be a dangerous place. According to the National Highway Traffic Safety Administration (NHTSA), there were an estimated 6.3 million police reported vehicle accidents in the United States in 2018. Distracted Drivers, Aggressive Drivers (including speeders) and Impaired Drivers under the influence of drugs or alcohol caused or contributed to most these accidents and continue to do so today. Being a Defensive Driver is your best way of avoiding an accident and protecting yourself while driving.

Most collisions that occur are a result of driver behavior. Over 90 percent to be precise. A small percentage can be traced back to equipment failure and an even smaller percentage can be linked to roadway conditions. Driver behavior or rather the behavior of the other drivers is the best reason to practice defensive driving. The National Safety Council defines defensive driving as: Driving to save lives, time and money despite the conditions around you and the actions of others. Defensive driving techniques involve more than just following the basic traffic laws.

Defensive drivers:

- Leave themselves an "out" when driving. Defensive drivers always think about their next move if a crash were to occur.
- Slow down when the conditions warrant.
- Do not engage in road rage activities.
- Avoid collisions by all means necessary- within the limits of the law .
- Plan their travels before leaving for their destination.
- Recognize the risks of their surroundings while driving.
- Look ahead 3 – 5 car lengths.
- Never Tailgate.
- Obey Traffic Signals. Defensive Driving Example

John has been seeing a lot of deer activity in the roadway on his normal way home from work. Instead of going the normal way, John decides to take a route where there is less deer activity on to the road. On his way home, it begins to rain heavily and the roadway becomes slick so he slows down to 5 MPH below the speed limit. After a few minutes of driving at this speed, the driver behind him begins to flash his lights and tailgate his vehicle. Instead of speeding up or stepping on the brakes, John decides to pull over where it is safe to do so to let the other driver pass.

Remember: Ultimately, fault doesn't matter. It's better to be alive and accident free than right.

27-6 Distracted Driving

Using cellphones or other devices like tablets while driving has proven to be deadly. Using these devices while operating a Commonwealth vehicle is not only violating PennDOT policy but it's against the law. Unfortunately, everyone has a cell phone and it seems that more and more drivers are using them while operating vehicles.

- The National Safety Council estimates that 1.6 million crashes a year can be directly related to cell phone use.
- Nearly 330,000 injuries occur annually from accidents caused by texting and driving.
- At 50 mph, you'll travel the length of a football field by taking your eyes off the road for just five-seconds. A lot can happen in that amount of time.

- Texting and driving is against PennDOT Policy. Never engage in text messaging or any unlawful use of a handheld device while driving a department vehicle or a personal vehicle on department time.

Ways to stay safe:

- Put your cell phone away while driving.
- If you need to answer a call or text, pull over to a safe place before picking up the phone.
- When traveling as a passenger, urge the driver not to text while driving. You can also offer to text for the driver.
- If you see another driver on the road who is using a phone while driving, maintain a safe distance from them. Give them a buffer in case they make a mistake, be a defensive driver. Always leave yourself an escape in case any type of accident occurs.

27-7 Night Driving

The most dangerous time to drive is at night. That is a scary thought considering many PennDOT Maintenance workers are required to drive at night. In the winter months, the hours of daylight are shortened causing some drivers to drive drowsy or fatigued. Drivers who are exposed to night driving also run the risk of being exposed or impaired drivers and of course rush hour traffic.

Older drivers also pose a greater risk. These drivers can be Commonwealth employees like you, or they can be private motorists. According to the National Safety Council, a 50-year old driver may need twice as much light to see as well as a 30-year old driver. At age 60, driving at night can become even more difficult. As you grow older you become susceptible to cataracts and other eye diseases that can affect your ability to see at night.

Even with the high beams on, visibility is limited to about 500 feet (250 feet without high beams). Nighttime driving creates hazards because of reaction time and light blindness.

So, what can you do?

- Make sure your headlights are aimed correctly. You want them hitting the road, not the trees.
- Make sure your headlights are clean. Brush the snow or mud from them before taking off for your shift.
- Look away from oncoming lights.
- If you wear glasses, make sure they're anti-reflective.
- Clean the windshield to eliminate streaks and glare.
- And the most important thing you can do is - SLOW DOWN! If you're having a hard time seeing at night, slow down. The simple action of traveling 5 mph slower at night will give you increased stopping distance and increased reaction time.

Stay alert and stay alive!

According to the National Highway Traffic Safety Administration (NHTSA), 50 percent of all traffic related fatalities happen after dark. It doesn't matter if you've driven the road a thousand times, driving at night is always more dangerous. Slow down, look for hazards and take extra precautions.

27-8 Driving in Changing Weather Conditions

Mother Nature is a fickle beast, especially in Pennsylvania. One minute it can be sunny and beautiful and the next, you could be experiencing a driving rainstorm. Then throw winter on top of the changing conditions and you have a recipe for a treacherous drive.

Of course, most people think of winter driving as snow driving, but winter brings with it so much more. Yes, sometimes you'll get snow, but you can also get sleet, freezing rain and fog all in the same day. How do you prepare for these types of changing hazards?

Snow

No matter what the condition, your first line of defense is to slow down! Make sure you are traveling at an appropriate speed no matter what type of vehicle you're driving. When it's snowing, you'll want to make sure you have your defroster running, your headlights on and your wipers on. Make sure to avoid sudden stops and jerky movements with the steering wheel. If you start to slide, steer in the same direction as the slide. This will straighten your vehicle.

Sleet and Freezing Rain

Every driver's nightmare is driving on ice. Freezing Rain and Sleet offer a cornucopia of hazards to drivers. These two types of weather conditions occur when it's cold at the surface but warm above. The precipitation falls as rain and freezes at the surface. The

problem is that sometimes the road only looks wet, but it's really an icy mess. The best way to prevent an accident when driving on Freezing Rain or Sleet is to slow down! If you are a plow truck driver, make sure you know where your chains are, and you know how to put them on.

Fog

Another hazard that Pennsylvania drivers are subjected to is fog. Fog occurs primarily in the Spring and fall but can appear and limit your visibility just about any time. Fog can bring even the best driver to a complete stop. When sight distance drops to zero, drivers need to follow these tips. Once again, slow down! Don't tailgate – leave plenty of space between you and the vehicle in front of you. Remember, decreased visibility means decreased reaction time and stopping distance. Don't use your high beams in the fog – and make sure your windshield wipers are on. Don't use cruise control!

27-9 Driving in the Rain

It's a fact of life, rain happens and sometimes we're forced to drive in it. Not everyone can wait for the next rainbow. Driving in the rain can be challenging. Sprinkles to down pours all offer up a different driving dilemma.

- Let's start with your equipment. Driving in the rain will be safer if your tires have a good tread on them and they are properly inflated. Bald or balding tires are dangerous when the roads are wet. Driving with bald tires can be the same as driving on ice. Bald tires cause your vehicle to hydroplane and depending on your speed you can lose control quickly.
- Speaking of speed, when it starts to rain, you'll want to slow down. The reaction time of your vehicle is reduced when it's raining, so if you slow down you reduce the chances of losing control.
- Wipers on – Headlights on. Pennsylvania Law says that if you are using your windshield wipers then you must also be using your headlights. See and be seen is always a good motto when driving in the rain.
- Since we're talking about windshield wipers, make sure they are in good operating order. Make sure they don't streak or stick. You might need to get new wiper blades if they aren't functioning properly.
- Don't Tailgate. Leave the tailgating for the football games. Give yourself a cushion of control between you and the vehicle in front of you. You'll want to increase your following distance depending on how hard it's raining and how big your vehicle is. The bigger the vehicle, the longer it takes to stop.
- Turn Around – Don't Drown. Do NOT drive through standing water. It only takes 6 inches of water to move a school bus. Water makes everything buoyant, so it really doesn't matter how large your vehicle is, once the tires are no longer touching the ground, it will begin to float. Unfortunately, most vehicles are not waterproof therefore they will also eventually sink!

Finally, remember that road surfaces are made with petroleum-based products. The oil that is in and on the road will go straight to the surface the second water hits it. Oil and water really don't mix, but instead cause the surface to become VERY slippery. Slow down, use your head lights and never try to drive through standing water.

27-10 Drowsy Driving

There are many hazards you face today anytime we operate a motor vehicle. Weather, poor road conditions, and wildlife are some common hazards you see daily. There are also many hazards created by other drivers on the road. One very deadly activity that is taking place far too often is drowsy driving.

Unfortunately, as a plow truck driver who is expected to go out in all kinds of weather conditions to keep the public safe, you are often the driver who is drowsy. Long shifts, callouts and poor weather conditions can make you feel exhausted.

There are some things you can do to avoid drowsy driving:

- Get plenty of sleep. Even though you're working long hours, sleeping at least six to seven hours a day will keep you fresh and alert.
- Eat a healthy diet, free of carbohydrates (especially right before your shift) and drink plenty of water. This will help to keep you awake and alert.
- If you know there could be bad weather and you could be called out, don't drink alcohol. Alcohol is a depressant and will cause you to be even sleepier. It takes an hour for a 12oz. beer to metabolize from your system. The sleep effects can last a bit longer depending on your diet and weight.
- Use caution with some medications. Consult and remind your physician that you drive a commercial vehicle and cannot be taking medications that cause drowsiness.

- If you are driving and cannot keep your eyes open, pull-over! Tell your foreman where you'll be and take a quick nap. A 10-minute power nap can make the difference between finishing your route or filling out paperwork because you've had an accident.

Do not be a drowsy driver. Take the necessary precautions to avoid putting yourself in a dangerous situation. Pay attention to the drivers around you and practice defensive driving techniques to protect yourself from other drivers who may be driving drowsy.

27-11 Fall and Fog Driving Tips

Fall driving can be treacherous. Early morning fog, wet leaves and the change-over from daylight savings time can all work together to make driving a challenge. Below are a few safety tips to make your early morning or late night drive a bit safer.

Watch out for leaves: Once leaves become wet, they can present slippery and dangerous driving conditions. Be sure to watch for patches of wet leaves on the road or on road lines. Dry leaves can also present a problem to your vehicle. Avoid parking your vehicle near leaf piles to prevent fires that could start from your vehicle's catalytic converter.

Stay alert on the road: The end of daylight savings time means reduced visibility on the roads, which can create unfamiliar driving conditions. Even on familiar roads, it's important that motorists use additional caution and adjust their driving habits to watch for pedestrians, cyclists and other roadway users who will be less visible, especially during the first week of the change.

Avoid sun glare: With the change in time you may need to adjust to the different morning or late afternoon glare from the sun. The glare can cause reflections off car windows and hoods and decrease your visibility. Have a good pair of sunglasses readily available to counter daytime glare, and consider lenses with anti-reflective coating to reduce glare when night driving can't be avoided.

Plan ahead for wet conditions: Fall often brings rainfall, which can decrease visibility and cause hydroplaning. Make sure your windshield wipers are in good working condition. If driving on a road with excess water, slow down and avoid sudden movements with the steering wheel or brake pedal. If you feel like you're floating, steer straight and gently release the gas pedal until you feel the tires make contact with the road surface. In an especially heavy downpour you may want to pull off the road until it's safe to continue.

Early morning fall fog also brings on reduced visibility conditions that can create new hazards drivers must prepare for.

Driving in Fog

Fog can be thought of as a cloud at ground level. It forms when the temperature drops to the dew point (the temperature at which air is saturated), and invisible water vapor in the air condenses to form suspended water droplets. Fog can reduce visibility to 1/4 mile or less, creating hazardous driving conditions. If you can't postpone your trip until dense fog lifts - usually by late morning or the afternoon - follow these additional tips:

- Drive with lights on low beam. High beams will only be reflected back off the fog and actually impair visibility even more.
- Reduce your speed -- and watch your speedometer. Fog creates a visual illusion of slow motion when you may actually be speeding.
- Listen for traffic you cannot see. Open your window a little, to hear better.
- Use wipers and defrosters as necessary for maximum visibility.
- Use the right edge of the road or painted road markings as a guide.
- Be patient. Do not pass lines of traffic.
- Do not stop on a freeway or heavily traveled road.

27-12 Federal CDL Mobile Phone Restrictions

In 2012, the Federal Motor Carrier Safety Administration (FMCSA) created a rule restricting the use of all hand-held mobile devices by drivers of commercial motor vehicles (CMV). This rule restricts and prohibits a commercial driver from holding a mobile device to make a call or to dial using more than one button. Commercial drivers who use a mobile phone while driving can only use a hands-free device.

Research commissioned by FMCSA shows that the odds of being involved in a safety-critical event (e.g., crash, near-crash, unintentional lane deviation) are 6 times greater for CMV drivers who engage in dialing a mobile phone while driving than for those who do not. Dialing drivers took their eyes off the forward roadway for an average of 3.8 seconds. At 55 mph (or 80.7 feet per second), this equates to a driver traveling 306 feet, the approximate length of a football field. without looking at the roadway!

What does this rule mean to drivers and carriers?

Fines and Penalties - Using a hand-held mobile phone while driving a CMV can result in driver disqualification. Penalties can be up to \$2,750 for drivers and up to \$11,000 for employers who allow or require drivers to use a hand-held communications device while driving.

Disqualification - Multiple violations of the prohibition of using a hand-held mobile phone while driving a CMV can result in a driver's disqualification by FMCSA. Multiple violations of State laws prohibiting use of a mobile phone while driving a CMV is a serious traffic violation that could result in a disqualification by a State of drivers required to have a Commercial Driver's License.

What are the risks? - Using a hand-held mobile phone is risky because it requires the driver to reach for and dial the phone to make a call. Reaching for a phone out of the driver's immediate area is risky as well as dialing because these actions take the driver's eyes off the roadway. The rule applies to drivers operating a commercial motor vehicle on a roadway, including moving forward or temporarily stationary because of traffic, traffic control devices, or other momentary delays.

A mounted phone is acceptable if it is mounted close to the driver. Impact on Safety Measurement System (SMS) Results -Violations negatively impact SMS results, and they carry the maximum severity weight.

Compliance

Make sure the mobile telephone is within close enough proximity that it is operable while the driver is restrained by properly installed and adjusted seat belts.

Use an earpiece or the speaker phone function.

Use voice-activated dialing.

Use the hands-free feature. To comply, a driver must have his or her mobile telephone located where he or she is able to initiate, answer, or terminate a call by touching a single button. The driver must be in the seated driving position and properly restrained by a seat belt. Drivers are not in compliance if they unsafely reach for a mobile phone, even if they intend to use the hands-free function.

27-13 No Cell Phones While Driving

PennDOT has had a no cell phone while driving policy since 2012. In that policy, employees are reminded that "Operators of Commonwealth vehicles shall not engage in text messaging or any unlawful use of cellular telephone, pager, beeper, personal data assistant and hand held device...according to Commonwealth Manual 615.3, Commonwealth Fleet Procedures, (Section 15 (5)(d) when operating.

Even though it is a PennDOT policy it is also important to realize that using a cell phone while operating a Commercial vehicle is also a violation of the Federal Motor Carrier Law and carries fines upwards of \$2000 if caught.

More importantly, university studies have shown that drivers who use a cellular device while driving (handheld, handsfree or texting) have the cognitive ability of an impaired driver who has a blood alcohol level of 0.08. That is the limit to be legally drunk in Pennsylvania.

Most Commercial drivers would never risk losing their license by driving impaired, yet they use their phones every day. Using a hand-held device requires the driver to reach for the phone, dial the phone and then engage in a conversation. These actions take the drivers hands off the wheel and their eyes off the road and their mind off the driving task.

A vehicle traveling 50 MPH can travel the length of a football field in five seconds. Imagine if you weren't looking at the road for those five seconds. A lot can happen in the space of a football field.

The most important reason for you not to use your cell phone while driving is you. If you have an accident, you will most likely be hurt. If you run into a family of four and they are hurt or worse killed, then you will have to live with that for the rest of your life.

Is your phone conversation really worth that? If you must make a work-related phone call:

- Wait until you can pull over safely and park before answering or placing a call.
- Use Bluetooth hands-free devices to make or answer calls while driving.

Employees should be aware that, in addition to any criminal penalty that may be imposed under the

anti-texting law, engaging in the use of an interactive wireless communication device (IWCD), including a hand-held phone while driving a vehicle for work-related business may result in disciplinary action up to and including termination.

27-14 Overhead Hazards

There are many PennDOT operations that require dump truck operators to raise and lower the bed of the truck. Paving, chipping and widening are all dependent on blacktop that is delivered by a dump truck, and the nature of the operations requires the operator to lift the bed. Even winter operations often require a dump truck operator to raise and lower the bed to move material.

Part of the danger of raising and lowering the bed is not knowing what is above the truck. Utility wires are the most common item to hit, but trees, roofs and over-head signs are also a hazard.

Not only is hitting over-head objects costly, it's also dangerous. If you hit a tree limb, over-head sign or roof, these things can come tumbling down and injure or kill the driver of the truck or fall in such a way to harm people standing near the truck. Over-head wires pose a completely different hazard with a similar outcome. Hitting an over-head utility line can result in electrocution of the driver and can also transmit to anyone standing on the ground at the time of impact.

There are a few simple steps you can take to make sure you stay safe and avoid these types of accidents:

- Know the height of your vehicle with the bed down and the bed up.
- Mark the height of your vehicle inside the cab of your truck so you don't forget.
- Make sure the bed is completely down before you leave the truck. This way the next driver doesn't just hop in and take off with the bed up.
- Foremen should mark where the overhead lines are with hot pink flags prior to work. This way a driver will know when to lower the bed during an operation.

27-15 Overhead Hazards

Accidents involving the bed of the truck are very costly and can be very deadly. Always use caution and know where the over-head hazards are before you move your truck.

On July 5, 2017 hot mix asphalt was being placed on a state route in Armstrong County. A Maintenance crew was paving above the repaired hillside slide. At approximately 11:55 a.m., while in the process of rolling the applied material, the operator felt the roller shift/slide slightly.

The weight of the roller, combined with the softness of the material, the slope of the hillside and gravity caused the roller to slide over the embankment. The operator had the awareness that the roller was going to tip, and jumped from the roller before it rolled down the hillside.

There were several factors that contributed to the incident:

- There was a recent slide of a high slope roadway (45-degree angle).
- The material and under base was soft.
- The Foreman was not on the scene, he had gone to a forward area of the roadway.
- The Foreman had not covered the JSA with the crew, prior to work activities.
- The Foreman did not do a Daily Safety Talk relevant to this operation.



We are fortunate that the operator was not seriously injured. Constant collaboration with design staff and reference to the Job Safety Analysis are crucial in all work operations, but more so when there is work in space restricted work areas. JSA's and Daily Safety Talks should always be used to insure the safety of our workers.

27-16 Safe Driving Practices

The National Highway Traffic Safety Administration (NHTSA) estimates that one person dies every fifteen minutes in the United States as a result of a vehicle crash. According to NHTSA, over 90 percent of all vehicle crashes were because of driver error. Over 40 percent of PennDOT Fleet accidents are attributed to driver error annually. Poor clearance and judgment, improper backing and failing to yield the right of way are some of the most popular causes.

As a PennDOT driver, you should always follow safe driving practices

- Clean and adjust rear and side view mirrors to minimize blind spots.
- Avoid lingering in other drivers' blind spots.
- Never stop and back-up in a travel lane.
- Avoid distractions. Resist the temptation to multi-task while driving.
- Approach intersections with caution and don't tailgate.
- Never use a cell phone while driving (talking or texting).
- Never drive with a raised truck bed or disable truck bed alarms.

As a PennDOT driver you should always drive defensively

- Try to anticipate other motorists' driving behaviors.
- Always use turn signals, check mirrors and blind spots before changing lanes.
- Look farther ahead and pay attention to high hazard areas like bridges, overhead wires, culverts, on/off ramps, intersections and elevated highways.
- Slow down after sundown and before sunrise to reduce the risk of deer/animal strikes.
- If backing cannot be avoided – use a spotter.

PennDOT employees that drive a vehicle to perform their assigned duties are required to attend Safe Driver Training. Employees who operate a crew cab or a commercial vehicle must complete the instructor led Safe Driver course within 120 calendar days of hire and then every two years thereafter. Employees that operate any other type of vehicle must complete at least the online safe driver course within 90 days of hire and every four years thereafter.

Drive like your life and your family's lives depend on it. Arrive Alive!

27-17 Safe Driving – No Texting

Everyone has heard that texting while driving is dangerous, yet it seems no matter how many times you hear about it, you're still tempted to pick up your phone, take your eyes off the road and check the weather, or respond to an LOL.

Staying off your phone can be surprisingly difficult especially when you have a family that may need you, or your boss is calling or texting to find out where you are. We have all been programmed from a young age to pick up the phone. As hard as you try, once you hear the ring or the buzz, you're already distracted. There are some things to help you get past the urge to pick up the phone.

- Put your cell phone on silent when you get the vehicle.
- Turn on the DO NOT DISTURB setting that only activates while your vehicle is moving.
- Better yet – turn your phone off.
- Put your phone out of reach.

Find the above technique that works for you and stick to it.

Here's some facts that could help you make the decision to stick to it!

- You are nearly 25% more likely to crash while using your phone.
- One in five drivers admit to texting while driving.
- Driving while texting has the same effect as being legally drunk and driving.
- Your vehicle will travel the length of a football field in the time it takes you to type LOL.

Texting and driving is dangerous! It's against Pennsylvania law and as a Commonwealth employee it's a major work rule violation. Don't make a decision that cost you your job, your life or take someone else's life.

DON'T TEXT AND DRIVE!

27-18 Safe Driving Practices for Employees

As a PennDOT employee you have logged a lot of miles. Whether you're a plow truck operator or an engineer, part of the business of the Department of Transportation is to travel the roadways building, inspecting, designing or maintaining.

As a PennDOT employee you are also expected to follow safe driving practices so you can return home safely at the end of the day. The following are a list of safe driving practices that all employees should follow:

- Comply with all guidelines, procedures and directives pertaining to the operation of PennDOT vehicles and applicable sections of the Pennsylvania Vehicle Code.
- Wear seat belts! Every person in the vehicle must have a seat belt on while the vehicle is in motion – Every Trip – Every Time. Seat Belts Save Lives!
- Never operate a vehicle while impaired by drugs or alcohol.
- Never engage in text messaging or any unlawful use of a cellular device while operating a PennDOT vehicle or a personal vehicle on PennDOT time.
- Properly position mirrors to minimize blind spots.
- Avoid backing when possible. Where two or more employees are present, use a spotter.
- Complete a circle of safety prior to entering a vehicle. Walk completely around the vehicle and even check underneath for potential hazards.
- Don't tailgate! Always maintain a proper following distance.
- Use your turn signals to alert other drivers of your intentions.
- Be alert and yield to pedestrians.
- Adjust travel speeds for road conditions.
- Always ensure your vehicle remains in the lane of travel. If lane encroachment is unavoidable, be prepared to yield to the opposing traffic to avoid a collision.
- Yield to all rail traffic and railroad crossings.
- Check for and properly judge all clearances with fixed objects including buildings, utility poles, mailboxes, guiderail and other vehicles.
- Ensure all tools, equipment and material is properly secured for transport.
- Report all mechanical defects promptly to the equipment manager. Complete your 614 daily.
- Always drive defensively.

27-19 Safe Driving Tips

On June 24, 2020 around 1 p.m. an employee was driving his personal vehicle, following his supervisor to inspect a bridge when he was involved in a head-on collision with a private motorist. The employee was flown to a nearby hospital and diagnosed with a concussion and minor laceration on his forehead.

On June 26, 2020 around 11 a.m. another employee was involved in an accident involving a department pick-up truck. A private motorist pulled out in front of his resulting in a collision. The PennDOT employee did not sustain any injuries, but the private motorist sustained severe injuries and was flown to a nearby hospital.

There is no indication that either employee was at fault, but these incidents are sobering reminders that we must be diligent in practicing safe driving techniques. Please review the safety tips below to help avoid an accident:

- Comply with all guidelines, procedures and directives pertaining to the safe operation of Commonwealth vehicles.
- Use your seat belt – every trip, every time, every passenger, every seat!
- Follow the speed limit and other traffic regulations.
- Properly position mirrors to minimize blind spots.
- Always keep your vehicle in your lane.
- Yield to opposing traffic, especially if your vehicle is wider than the lane which you are driving.

- Adjust your speed as weather conditions change. Conditions affecting safe travel speed include but are not limited to weather, road surface conditions, traffic, changes in road width, sharp bends/curves and accidents.
- Use all available defensive driving methods to avoid collisions, including proper signaling, checking rearview mirrors, yielding at crosswalks and to other vehicles as required by law and always have an awareness of your surroundings.

27-20 Safety Talk: “Have a Heart” Seat Belt Safety Heart Month

From 1970 to present PennDOT has had sixteen fatalities due to employees not wearing a seat belt performing commonwealth business. According to the Center for Disease Control and Prevention (CDC) using seat belts reduces serious injuries and deaths in crashes by about 50%.

PennDOT requires employees to wear seat belts under the following conditions:

- Operating PennDOT vehicles and equipment
- Operating personal vehicles on PennDOT business
- Riding in any vehicle while on PennDOT business
- Occupying a stationary or shadow vehicle in a work zone, or where the potential for a collision exists

*Exception: If manufacturer recommendations on the use of seat belts and shoulder harnesses during operations differ from PennDOT policy. Seat belts and shoulder harnesses are to be worn in accordance with manufacturer recommendations when operating PennDOT vehicles and equipment. (This also applies to equipment with rollover protective structures (ROPS)).



American Heart Month is important because according to the (CDC) Heart disease is the leading cause of death in the United States. Here are some tips on staying heart healthy and safety tips for shoveling snow and experiencing working in extreme temperatures at home or in the workplace:

- Manage conditions such as high blood pressure and high cholesterol. Work with your doctor and take any medications as directed.
- Stay active at least 150 minutes per week, breaking up the time into small blocks can make it easier.
- Eat healthy, consume fruits and vegetables on a daily basis and limit the amount of fat, sodium and sugar in your diet.
- Avoid eating a big meal prior to or soon after shoveling, it can put an extra load on the heart.
- Use a small shovel, lifting heavy loads of snow increases blood pressure.
- Consult a doctor, if you have a prior medical condition.
- Dress in layers, know the symptoms of hypothermia.
- Know the signs of a heart attack.



American Heart Month

Know the Potential Signs of a Heart Attack:

- Crushing chest pain
- Nausea and vomiting
- Shortness of breath
- Pain or discomfort in the jaw, neck or back
- Feeling weak
- Light-headed or faint
- Cold sweat



What to do:

- Call 9-1-1
- Have the person sit or rest
- Loosen any tight clothing
- Begin cardiopulmonary resuscitation CPR if the person is not breathing
 - o Perform CPR if you are certified
 - o If not certified follow the instructions of the 9-1-1 operator
- Use an automated external defibrillator (AED) if there is one immediately available and the person is unconscious
 - o Follow the instructions for using this device

Remember your heart is one of the main sources keeping you alive. Therefore, have a heart by taking time to follow seat belt policies for your friends, co-workers, and family and remember to take care of yourself too!

27-21 Seat Belts

Pennsylvania's seat belt law requires drivers and passengers to wear a seat belt. As a Commonwealth employee, you are required to wear a seat belt anytime you are driving or are a passenger in a Commonwealth vehicle – every seat is covered (Front and back) every trip – every time.

Studies have shown that if you are in a crash at 30 mph, if you are not wearing a seat belt, you will be thrown at a force of 3 ½ tons or about the weight of an elephant. Now imagine if the others in the vehicle were wearing their seat belts. If you are unrestrained you have suddenly become a flying object – or a flying elephant. As a flying object, you have the potential to hit anyone else in the vehicle with a force of 3 ½ tons. That's a lot of force that will cause a lot of damage.

Of course, with a force the size of an elephant it would stand to reason that you could also break a window or two and you will most likely be ejected. A standard misconception is that a person must be fully ejected to die. Not true, although being fully ejected could quite possibly kill you, you could also be seriously injured or killed simply by hitting your head against the windshield or steering column. Blunt force trauma will cause serious injury regardless if you've been fully ejected or only partially.

The safest place to be during a crash is in your seat, inside your vehicle. Think of it another way. You're at an amusement park, and you're getting ready to ride a roller coaster. The attendant comes by and doesn't lock your seat restraint. Will you ride without a seat belt? Most people would not, but these same people opt to NOT wear a seat belt in their vehicle.

Riding in a vehicle gives a false sense of security. Have you ever said, "I'm just going to the store, I don't need to put on my seat belt"? 75 percent of all crashes occur within 25 miles of home. Do you work more than 25 miles from home? 8 of 10 crashes occur at speeds less than 40 mph. People not wearing seat belts have been fatally injured at speeds of 12 mph – that's about how fast you travel through a parking lot.

Your seat belt is your required PPE while you're in a vehicle. In a collision, you have a choice. You can smash your face, head and neck into the windshield at 50 mph or you can choose to have your body caught by your seat belt.

Buckle up and arrive alive!

27-22 Sideswipe Accidents

Blind spot collisions, Poor clearance and judgment, lane encroachment, sideswipes. No matter what you call these types of accidents, the outcome is the same. Property damage and injury, sometimes severe.

Most of the PennDOT sideswipe accidents occur during the winter months. That should really come as no surprise with the increase wing-plow use. New or seasoned drivers can both be caught-up in a wing-plow situation. A wing-plow can be a deadly weapon if the driver is going a bit too fast. These little side plows can tear off guiderail, be used as a can opener and tear up vehicle doors and of course and pop a mirror right off of a car given the correct speed and velocity.

1 PennDOT has recently updated Chapter L, Recognition, Rules and Enforcement of the Manual for Employee Health and Safety (MESH) as well as the Seat Belt section in the Safety Policy Handbook.

2 Source for this information: <https://www.cdc.gov/features/heartmonth/index.html>

3 Source for this information: <https://nyc.heart.org/2017/12/14/american-heart-association-warns-snow-shoveling-health-hazards/>

4 Source: <https://www.redcross.ca/blog/2017/12/what-to-do-if-you-think-someone-is-having-a-heart-attack>

But not all sideswipes are done with a wing-plow. Sometimes drivers fail to yield the right-of-way to oncoming motorists, sometimes they were simply going too fast and drifted to the side of the road or to the center line. To be clear, sideswipes can happen in summer or winter, day or night.

As an operator, you might be thinking that there isn't much to be done to avoid sideswipes. After all – accidents happen...Right? Well, no! There is actually a number of ways to avoid having a sideswipe accident. Check this out.

- Use pre-planned, approved routes. Check your route ahead of time for any possible hazards. Use this route as much as possible.
- When changing lanes, check mirrors and blind spots and always use turn signals.
- Always follow the posted speed guidelines, but drive slower when conditions warrant it.
- Adjust mirrors to minimize blind spots.
- Clean mirrors and windows often. Re-adjust the mirrors as necessary.
- Avoid driving in other drivers' blind spots and be aware of drivers who may be in your blind spot.
- Avoid turns that require you to stop and back-up.
- Some Districts/Counties provide wing plow training that includes an obstacle course to familiarize employees with clearances issues.
- When plowing, make sure the wing plow is always in sight and chained up when not in use.

27-23 Slow Down in Curves

As a CDL operator and PennDOT employee you have no doubt seen your share of accidents along the roadways. Those accidents have most likely involved small cars and pick-ups as well as large trucks and tractor and trailers. No-one is immune to traffic accidents. There is one thing that remains consistent in many accidents and that is speed.

On Monday, August 15, 2011 a mandatory safety talk was sent out regarding an accident that occurred causing serious injury to a PennDOT employee. The report indicated that he was driving a haul-away truck down a steep grade. He rounded a sharp right turn and lost control of the vehicle. The dump truck over-turned and trapped the employee inside, pinning his leg.

There have been many more accidents involving over-turned dump trucks since that day. Some have been very serious while others have been property damage only. Regardless of the severity of the crash, laying a truck on its side should never happen.

To ensure everyone gets to go home safely, please follow the guidelines below when you are operating a Department vehicle or your personal vehicle.

- Scan the roadway for the projected path of travel.
- Watch for roadway signs denoting curves and necessary speed restrictions.
- Large trucks should slow down to a speed less than what is posted.
- Breaking distance and necessary downshifting must be considered when approaching sharp curves.
- Avoid using brakes while maneuvering a curve, this can result in wheels being locked causing skidding.
- Downshift prior to a curve to maintain control of your vehicle and reduce strain on the brakes.
- Drive at a consistently moderate speed when carrying a large load, suddenly increasing or decreasing your speed may cause the load to shift and truck to overturn.
- Heavier loads require more time to adjust to slower speeds.

27-24 The Importance of Proper Tire Pressure

Vehicle safety is dependent on many factors: the driver/operator, weather conditions and the condition of the vehicle. One more very important aspect of vehicle safety starts with the tires.

Having properly inflated tires on your vehicle, no matter the size of the vehicle is crucial for safe driving.

Think of it this way. When you have good tread on your shoes, you're less likely to fall when it's slippery. Your tires should be seen in the same way.

Low tire pressure affects braking distance and provides less responsive steering and handling. This can be especially dangerous when a driver must stop quickly or steer quickly to avoid a collision with another vehicle or even an animal. Low air pressure can also accelerate tread wear and can even cause a tire to blow-out. Low tire pressure can also reduce your gas mileage.

You can also have overinflated tire pressure. If you have overinflated tires, you need to consider wear and tear on your tire. The treads will wear greater in the center of the tire.

Refer to your vehicle's owner's manual or tire inflation specification found on the inside panel of the driver's side door. Do not use the advised pressure that is molded into the sidewall of the tire. This is the pressure recommended by the tire manufacturer but does not always meet the specified pressure recommended by the vehicle manufacturer.

AAA recommends the following inflation tips:

- Check tire pressure regularly. Once a week is best, but no less than once a month and always before a long trip.
- Use a good pressure gauge. Dial and digital gauges are more accurate.
- Follow the vehicle manufacturer's recommended inflation pressure, not the pressure molded on the sidewall of the tire.
- Check tire pressure while the tires are cold.
- An increased pressure reading (typically 2 to 6 psi higher) is normal when tires are hot.
- If recommended by the vehicle manufacturer, increase tire pressure for towing, carrying heavy loads, or extended highway travel.

27-25 Towing Equipment

When towing equipment, it is essential that you know and understand your tow vehicle, the trailer length and weight limits, the process of hitching and unhitching, proper hitch for the vehicle and proper length of chains.

- Let's start with the trailer tires. If the trailer has been sitting over the winter and hasn't been moved you will want to check for rot, flat spots or bulges. If you find any of these consult the garage before you move the trailer.
- Make sure the ball and hitch are the same size. Incorrectly sized hitch balls are the # 1 cause of trailer accidents. Hitch balls typically come in three sizes, 1 7/8 inches, 2 inches or 2 5/16 inches.
- If you're using a pintle hook type hitch, make sure the hitch is closed and the safety pin is in place.
- Trailer Safety Chains are your first line of defense in saving your trailer if it should come unhitched. Make sure the chains are strong enough to hold the load and when your hooking up the trailer, make sure there is enough chain to cross them under the tongue. This will cradle the tongue if it should come unhitched.
- Check the weight limits for your trailer. Overloading the trailer can cause the trailer to fail. This could cause the load to be lost. Overloading the trailer also puts undue strain on the tow vehicle.
- Check your trailer lights before you pull out. Make sure you have lights, that the brake lights and turn signals are working.
- Check your brake away cable. Make sure the brake away cable is connected independently to a separate ring on your truck. This will ensure the trailer coming to an abrupt and complete stop if failure were to occur.
- Finally, when you are getting ready to park the trailer and unhitch, make sure the wheel chocks are in place prior to unhitching.

27-26 Vehicle and Equipment Rollovers

The most significant environmental factor that contributes to the majority of vehicle/equipment rollovers is working near an edge of a road or embankment. Significant rain allows the soil near the edge of the road or embankment to become soft, resulting in "soft shoulder", allowing the shoulder to give way.

To prevent rollover incidents, operators must first understand what leads to rollovers and how to prevent them.

Causes of Rollovers

There are a few causes that lead to rollovers:

- Environmental factors
 - Soft shoulders
 - Steep slopes
 - Roadway curves

- Human factors
 - Excessive speed
 - Lack of training
 - Overcompensating
 - Complacency/distractions
- Vehicle/Equipment factors
 - Mechanical failures
 - High center of gravity

When a Rollover is Occurring:

- Do not try to escape the vehicle.
- Immediately remove your feet from the pedals to prevent ankle breakage.
- Release the steering wheel.
- Cross your arms against your body deep into the seat.
- Make sure not to lean forward during the rollover.

Once the Vehicle/Equipment Rollover Stops:

- Brace your feet against the floor to stabilize your body in stillness and assess the damage to yourself and any passengers.
- Have everyone involved check for broken glass, blood or severe injury that may not be immediately noticed in the event of a traumatic incident.
- Take a few deep breaths to recalibrate your nervous system.
- If anyone is injured, do not move them.
- Call 911 and seek help immediately.

Vehicle/equipment that have a Rollover Protection System (ROPS) such as an enclosed cab and a seat belt are less likely to suffer from catastrophic injuries. In the last nine (9) years, PennDOT has had 53 rollovers with construction equipment.

Additional information can be found at the National Highway Traffic Safety Administration and PUB-445M Manual for Employee Safety & Health.



Section 28 – Severe Weather

- 28-1 High Winds
- 28-2 Hurricane Safety Tips
- 28-3 Thunderstorms
- 28-4 Pennsylvania Tornado Safety
- 28-5 TORNADOS
- 28-6 Weather Hazards

28-1 High Winds

As you know, working for PennDOT requires you to work in all kinds of weather. Hot, cold, snow and ice all present their own set of issues and problems, but another weather phenomenon that we need to discuss is high winds.

High winds will bring down trees and power lines that can close roads. High winds can also wreak havoc on construction sites by tossing signs, tools and even job trailers. There are several hazards you need to be aware of to keep yourself safe during high winds.

Hazard Identification

- Wind is a leading cause of eye injuries because of dust and debris blowing into an operator's eyes.
- Struck-by incidents are prevalent during windstorms when objects get blown around.
- Doors can be pulled from an operator's hands causing a strain or a sprain.
- Slips, trips and falls can occur while trying to remove trees and debris from roadways.
- Electrocution can occur if you try to remove a tree from a roadway and there is a live electrical line entwined in the tree.
- In extreme wind, large trucks, even dump trucks can be blown over.
- Aerial lifts can be blown over.

Eliminate the Hazards and Prevent Injuries

- Wear safety glasses or goggles to prevent dust and debris from entering your eyes.
- Secure all loose objects in high winds. Use sandbags to hold down portable signs.
- Park your vehicle so you are entering or exiting opposite of the direction the wind is blowing.
- Never attempt to remove a tree from the roadway alone. Always use the buddy system.
- NEVER cut trees from power lines. Call the utility company and prohibit anyone from entering the area until the power company says it's okay to do so.
- Do NOT use an aerial lift during extreme windy conditions.

You'll need to avoid certain tasks during high-wind events so plan your work accordingly to keep yourself and others on your crew safe.

28-2 Hurricane Safety Tips

Hurricanes are some of the deadliest storms on earth. They produce high winds and rain. In coastal areas, hurricanes also bring the threat of storm surge. In Pennsylvania, the effects we normally feel from hurricanes are inland flooding from the heavy rains that accompany the storm, destructive winds, landslides and roadway and embankment subsidence.

Hurricanes are most prominent between June 1 and November 1. This date range is known as the Atlantic Hurricane Season. Although, a hurricane can form outside of this date range, most of the big storms occur between August and October, the peak of hurricane season.

A hurricane doesn't have to have a direct hit to cause damage. Inland flooding from the heavy rains these big storms bring is the second leading cause of fatalities. Torrential rains can occur hundreds of miles inland from the coast and can persist for days after the storm has passed by.

Depending on how close you are to the center (eye) of the storm will depend on how wicked the winds will be at your location. The closer you are located to the eye of the storm, the worse the winds will be. Hurricane force winds can destroy trailers, manufactured homes and can toss loose objects like wood, signs and roofing, causing a hazard to anyone nearby.

As a PennDOT Maintenance Employee you'll be called upon to close roads during the storm, but most of your work will come after the storm has passed. Hurricanes can disrupt the infrastructure of an area for days, weeks or months. There will be power line issues, trees across roadways, shoulder and roadway washouts, landslides, cross pipe and culvert failures and bridge failures.

Be sure to use and wear all PPE necessary to perform your daily routine safely. You'll need your hard hat and vest, and also may need gloves, rubber boots, safety glasses and goggles. Be on the lookout for biological hazards, bloodborne pathogens, chemical hazards, venomous snakes, downed power lines and undermining of roadways and structures.

These types of disasters will require long hours and will present numerous hazards. Do not become complacent to the extremely important job you are providing to the citizens of Pennsylvania. You are needed to clear and repair the roads so necessary food, medicine and resources can reach those who most need it.

28-3 Thunderstorms

Many people love a good thunderstorm from the safety of their home. But it's a much different story if you're stranded in the middle of the road with no-where to go.

Thunderstorms kill 80 people a year and injure hundreds more. Construction workers, laborers, equipment operators, engineers, surveyors and inspectors have been struck on the job.

Generally, thunderstorms develop in the mid-to-late afternoon in the spring and summer in Pennsylvania. Lightning can strike anyone, anywhere and multiple times in the same place. Lightning seeks a ground to discharge its energy and complete a circuit. It often strikes the tallest objects in an area but will also strike metal and water and can travel into a person who is nearby.

Protection During a Storm

- If you see lightning or hear thunder take shelter immediately. Lightning can strike out of a sunny sky 10 or more miles ahead of the storm. An early indicator of an imminent lightning strike is when you feel or see the hair on your arms standing up. If this happens, drop any tools and hit the dirt. Get as low as possible.
- If you see a storm coming, make some preparations to reduce your risk. Power or electrical tools should be disconnected from their power sources. Avoid using telephones and computers during a thunderstorm (even wireless phones and computers) Move away from water sources and metal objects including heavy machinery.
- If you're caught in a storm, put down any tools that could be conductors. Things like rakes and shovels will conduct electricity. Seek shelter in an enclosed building. If there are no buildings, get into the cab of a vehicle. Make sure the windows and doors are closed. Try not to park the vehicle under a power line. If you have parked near a power line, move the vehicle once everyone is aboard.
- Allow thirty minutes to resume work once the storm has passed.

If someone on your crew has been struck by lightning, call 911 immediately! People who have been struck by lightning will not remain electrified so you can start CPR as soon as possible. Do not move the victim because they may have burns, nervous system damage or broken bones. Even if the victim appears to be unhurt, medical attention should still be requested.

28-4 Pennsylvania Tornado Facts

You may think that Pennsylvania doesn't get severe enough storms to produce tornados. If you think that, then you'd be wrong. Pennsylvania ranks 25th in the nation for tornados. Normally, the tornados we see in Pennsylvania are smaller, with a shorter life span, but even an EF 1 can mess up your neighborhood.

Not all tornados will have a well-developed funnel cloud, but all tornados will be the result of a rotating severe thunderstorm. Tornados cause significant damage to structures, roadways, power, gas and communication lines and the thunderstorms that bring these beasts can produce flash flooding and hail damage.

If you are working on the road during a tornado warning, seek shelter immediately. Outdoor areas are not protected from flying debris. Most people are hurt in tornados because they have been hit by flying debris. Your safest place is in a basement. If you can't get to a basement, then the lowest floor of a sturdy building.

DO NOT seek shelter under a bridge or over pass. These structures increase the wind speeds of the tornado and could collapse on top of you.

Have a plan for severe weather and recognize the signs.

- Listen to all watches and warnings issued by the National Weather Service.
- Watch for dark skies, often greenish skies indicate a severe storm.
- Watch for a dark, low-hanging cloud (particularly if it's rotating.)
- If you start to experience large hail, it's time to take shelter.

Remember: A tornado watch means conditions are favorable for a tornado. A tornado warning means a tornado has been spotted or has been indicated by weather radar. If you hear a tornado warning seek shelter immediately.

28-5 Tornadoes

Tornadoes can occur anywhere in the United States at any time of the year. In Pennsylvania we are most likely to see a tornado during the spring and the fall. You'll know when tornadoes are favorable because they are accompanied by a severe thunderstorm.

Tornado's form when a severe thunderstorm begins to rotate. These storms will produce hail and strong winds prior to the tornado forming. However, not all thunderstorms that produce hail and strong winds produce twisters.

TORNADO WATCH

When severe thunderstorms and tornadoes are predicted for an area, the National Weather Service will issue a tornado WATCH. This means that conditions are or will be favorable for tornado development. If you hear a watch issued on your phone or on the radio while you're in the field, you need to be on the lookout for the thunder clouds to build.

TORNADO WARNING

When the National Weather Service issues a tornado warning, you need to find shelter immediately. A warning indicates that a tornado has been spotted and reported or indicated by a radar signature indicative to a tornado. No matter the size of a tornado, these beasts can be dangerous and life threatening.

Find Shelter

If you find yourself face to face with a tornado you need to find shelter as quickly as possible. If you have no choice but to ride it out in your vehicle, make sure you put your seatbelt on. You'll be more likely to stay in your vehicle and escape severe injury with your seat belt on. However, your vehicle is not the safest place to be.

The best place to be in a tornado is below ground level in a sturdy building. Not a job trailer.

Do NOT park under a bridge or overpass. Wind speeds during a tornado can climb to 300 MPH or more, the narrow opening of bridges and overpasses increase tornado wind speed and can be more than doubled under a bridge.

Be prepared this severe weather season, listen to the watches and warnings and be ready to take action when a big storm heads your way.

28-6 Weather Hazards

Summer or winter, there is one thing that can shut down a job faster than anything else...the weather. The worst part is we have no control over it. What we can control is how we plan for the weather and the safety precautions we take to combat it.

It's important to know what hazards each weather phenomenon brings.

Wind:

- Can blow dust into your eyes.
- Can blow down trees, blow materials and people off scaffolds and roofs.

Lightning:

- Lightning seeks a ground to discharge and complete the circuit. It does this by striking the highest or tallest object. If you're standing on a roadway, you may very well be the tallest object.
- Lightning can strike prior to or after a storm; up to ten miles away.
- A direct strike often results in cardiac arrest.
- Lightning kills about 80 people a year.

Rain:

- Rain makes surfaces slippery, so slow down in the rain.
- Be sure to wear your rain gear so you can be seen.
- Rain will make mud. Mud can cause you to slip and fall. Mud can also cause pulled muscles from straining.

Sleet, snow and ice:

- All three create hazardous road conditions.
- These types of weather can make it very dangerous to walk as well.

No matter what the weather brings, have a plan. Know what Personal Protective gear will keep you safe and know when to shut down a job to protect yourself and your co-workers.

Section 29 – Snow Operations

- 29-1 Assessing Risks for Winter Hazards
- 29-2 Auger Safety
- 29-3 Blizzards
- 29-4 Cold Weather Injuries and Illnesses
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- 29-6 Dressing for Cold Weather
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- 29-25 Working Around Augers
- 29-26 Working in Cold Weather

29-1 Assessing Risks for Winter Hazards



Winter is coming and it is time to prepare. Assessing the work environment for hazards associated with winter weather before it arrives allows for adequate time to address potential issues before they can turn into potential injuries. Below are steps to take before the ice and snow hits.

Work Site Preparation:

- Ensure there is a snow shovel and salt and/or antiskid available for keeping walkways clear.
- Inspect building gutters/drainage areas to ensure melting snow and ice will drain properly.
- Remove leaves from walkways and parking areas to prevent additional slip hazards.
- Determine if equipment for winter operations requires maintenance prior to winter weather.
- Examine outdoor electrical sockets and conduit; report any damage to a supervisor.
- Inspect electrical cords/receptacles for damage and ensure all grounded plugs are fully intact. Remove damaged electrical equipment from service.
- Ensure outdoor lighting is in full working order and have any burnt out bulbs replaced.
- Use caution signs to alert others of wet floors.
- Address water tracked into the facility through use of absorbent mats or other strategies.

Behavior/Driving:

- Inspect all Personal Protective Equipment and cold weather clothing.
- Ensure treads of winter/safety footwear are in good shape.
- Prepare a spare set of clothing to have at work, including extra gloves, socks and skull caps or head liners to change into if your clothes become wet.
- When driving, be conscious of black ice, wet leaves, and packed snow on pavement.
- Never drive with the truck bed in the raised position or circumvent truck bed alarms!
- When driving in winter weather always be alert, aware and drive defensively. Increase following distance and reaction time on snow or ice-covered roads being certain to signal other drivers in advance of turns.
- Clear ice and snow from windshield and lights before driving. Check equipment fluids.
- Employees must maintain three points of contact when mounting and dismounting construction vehicles and equipment.

29-2 Auger Safety

As we go through the winter season, employees are exposed to numerous hazards related to winter operations. One of these hazards is working on or around augers on the back of plow trucks.

While not frequently occurring, injuries resulting from auger accidents are usually very serious or even life-threatening. The infrequent nature of these accidents makes it even more important to routinely review and reinforce the proper procedures.

It's imperative that the seriousness of following proper procedures while working around augers is addressed with all exposed employees. If you haven't already done so, please implement a policy that reinforces safe work practices around augers with all affected employees.

Please review the guidelines and additional resources below to help avoid auger injuries.

Clearing Auger Jams:

1. Shut off the engine.
2. Chock dump truck wheels.
3. Remove the keys so that you are the only one who can restart the equipment.
4. Disconnect hydraulic hoses at the spreader (if equipped).
5. Drop the clean out plate.
6. NEVER place hands or other body parts into the auger area for any reason.
7. Keep loose fitting clothing and gloves away from the spreader auger as they can become entangled and be drawn into the auger.
8. Be aware of residual hydraulic pressure. The auger may turn several times once a jam is cleared.
9. Use a longer piece of wood or other object that will break quickly and easily if the auger moves to clear material from the spreader auger (Never use a metal object).
10. Use the buddy system or get assistance if the jam cannot be safely cleared without difficulty.

When working on or around augers:

1. Advise employees of existing hazards when working near exposed rotating machine parts.
2. DO NOT place hands near or around moving parts/controls for any reason.
3. Hands should never enter the area of the spreader box when performing any repair or maintenance unless the hydraulic lines to the drive motor have been disconnected and the unit has been properly relieved of all hydraulic pressures.
4. After any repair that has required the total disassembly of the spreader, the spreader box must be completely reassembled and shielded before functionality tests are performed on the unit.

Please refer to the following resources for additional information on auger safety.

- Auger JSA titled "Winter Maintenance – Clearing Auger Jams (Plow Operator)"
- Auger Safety Video on clearing the auger (please save to the video to your computer to ensure the best possible playback).

29-3 Blizzards

The radio announcer says, "Get your bread and milk, and stay off the roads...we're getting a blizzard!" Believe it or not, it's not the amount of snow you get that makes a winter storm a blizzard. According to the National Weather Service, a snowstorm becomes a blizzard when it has sustained winds of at least 35 MPH for at least three hours.

The biggest concern for blizzards or blizzard like conditions are the white-out conditions that occur as a result of the sustained winds. Drivers are often caught off guard when a white-out occurs. This includes plow-truck drivers. Visibility becomes non-existent and you have no idea what is front of you or if the people behind you can see you're there.

There are a few things you can do to protect yourself in white-out conditions:

- Make sure your headlights are clean and your wind shield wipers are working properly
- Make sure you have your yellow flashing lights on.
- If you can't see – SLOW DOWN!
- Avoid abrupt acceleration, braking and steering.
- Don't tailgate.
- If you can't see, pull over whenever it's safe to do so.

It is your job to provide public safety and to keep the roads passable. But you must also take care of yourself and be safe. If you have an accident, who will be there to keep the roads safe?

29-4 Cold Weather Injuries and Illnesses

The recent arctic wind caused a sudden drop in temperature, in many cases below zero, in most of northern states including Pennsylvania. If we are not ready and aware, extremely cold weather could cause serious injuries or illness, such as frostbite and hypothermia in the winter season. Many PennDOT employees work in cold and freezing conditions during the winter season to plow snow and to keep roads open for traffic. Prolonged exposure to freezing or cold temperatures can cause serious health problems such as chilblains, trench foot, hypothermia, and frostbite. In extreme cases, including cold water immersion, the exposure can lead to death. One of the most dangerous conditions that develops from working in the cold can be the hardest to recognize. It is very important for us to prepare for cold weather, to be aware of winter related injuries and illnesses, and to take precautions to protect ourselves.

Chilblains

Chilblains (also known as pernio and perniosis) are painful inflammations of small blood vessels in the skin that occur in response to repeated exposure to cold air temperatures ranging from just above freezing to as high as 60°F. Common symptoms include itching, bumps, and red or violet patches on the hands or feet. The skin usually clears up on its own within one to three weeks, though it may recur for years.



Trench Foot

Trench foot (also known as immersion foot) is an injury of the feet resulting from prolonged exposure to wet and cold conditions. Trench foot can occur at temperatures as high as 60°F if the feet are constantly wet. Injury occurs because wet feet lose heat 25-times faster than dry feet. To prevent heat loss to the rest of the body, blood vessels constrict to shut down circulation in the feet. Skin tissue begins to blister, followed by skin tissue dying and falling off.

Hypothermia

Hypothermia happens when our body temperature drops below 95°F. The first sign of hypothermia is severe shivering, which is beneficial to help keep the body warm. If the body continues to lose heat, shivering will eventually stop, skin may turn blue, pupils will dilate, pulse and breathing will slow, and drowsiness or exhaustion will set in. As this progresses, confusion and slurred speech may occur, followed by loss of coordination, loss consciousness, and eventually loss of life. Being too cold can also cloud judgment. In rare cases, people experiencing hypothermia may start to shed layers of clothing rather than adding layers. Researchers believe that in the final throes of hypothermia, a person may feel like he or she is overheating due to a rush of warm blood to the extremities.

Frostbite

Frostbite happens when a part of the body freezes from exposure to severe cold and causes damage to the tissue. If the tissue can't be saved, the body part may need to be removed to prevent even worse health problems. If caught early, it is possible to prevent permanent damage. Many parts of the body are prone to frostbite, including fingers, toes, nose, chin, and ears. Affected skin appears white, waxy, or grayish-yellow, and is cold and numb. If the condition can progress to deep frostbite, all layers of the skin are affected, and the outcome is likely to be more serious. The skin will become completely numb, blisters may form, and eventually the skin tissue dies, and turns black. Warning signs of frostbite may include numbness, tingling, stinging, and pain on or near the affected body part(s).



29-5 Cold Weather

As a PennDOT employee you work outside in the summer and the winter. Working in the winter can be difficult if you aren't ready for the extreme conditions and can result in hypothermia and frost bite.

If you're planning on working outside this winter, make sure you know how to protect yourself.

- Dress in layers – The layers should fit loosely because tight fitting clothing reduces circulation and can restrict movement which would create another hazardous working situation.
- Make sure your ears, face, hands and feet are protected. Your extremities are the first to get cold and can experience frostbite quicker than other parts of the body.
 - o Boots should be waterproof and have room for an extra pair of socks.

- o Make sure you wear a hat. Your hat needs to fit tightly against your head so you can put your hard hat over top.
- Take frequent warming breaks in warm, dry shelters.
- Drink warm beverages and eat warm, high-calorie foods.

Hypothermia and Frostbite

Hypothermia and Frostbite can take a toll on your life. Be sure to know how to recognize the signs.

Hypothermia – early stage

- Shivering
- Fatigue
- Loss of Coordination
- Confusion and Disorientation

Hypothermia – late stage (If not treated early, Hypothermia can be life-threatening)

- No shivering
- Blue skin
- Dilated pupils
- Slowed pulse and breathing
- Loss of Consciousness

Frostbite

- Cold skin and a prickly feeling
- Numbness
- Red, white, bluish-white or grayish-yellow skin
- Hard or waxy looking skin
- Clumsiness due to joint or muscle stiffness
- Blistering after re-warming.

If you or a co-worker exhibit any of the signs for hypothermia or frostbite, tell your supervisor immediately. Call 911 and seek medical attention as soon as possible.

29-6 Dressing for Winter Work

When you work outside in the cold it can be miserable to be cold for 7 and a half hours a day. Cold toes and cold hands can take away from the job you should be doing. Being cold can be a distraction that can be deadly. To avoid being cold its important to dress for the weather.

- Dress in layers. You should have at least three layers.
 - o The base layer should be a polyester or wool type materials to wick off sweat
 - o The middle layer should be the insulating layer. You'll want to look for a polyester or fleece type material to stay warm.
 - o The outer layer should offer rain and wind protection. If you stay dry, you stay warm.
- Don't over bundle. If you can't move comfortably, then you are creating another hazard.
- Minimize sweat. If you begin to sweat, take a layer off.
- Wear a hat that fits tightly against your head. No pompoms on top of your hat so you can get your hard hat on top of it. Its good to use a wool knit hat that pulls down over your ears.
- Make sure you wear socks that will keep your feet warm. Wear polyester type socks as your base layer and then wool socks over top. Make sure you have water resistant boots. Remember, if you're dry, you're warm.
- Gloves are very important. Choose your gloves wisely. A thin pair of wool gloves under a pair of leather gloves should keep your hands toasty.

Remember: Don't overdress. If you can't move, you could have an accident. Going into shock in cold weather can be more dangerous than during warmer weather. If you or a co-worker has an accident during extremely cold conditions, it is very important to keep the injured employee warm.

29-7 Driving in Inclement Weather

Safe driving in inclement weather begins with checking your vehicle. Complete the 614 and make sure to do an air brake test before pulling out. Whether you're driving a truck or a car, you need to check the fluid levels, particularly the washer fluid, and antifreeze. Also check your tires for inflation and tread depth. The ability to control your vehicle depends on the friction with the ground beneath your wheels.

Under normal conditions the contact patch of a car tire is about the size of the palm of your hand. Cornering will make that shrink. That is why tire condition is so important especially in bad weather.

It is a state law that you must clear your vehicle of snow and ice before driving. It will give you an unobstructed view and will prevent the snow or ice from blowing off your car and striking another motorist. Make sure your wipers and defroster are in good condition. Headlights should be on low beam to provide the best visibility. Remember – wipers on – Headlights on! During poor visibility periods adjust your speed and following distance. These are the two best things you can do to keep safe. Most accidents are spinouts caused by excess speed for road conditions. It is better to slow down and take a longer trip than to not arrive at all. Slick road conditions require smoother steering, acceleration and braking. Actions such as jerking the wheel or stabbing the brakes can cause you to lose traction and slide. Small mistakes can become big problems.

Here are some tips for driving in inclement weather:

- Increase the stopping distance between you and other vehicles.
- Remember that bridges will freeze before other surfaces.
- Be aware of Black Ice.
- Do not use brake retarders or other auxiliary braking systems when driving on slippery surfaces.
- Be careful when driving just after the rain begins because the water will mix with oil on the entire road surface and make it slippery.
- To reduce instances of hydroplaning on standing water, reduce your speed.
- Avoid driving into deep-water. Turn around – don't drown.
- Avoid using cruise control in wet weather driving conditions.
- Look farther ahead and pay particular attention to hot spots such as bridges, culverts, on- and off-ramps, and elevated highways. These will freeze before the regular road surface.

29-8 Fighting Fatigue

Do you regularly work feeling tired, groggy or run-down? If so, you may not be getting enough sleep. It's estimated that more than one-third of the U.S. workforce is sleep deprived. Lack of sleep can lead to health issues like diabetes, cardiovascular disease, and depression. To help get better sleep for overall health and be more alert during the day:

- Get 7 to 9 hours of sleep every night.
- Maintain a consistent bedtime and wake-up time - even on weekends.
- Keep your bedroom dark and cool when you're sleeping.
- Avoid eating heavy meals before bedtime.
- Keep electronic devices, such as cellphones and TVs, out of the bedroom.

Sleep deprivation also affects driving safety. National Highway Traffic Safety Administration statistics show that in the year 2017, 50,000 injuries and nearly 800 deaths occurred due to drowsy driving. Drowsiness makes you less able to pay attention to the road, slows reaction time if you must brake or steer suddenly, and affects your ability to make good decisions.

To help stay alert while driving, especially on long trips:

- Take regular rest breaks to get fresh air.
- Do some stretching exercises.

- Rotate drivers if possible.
- Don't drink alcohol or take medications that may make you drowsy.
- Find a safe place to pull over and rest for a while if you feel drowsy.
- Don't drive at all if you feel too tired.

How do you know if you're too tired? Learn the warning signs of drowsy driving:

- Yawning or blinking frequently.
- Difficulty remembering the past few miles driven.
- Missing your exit.
- Drifting from your lane.
- Hitting a rumble strip on the side of the road.

No one knows the exact moment when sleep comes over their body. Falling asleep at the wheel is clearly dangerous, but being sleepy affects your ability to drive safely even if you don't fall asleep. Protect yourself and others by paying attention to your sleep habits and never drive drowsy!

29-9 Frostbite

Frostbite is caused by exposure to very cold temperatures. The best way to prevent frostbite is to stay out of the cold. That isn't always the easiest thing to do for those of us who work outside all winter long. For us we have to take precautions to make sure our extremities are covered and stay warm.

Be prepared

- Wear warm loose-fitting clothing and gloves.
- Keep your feet dry. Remember, if you're dry you have a better chance of being warm.
- Keep active.
- Avoid alcohol and caffeine.

How to recognize frostbite

- A sharp burning or prickling sensation of the skin.
- A lighter color (pale) color of the skin in the affected area. Skin tones can turn from pale, to bluish white to whitish yellow.
- The sensation of pain will gradually turn to numbness as the severity of the frostbite increases.

How to treat frostbite

If you have any of the above symptoms seek medical treatment as soon as possible. Until you can see a doctor:

- Get to a warm area.
- Remove any wet or restrictive clothing.
- DO NOT immerse the affected area in HOT water. Gradually rewarm the area using warm water for 35 – 40 minutes.
- Do not rub the affected area. Frostbite freezes cells and rubbing the affected area will further destroy these cells causing additional tissue damage.
- If the area blisters, do not pop the blisters. Cover them with a sterile cloth until you can be seen by a medical professional.

Remember: It's easier to prevent frostbite than it is to treat it, if you must be outside, be prepared.

29-10 Getting Ready for Winter Work

Working outside in the winter can be a dirty job, but many of us have to do it. Are you ready for winter work?

Here are some reminders about dressing for the weather and staying strong, healthy and safe:

Two big concerns of working or simply spending time outdoors in cold weather are frostbite and hypothermia. Both can occur at much higher temperatures than many people realize. For example, exposed skin can start to freeze at just 28 degrees Fahrenheit

(-2 degrees Celsius) and deep frostbite can cause blood clots and even gangrene. Hypothermia is a potentially fatal condition caused by loss of body temperature, even in winter conditions people might not consider particularly nasty. Symptoms include fatigue, nausea, confusion, light-headedness and profuse sweating. Without medical treatment the victim can lose consciousness and die. From 1999 to 2011, a total of 16,911 deaths in the United States, an average of 1,301 per year, were associated with exposure to excessive natural cold. The highest yearly total of hypothermia-related deaths.

- **Wear the right gloves for the work you are doing.** Gloves should have enough insulation to keep you warm and prevent frostbite, but be thin enough so you can feel what you are doing if you are manipulating controls or tools. Gloves which are too thick can also make your hands and wrists work too hard trying to hold on to objects, causing repetitive strain injury.
- **Dress in layers of light-weight clothing which keep you warmer than a single layer of heavy clothes.** Remove layers as necessary to prevent overheating and perspiring which can lead to chills or hypothermia later. Remember that wet clothing is 20 times less warm than dry clothing. Wear a hat and you'll stay much warmer when working in cold conditions. As much as half your body heat can go up in steam off the top of a bare head. Protect your ears from frostbite as well by wearing a hat that will cover your ears, or use ear muffs.
- **While donning a scarf or muffler might help keep your neck warm in the cold weather,** it could also kill you if you work near rotating machinery. Check your winter wardrobe for entanglement hazards such as loose sleeves and dangling drawstrings.
- **Keep your safety eyewear from fogging up in the cold.** Investigate anti-fog coatings and wipes to see if these products are appropriate for your eyewear. If you have to keep taking off your safety eyewear because it fogs up, it isn't protecting you.
- **Look at the soles of your winter footwear.** Your shoes or boots should have adequate tread to prevent slips and falls on wet or icy surfaces. For extremely slippery situations, you can attach clogs or cleats to your footwear. Slow down when walking across slippery surfaces and be especially careful on ladders, platforms and stairways.
- **Eat winter-weight meals.** This does not mean a high fat diet, but one with enough calories and nutrients to give you the fuel you need. Start with a breakfast of whole grain cereal and toast.
- **Get plenty of rest.** Working in the cold and even traveling to and from work in the winter takes lots of energy. Cold weather can strain your heart, even if you aren't overexerting yourself, so be sure to pace yourself when lifting heavy objects or shoveling snow.

Did you know that 70 per cent of deaths during snow or ice storms occur in vehicles? It pays to carry blankets or sleeping bags, matches, candles, a snow shovel and sandbags, a flashlight, and non-perishable food such as cereal bars, in case a winter storm sidelines you in your vehicle.

29-11 Hydraulic Plow and Spreader Leaks

Plows and Spreader Equipment containing oils tend to leak when stored and not in use. The following procedures need to be followed:

- Spills are to be immediately addressed.
- Store on pavement – not on a soil surface, to prevent oil absorption into the ground.
- Spills on pavement fall under housekeeping and storm water pollution prevention; use absorbent material to promptly collect the material.
- Cap or bag connective ends when not in use to prevent release of hydraulic fluid.
- Monitor to be sure oils have not been released in or around stockpile drainage systems (drainage grates, retention ponds) – immediately report releases to the County Equipment Manager.
- This is a stockpile inspection item; and will be reported to the County Equipment Manager as a deficiency if found.



29-12 Plow Truck Driver Safety – Working Alone

Being a plow truck driver is not an easy job. As you know, many people depend on you to keep the roads cleared in some of the worst conditions. When the media is telling everyone else to stay home, you are headed out to keep the traveling public safe. People like medical professionals and first responders rely on the dependency of PennDOT and their snow plow fleet to get them to work safely.

Plowing snow is a lonely business. Most of the time in a 12-hour shift you only have contact with co-workers at the beginning and at the end of your shift. Because of this, no-one is looking out for you – except you.

Some hazards you can encounter by working alone:

- Accidents and emergencies with the traveling public.
- Sudden Illness of the plow truck driver.
- Sudden accident involving the driver.
- Slips. Trips and falls.
- Physical violence from a member of the public.
- Inadequate provision of rest room facilities.

As a lone worker, you have a responsibility to work safely. Remember to:

- Call the dispatcher or your supervisor anytime you leave your truck. Call them again when you get back in your truck. Tell them where you are and how long you plan to be away from your truck. This way, if you fall or something happens, they will have a reasonable timetable to start looking for you if you don't check back in.
- Take reasonable care to look after yourself and care for your own safety and health.
- Safeguard the safety and health of the other people affected by your work, specifically the traveling public.
- Pay attention and cooperate with safety policies.
- Always wear your hard hat and vest anytime you're outside of your vehicle.
- Report all accidents, injuries and near-misses to your supervisor immediately.

29-13 Plowing Snow

PennDOT has over 2,200 plow trucks and employees nearly 5,000 operators every winter to plow snow. It's the number one job of the Department of Transportation to keep roads passable and safe during winter weather.

As a plow truck driver, you may have asked at one time or another, how fast should I be going? Unfortunately, that answer will always be...It depends.

There are many factors that go into the speed you should be plowing.

- The type of plow you're using
- Road Conditions
- Visibility
- The type of snow and how deep it is.
- Objects located along the roadside.
- Are you using a wing plow?
- Are you plowing in Tandem?
- How familiar you are with your truck.

One thing to remember is that the faster you go, the farther you'll throw the snow. So you must consider what will be hit with the snow you're throwing. Are you on an open stretch of 4-lane or are in a downtown where there are cars, sidewalks and bus stops?

You also need to consider your speed when you are applying salt and anti-skid. The faster you are traveling the more bounce and splatter you'll get from the material.

A couple other things to think about when determining speed while plowing.

- Is your truck full or almost empty?
- What are the current road conditions?

- Do you have 3 inches of white fluffy snow or ½ inch of ice?
- What if you had 2 inches of slush?
- Are you applying salt or not?
- How quickly can you stop?

Ultimately, plow speed is based on good judgement. You need to be moving fast enough to move the snow and not get stuck but slow enough to keep salt in the road. The most important factor is to move slow enough to keep yourself and everyone else safe.

29-14 Safety Tips for Snowplow Truck Operators

Keeping yourself safe during winter operations can be challenging. Walking across an icy parking lot can lead to a slip and fall, plowing a dark lonely road can lead to a vehicle accident.

There are ways to keep yourself safe this winter while you're keeping everyone else safe on the roads.

1. Dress in layers to adjust to changing temperatures. Wear warm, waterproof/water resistant clothing.
2. Cover your head when you go outside. Up to 40 percent of your body heat can escape through your head.
3. Try to avoid driving when you are tired. Exhaustion and fatigue are a driver's two worst enemies and cause many accidents. Make healthy choices with your diet – eat things that have natural sugars to keep you awake. You need energy to keep your muscles warm and your brain alert.
4. Take regular breaks. Driving in the snow can have a hypnotic effect on you and cause you to become drowsy. Driving in snow for several hours can also affect your vision. You should take a break every couple hours to stay alert and responsive.
5. This seems like a simple task, but before you head out to plow, make sure all of your equipment is operating correctly. Check your heater and defroster, your windshield wipers and mirrors. Check that your plow chains haven't broken and speaking of chains, make sure you know where your tire chains are in case you need them through the course of your shift.
6. And finally, if you need to get out of your truck for any reason, check in with the dispatcher or your foreman. They need to know where you are so if something happens to you, they know where to look for you. Once your back in your truck, call them again just to let them know you're back and okay.

29-15 Shift into Winter Driving Quiz -- Are you ready to Shift into Winter?

Before you head out in winter weather

- 1) A driver's chances of being involved, injured or killed in a crash dramatically increase during PA's winter driving season, which runs between October 1 and March 31. Before heading out when the weather is bad, you should:
 - a. Consider delaying the trip if the weather is bad.
 - b. Check the current road conditions and weather forecasts and visit your local weather for current conditions
 - c. Plan your route ahead of time and avoid roads that may become dangerous in bad weather.
 - d. Leave lots of extra time so you are not rushing.
 - e. All of the above.

CORRECT ANSWER: E – All of the Above -- You should do all these things before deciding to go out when the weather is bad. Where possible, try to travel during daylight and let someone know your route and planned arrival time.

Speed

- 2) Snow, sleet, ice and fog are just some of the challenging conditions we can experience when driving in winter. When you face these conditions, you should:
 - a. Drive at the speed limit
 - b. Drop your speed to match the road conditions
 - c. Keep up with traffic

CORRECT ANSWER: B – In winter conditions, you should drop your speed to match road conditions. The posted speed limit is the maximum speed limit under ideal conditions. In winter, it is often safer to drive below the posted speed.

Following distance

- 3) Winter road conditions such ice, snow, sleet, fog and lower light mean you need to keep more distance between your car and the car in front of you to give yourself more room to stop safely. In winter conditions, you should leave:
 - a. At least four to six seconds between your vehicle and the one in front of you.
 - b. Three seconds.
 - c. Two seconds if your car has anti-lock brakes.

CORRECT ANSWER: A – You should always stay at least four seconds behind the car in front of you. No matter how much driving experience you have, the way your car will move on snow or ice is unpredictable so increasing your following distance is a safe winter driving practice.

How to measure following distance.

Choose a fixed point that is even with the car in front of you. For example, an overhead sign, a tree or a building. If you reach the same fixed point before you count to four, then you are driving too close.

Icy conditions

- 4) Skids can happen any time your tires lose their grip on the road. In slippery road conditions, if your car begins to skid, you should:
 - a. Turn the steering wheel in the direction you want the car to go.
 - b. Ease your foot off the accelerator, while looking and steering smoothly in the direction you want the car to go.
 - c. Pump your brakes and steer in the direction you want the car to go.

CORRECT ANSWER: B – You should ease your foot off the accelerator while looking and steering smoothly in the direction you want the car to go. In fact, you may need to repeat this action more than once until you regain control. Don't slam on the brakes, as that will only make the situation worse.

Winter tires

- 5) One of the safest winter driving practices is to use a set of four matched winter tires that carry the winter tire logo – even if you drive a 4-x-4. Which winter tire is designed specifically for use in severe snow conditions?
 - a. Mountain Snowflake Winter tire logo
 - b. Mud and Snow Winter tire logo

CORRECT ANSWER: A – The Mud and Snow tire is legally acceptable but does not provide the same degree of performance as a Mountain Snowflake tire does in severe winter conditions.

29-16 Shift Work

As a PennDOT Snowplow Operator, you may very well have to work a shift and sometimes that shift can turn into a double if it's a bad storm. Well you're not alone. Nearly 15 million Americans work some type of shift work and studies link shift work to fatigue. The National Safety Council reports that 13 percent of workplace injuries can be linked to fatigue.

How to recognize fatigue:

- Excessive drowsiness
- Sluggishness
- Difficulty sleeping when you finally have down time
- Inability or difficulty adjusting to a new schedule
- You need more time to react to normal tasks (this can be very bad if your normal task is driving in the snow)
- Inattentiveness

When you work an overnight shift, staying alert and safe can be challenging because your body is used to sleeping at this time. So, what can you do to keep yourself safe?

- Take frequent breaks.

- Look for exercise opportunities – exercise creates endorphins that help you stay awake.
- Drink caffeinated beverages at the beginning of your shift, but try to stop drinking caffeine about two hours before you go home so you can get to sleep.
- Sleep at least eight hours before coming to work.

If you feel you are too tired or fatigued to drive safely, tell your supervisor.

29-17 Snowplow Truck Safety

Snowplow truck safety is something that every snowplow truck driver must be aware of. The blowing and drifting snow mixed with slick pavement makes very hazardous conditions for you and the traveling public.

So how can you make sure that you stay safe while keeping Pennsylvania motorists safe?

1. Know your route! Take the dry runs you do during the non-snow times seriously. Take note of obstacles and tell your supervisor. Make every effort to eliminate the obstacle, if you can't eliminate it – delineate it. If it can't be delineated – communicate with your fellow drivers that the obstacle exists. Remember these words – ELIMINATE – DELINEATE – COMMUNICATE!
2. Always be tolerant and patient of other drivers or pedestrians around you. Imagine yourself in their shoes. Perhaps you're a young driver, or an older driver. The big truck can be intimidating, so be patient.
3. Watch your speed! Many plow truck drivers have accidents because they are going too fast for the weather conditions. It might be desirable to get the job done faster, but faster isn't always better and you risk having an accident that could cause harm to you, another motorist and of course your plow truck. Make sure you are constantly keeping an eye out for ice or other obstacles.
4. Make sure your plow, wing plow and chains are in good working order. Do your pre-trip to be sure the fluids are topped off. You'll also want to check that the lights are operational as well as the auger and spreader. Do you know where your tire chains are? Some conditions will warrant that you use chains so know before you go where they are and how to put them on your truck.
5. Obey all traffic laws and wear your seat belt!
6. Before cleaning out the auger make sure all power is cut to the truck.
7. Get rest before going back out to plow again.

Plow truck operators serve the state and their community during the worst road conditions. However, it is important that EVERYONE, including you, the plow truck operator, gets to go home safely in the snow.

29-18 Walking on Ice

At least a third of all PennDOT injuries involve some type of slip, trip or fall. This category is the number one cause of injury in America. Many of these slips and falls occur at the stockpile in the winter. Walking on ice can be tricky, so to keep yourself safe this winter and follow these tips.

Plan ahead

If the roads are slippery, you can and should assume that the parking area will be slippery as well. Give yourself extra time to drive to work and then to walk across the parking area.

Wear boots with a good tread.

Your boots, like your tires should have good tread on them. Similar to your car, you'll want to check these before the snow flies and the ice builds. You can also add cleats to your shoes or boots to give extra traction.

Entering or exiting your vehicle

You've just finished a shift, you're tired and want to go home, but this is no time to take short cuts. Climb down from your truck backwards and maintain three points of contact. If you're just getting to work, get out of your vehicle slowly and expect the parking lot to be icy.

Designated walkways

Try to stay on the path into the building, this will help you to know where you're going, especially at night. If the pathway is icy, apply

anti-skid or salt to help melt the snow and ice and keep it safe for your co-workers.

Walk safely on ice and snow

If you can't avoid walking on ice and snow:

- Take short steps.
- Keep your hands out of your pockets.
- Walk like a penguin, waddle and keep your center of gravity over your feet and knees.
- Prepare yourself to fall. Try not to catch yourself. Wrap your arms around your body and keep your head safe.

29-19 Wind Chill

Have you ever said, or heard someone say, "Wow, it would be so much warmer if the wind wasn't blowing."?

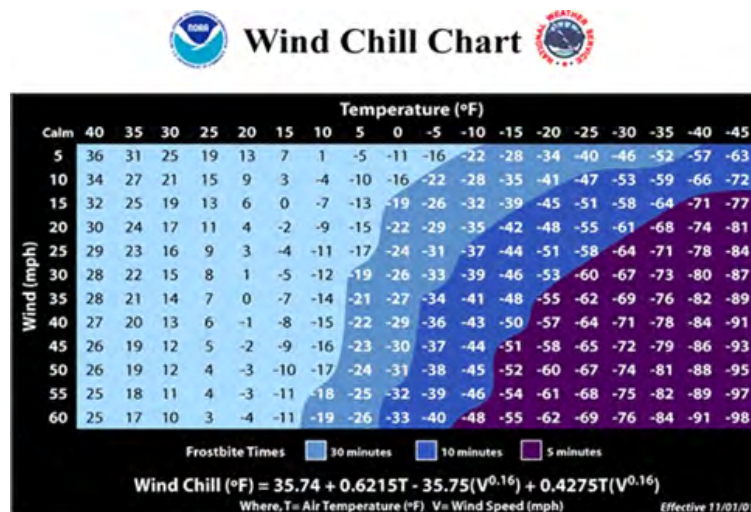
Wind chill or the real feel is a very real thing. Adding wind to an already cold day can pose a very dangerous threat. For instance, if it's 10 degrees outside and the wind is blowing at 20 MPH the real feel temperature feels like -9 degrees. That's cold!

Cold Stress

It's important to understand why you feel colder when the wind blows. When the wind blows, it removes the warm air our bodies produce that sits just above the skin. This gives a feeling of being colder because our insulation was blown away. Prolonged windy conditions can cause the body to cool quicker and can lead to cold illnesses such as frost bite and hypothermia.

Listen to the Warnings

Because of the dangers of cold stress, the National Weather Service will issue wind chill advisories and warnings when they have calculated that wind coupled with cold air could threaten or endanger people in an area.



The Chart above, issued by the National Weather Service gives you an idea of what the real feel is, but your body is the only true gauge for how you feel.

Stay Warm This Winter

When the temperatures dip, you need to take extra precautions to stay warm.

- Dress in layers.
- Stay Dry.
- Take breaks in warm areas or vehicles.
- Drink warm beverages to help warm your core temperature.
- Look out for your co-workers. If you notice someone looking like they are pale, shivering abnormally or they look like they are generally ill, tell your supervisor and get them into a warm place.

Wind chill is very real, especially if you are working outside in the cold. Don't be a victim, listen to the warnings, dress for the weather and stay safe this winter.

29-20 Wing Plow Operational Guidelines

Pre-Operational Check List:

1. Inspect components for the following:
 - Plow and plow frames for cracks, broken welds or loose bolts. Safety chains and cutting edges for wear and general condition.
 - Plow pins for washers and cotter pins.
 - Hydraulic lines, fittings and cylinders for damage or leaks.
 - Safety chain security for transporting.
 - Bolts and push beam anchor bolts.
 - Rear mounting plate and wing brace vertical supports for bends, loose bolts and cracks.
 - Controls for smooth and correct operation.
2. Repair or replace any items found to be deficient.
3. Check the condition of the plows periodically during the shift and inspect at end of the shift.

Lowering the wing:

1. Be certain area is clear and safety chain is removed.
2. Lower wing to the pavement.

Raising the wing:

1. Raising and lowering may be performed with the vehicle in motion.
2. When approaching railroad crossings, slow down and raise the wing so as not to hook into tracks. Also use caution at bridge joints.

Safe Operating Practices:

1. Each area should develop a site-specific plan for wing plow operation ("Wing Caution Zones"). There are obstacles. Know where they are.
2. Important: refrain from unhooking the safety chain on the wing until the engine has been started and the hydraulics on the wing are pressurized, because the cylinder may not support the wing until charged.
3. Do not operate the plow unless you are qualified, trained and understand how to operate the vehicle and the controls.
4. Adjust your plowing speed to the conditions. e.g. obstacles, traffic volumes, pedestrians, highway conditions, grade, terrain and visibility.
5. Use caution when plowing around obstacles. If in doubt, raise the wing.
6. When roadway conditions are too narrow to accommodate the use of the wing without lane changes, raise the wing plow.
7. Do not use the wing in weather conditions where visibility is adversely affected, such as heavy fog or whiteout conditions.
8. Wing plowing is not recommended on soft surfaces such as gravel shoulders. If you do use the wing on soft surfaces, do so only after slowing to a safe speed and adjusting the wing lift to prevent the wing from penetrating the soft shoulder.
9. Do not use the wing plow if traffic or highway conditions are not suitable for safe operation.
10. When using the wing plow, remain constantly alert to traffic and roadside obstacles.
11. Before leaving the unit secure the wing plow, if in the up position connect safety chain. If in the down position, leave resting on the ground.
12. Slow down and downshift instead of lifting the wing plow, this will help maintain your plow pattern and reduce the time to clear the travel way.
13. When gang plowing (3 or more trucks), position the wing plow unit where the wing can be buffered or protected by one of the other plow trucks in the formation.
14. Safety chains are not designed to keep the wing plow tight against the side of the vehicle. Wings can move out even with safety chains properly attached.
15. When storm conditions impair visibility and the centerline is difficult to find, discontinue use of the wing plow.

16. Do not rub guardrail with the wing. The leverage exerted on the wing can turn the truck toward the rail. Be aware that when the wing is in the up position, it still extends past the edge of the underbody or edge of the front plow and can strike obstacles that plows or blades can clear.
17. Use a block to prevent accidentally raising the wing whenever the truck or plow is being worked on.
18. During dry runs for winter operations, don't forget to include expansion joints on bridges. Check plow angle vs. joint angle.

29-21 Wing Plow Safety

Plowing snow is what PennDOT does best. Seeing that big yellow truck coming down the road with snow flying off the front plow and the wing plow is a comfort to most drivers when old man winter is throwing the worst at them. But staying safe while your plowing is just as important as keeping the motorists safe.

Before you go out on your snow route, you'll want to do a circle of safety and complete your 614. Make sure you pay close attention to the front plow and especially your wing plow. A few things you'll want to look for on the wing are:

- Chains – make sure the chains are in good working order and aren't cracked or broken in any way.
- Moldboard – Check the moldboard is good and doesn't have any damage to it.
- Cutting edge – Check the cutting edge for dings and dents and also check the shoe adjustments.
- Welds – Check the welds on the front tower and frame attachments paying close attention to their strength.
- Hoses – Check for leaks around the hoses and fittings. And make sure none of the hoses will be pinched.
- Cylinders – Make sure there are no leaks and keep them closed when not in use.

While using the wing plow, watch your speed. Many of the accidents involving plow trucks, especially with a wing are a direct result of how fast the driver was traveling. Be aware of your route, note where the fences and mailboxes are and be tolerant of other drivers. Drive safely and make this winter accident free.

29-22 Winter Preparation and Driving

As a PennDOT employee you don't have the luxury of staying home when it snows. The nature of our work doesn't allow you to stay off the roads. When the media is telling everyone else to stay home, you're heading for the truck, because this is your job... to keep the public safe.

Unfortunately, reduced visibility, slippery roads and changing weather conditions is the most dangerous time to work.

Last year in the winter months (November through March) the department experienced an increased number of fleet accidents. Most were a direct result of a winter activity, (plowing snow, spreading anti-skid and winter road checking). The driving behaviors of private motorists may be the most feared hazard, but nearly half of the fleet accidents had a documented PennDOT driver error. Poor clearance and judgment, improper backing and too fast for conditions consistently represent the top three.

Most of these accidents can be avoided by balancing safety and production. We need to constantly practice safe driving to protect ourselves, the public, and our property. Be a safe driver, not a statistic. Take some time to review the following safe driving tips and reminders.

- **Don't wait until there is a problem, ensure vehicles are properly winterized.**
 - o Make sure vehicles are maintained and ready for inclement weather.
- **Have operators practice driving with the plows attached before the weather strikes.**
 - o Use cone set ups to allow operators to get accustomed to the extra width of their vehicles.
 - o Angle/Sideswipe is the most frequent fleet accident type during snow removal operations.
- **Use pre-planned, approved routes whenever possible.**
 - o Conduct dry runs of your route to identify any possible hazards (overhead hazards, clearance hazards, road surface obstructions, etc.).
- **Be aware of deer during this time of year.**
 - o While deer collisions begin to slow down in mid-December, they still accounted for 5% of all fleet accidents during this time last year.

- o Slow down after sundown and before sunrise to reduce the risk of deer strikes.
- **NEVER drive with the truck bed in the raised position or disable truck bed alarms!**
 - o Accidents involving overhead clearances, while easy to avoid, cause severe damage and are extremely costly.
- **When plowing, ensure the wing plow is always in sight and chained when not in use.**
 - o Clean mirrors and windows often.
 - o Adjust mirrors, as necessary, to reduce blind spots.
 - o Avoid turns that require you to stop and back-up.
- **Slow down! Slow down! Slow down!**
 - o Always follow the posted speed limits, but adjust your speed according to conditions.
 - o Adjusting speed and following distance are two of the best things you can do to keep safe.
- **Always drive defensively!**
 - o Signal properly and check your mirrors frequently.
 - o Look farther ahead and pay attention to high hazard areas such as bridges, overhead wires, culverts, on- and off-ramps, intersections, and elevated highways.
 - o Try to anticipate private motorists' driving behaviors whenever possible.
- **Avoid driving while fatigued or drowsy.**
 - o Be mindful of getting adequate sleep, both in quality and quantity.
 - o Driving while sleep-deprived or fatigued (6 hours of sleep or less) triples your risk of accidents.

Arrive Alive!! Remember, it's your job to keep the traveling public safe, but it's also your job to keep you safe!

29-23 Winter Weather Precautions

With winter weather expected, associated hazards are on the rise. Slippery walking surfaces, slick driving conditions and cold temperatures will be present throughout the next few months. When these hazards exist, precautions should be taken to avoid injury.

When slippery walking surfaces are present, consider the following:

- Wear boots or shoes with good traction; if working in an office setting bring more appropriate office footwear with you and change once inside.
- Keep your eyes on the path of travel and be on the lookout for black ice near stockpiles and county offices.
- Adjust your step accordingly if you must walk across slippery surfaces:

Normal stride	
When slip hazards are present	
When walking on slippery surfaces	

When slick driving conditions are predicted, consider the following:

- Give yourself enough time to get to your destination.
- Travel at a safe speed when commuting to work or plowing, especially operators assigned to a snow route.
- Keep a safe distance from the vehicle in front of you, the distance needed to stop a vehicle on black ice can be twice as long as normal driving circumstances and even longer for a snow plow because of its weight capacity!
- Use caution when driving on bridges, ramps and overpasses in the early morning when the temperature rises faster in the air than the pavement.

When outdoors during cold weather, consider the following:

- Be aware of the temperature, including the wind chill, throughout the shift.
- Dress appropriately to withstand the lowest forecasted temperature.
- Dress in layers so as the temperature changes, clothing can be added or removed.
- Avoid touching cold metal surfaces with bare skin.
- Cover all exposed skin, which includes wearing a hat and gloves.

Keep in mind:

- According to ANSI, cold weather liners such as a skull cap or beanie may be worn if they are specifically designed to be compatible with the protective properties of a hard hat. "Winter liners should be made of fabric, plastic, or other suitable material. Colored materials shall be fast- dyed. The outer surface may be water resistant."

29-24 Winter Weather Safety

The winter season brings cold temperatures and often times severe weather conditions that create many hazards for individuals working in these conditions. Even if you work indoors, winter weather still poses many hazards for you such as driving into work in bad weather or walking through an icy parking lot to get to your building. It is important to recognize and address the hazards winter brings with it.

Winter Driving Crash Statistics

One of the main issues winter poses in many parts of the country is poor driving conditions. According to the Department of Transportation, winter weather conditions are responsible for over 192,000 injuries and 2,200 deaths each year on the road. Outside injury and loss of life, winter weather conditions are responsible for millions of dollars in property damage incidents. The hazards created by winter weather make it hard for even the most experienced drivers to operate a vehicle safely.

Slips, Trips, and Falls

Slips, trips, and falls are one of the leading causes of injuries and fatalities in the workplace. According to OSHA, slip, trip, and fall incidents cause 15% of all accidental deaths, and are second only to motor vehicles as a cause of fatalities on the job. Snow, sleet, and ice greatly increase the chances for slip, trip, and fall incidents to occur.

Winter Safety Tips When driving:

- Monitor weather for any incoming snow storms or icy conditions and plan your travel around those conditions. Do not put yourself in a situation where you are stuck on a roadside.
- Do not drive in wintry conditions if possible. Eliminating driving eliminates your chances of being in an accident.
- Be a defensive driver. Stay clear of other drivers and maintain a safe distance in case you need to brake or turn to avoid an accident.
 - o Slow down. Winter weather conditions necessitate having to reduce your speed. Reducing your speed will give you more time to react as well as help to avoid losing control of your vehicle.

**When walking on icy/ snowy surfaces:**

- Remove trip hazards before snow or ice conditions are present. This eliminates someone tripping over a buried object after the snow or ice hits.
- Shovel and salt parking lots and walkways prior to work beginning in that area. Have walkways addressed before workers get on site in the morning.
- Take your time when walking across any slippery surfaces. Taking smaller steps lessens your chances to lose your balance.
- Have the proper footwear on for the weather. Wear shoes with solid tread on the soles.



Discussion point: What other hazards does winter create in your work areas?

29-25 Working Around Augers

As we go through the winter season, employees are exposed to hazards related to winter operations. One of these hazards is clearing the auger on the back of the trucks during snow removal operations. Although employees have been instructed in proper maintenance procedures during employee training, severe injuries when working around augers still occur.

On Monday, October 1, 2012 a very serious accident occurred. Fortunately, the PennDOT employee did not sustain life-threatening injuries. A Diesel Mechanic was installing a new auger on the truck and was running the truck to calibrate it at a slower speed when his hand got caught in the auger, resulting in significant blood loss and damage to his right hand. The employee was air lifted to the hospital.



In response to this injury and in an effort to prevent another severe, potentially catastrophic injury, the Department is making it mandatory that the seriousness of following proper procedures while working around augers is addressed with each and every employee exposed. We ask that you implement a policy to routinely reinforce these guidelines with all employees who encounter this situation.

Even though a truck's engine is shut off, the hydraulic system still has residual pressure and will turn the auger once a jam is cleared. Therefore, it is important that the following procedures continue to be used when working around an auger or around the back of the vehicle:

1. Shut off the engine.
2. Chock dump truck wheels.
3. Remove the keys so that you are the only one who can restart the equipment.
4. Close the tailgate latch.
5. Disconnect hydraulic hoses at the spreader (if equipped).
6. Drop the clean out plate.
7. Use a piece of wood or other object that will break quickly and easily if the auger moves to clear material from the spreader auger (Never use a metal object).
8. Keep loose fitting clothing and gloves away from the spreader auger as they can become entangled and be drawn into the auger.
9. NEVER, NEVER, NEVER place hands into the auger.
10. Continually reinforce the potential for serious injury when routine precautions are not taken.

29-26 Working in Cold Weather

As a PennDOT worker, you spend much of your day outside. During the winter months you face natural hazards: cold weather, snow and ice. The colder it gets, the greater the hazard. Add wind and rain and you'll need to take extra steps to stay warm.

Plowing

When the National Weather Service is telling everyone to stay home, you're called in to work to get out in it. Plowing snow can be dangerous. Slippery conditions on the roads and other drivers can make just getting to work treacherous. Before you can plow, you often must load material into your truck, make sure the auger is working and the brine tank is full. Make sure you are wearing gloves to protect your hands while doing this work outside the truck.

Other Winter Work

Sometimes, there is no snow to plow but, there is still work to be done outside. Make sure you come to work prepared for all weather conditions.

- Dress in layers
- Protect your hands: Wear insulated gloves that allow your hands to move freely and keep you warm.
- Protect your head and face: Wear a knit cap or knit mask. Make sure it fits tightly against your head so you can still wear your hard hat.

- Make sure your boots are waterproof with good tread. Wearing wool socks will keep your feet and toes toasty.
- Drink warm liquids to keep your core warm. Warm, sugary drinks and soups are best.

Know the Signs

- Know and understand the signs of hypothermia and frostbite.
- Take breaks in a warm area or vehicle.
- Tell your supervisor if you or a co-worker has symptoms of hypothermia or frostbite.

Staying warm and dry will help you to combat winter. Take extra precautions like using three points of contact when getting in or out of your vehicle and treating the stockpile area with salt and anti-skid will help prevent falls.

Section 30 - Stress

30-1 Conflict De-escalation Techniques

30-2 Dealing with Stress from Home

30-3 Managing Stress at Work

30-4 Stress at Work

30-5 Workplace Stress

30-6 Workplace Violence

30-1 Conflict De-escalation Techniques

Have you ever found yourself in a situation where it went out of control quickly? Certain occupations are more at risk of exposure to violence than others. Employees who work alone, who work in high crime areas or who work late at night are all more likely to be subjected to an act of violence.

If you are a worker who routinely deals with angry customers, such as a flagger controlling traffic in a work zone, you know how quickly things can get out of control.

Here are a couple conflict de-escalation techniques that could help in the case of an angry customer or even co-worker.

First you need to recognize verbal and non-verbal cues to be prepared for a conflict.

Recognition:

- A person clenching his/her fists or tightening and untightening their jaw.
- A sudden change in body language or tone used during a conversation.
- The person starts pacing or fidgeting or talking very fast.
- The change in the type of eye contact.
- The Rooster Stance – chest protruding and arms moving more away from the body.
- Disruptive behaviors such as yelling, bullying, actively defying or refusing to comply with rules.

De-Escalation:

So, what can you do to de-escalate the situation?

- Be calm before interacting with the person. (If you're upset, it's only going to escalate the situation).
- Take a deep breath.
- Use a low dull tone of voice and don't get defensive even if the insults are directed at you.
- Appear calm and self-assured even if you aren't.
- Maintain limited eye contact and try to be at the same eye level. If the customer is standing, you should stand also.
- Maintain a neutral facial expression.
- Place your hands in front of your body in an open and relaxed position.
- Don't shrug your shoulders.
- Don't point fingers.
- Maintain at least 12 feet between you and the customer.
- Make a personal connection. Ask them their name and then use it.
- Most importantly, if the situation feels unsafe – leave and call for help! Have a plan to protect yourself, an avenue of escape and a way to defend yourself and your co-workers.

Most importantly, if the situation feels unsafe – leave and call for help! Have a plan to protect yourself, an avenue of escape and a way to defend yourself and your co-workers.

30-2 Dealing with Stress from Home

Our home life often overlaps with our work, and stress at home can affect our work if we are not careful. While some stress is so great that the worker experiencing it should not be at work, most stress can be handled so that it does not create a hazardous situation.

Common Stressors

There are many different stressors in each of our lives at any given time. It is important to recognize types of common stressors and whether they are affecting you at work. Common home life stressors include:

- Health. Many people are dealing with health issues, whether themselves or a loved one. A serious health scare can be one of the most trying situations we deal with in life.
- Finances. Lack of money or excessive bills can weigh on a person.

- Relationships. Fighting or arguing with a loved one can create a stressful situation for an individual.

While many people experience these situations, there are many more stressors depending on the individual. We are all unique, and what causes stress for each of us varies greatly.

How Stress Affects Work

There are many negative effects when someone carries stress from home to work. Examples include:

- Lack of focus. Dealing with any of the above stressors can cause a mental load. Constantly thinking about a stressful situation takes your mind off the task at hand- potentially causing a dangerous situation.
- Strain on work relationships. Stress can cause a person to shut down or become angry with those around them. This negatively affects communication between workers and the ability to work together. This can also lead to accidents.

How to Deal with Stress

There is no one size fits all solution for dealing with stress from a situation at home. Everyone is different and how we each deal with stress will vary. Some helpful ideas that may include:

- Recognize what is truly bothering you. From there it is less difficult to attempt to find solutions. Also, recognizing the stressor can help you separate your anger towards a situation or person at home from those around you at work.
- Act to mitigate or eliminate the stressor. Not all stressors can be eliminated, but our reaction and how we face it can be improved. Have a conversation with a loved one, friend, or coworker about the issue. Many times, our minds are our own worst enemies.
- Have hobbies or other ways to relax. Everyone needs a mental break from work and any stress caused at home.

Summary

Dealing with these issues is not easy. However, it is important to recognize their existence effects on a larger scale. If your head is not in the game at work, have a discussion with a co- worker or supervisor. And remember, SEAP is also there to help if needed. Call 800-692-7459 to talk with a specialist.

30-3 Managing Stress at Work

While many of us need a certain level of stress to achieve peak performance, too much stress can take its toll increasing the risk of job burnout, anxiety, depression, insomnia, hypertension and frequent illnesses. The more an organization can do to reduce stress on the job – and the more individuals can do to better manage the stress in their lives – the more productive the workplace.

There are many contributors to employee stress. Supervisors, in particular, are faced with numerous challenges, including:

- Downsizing or reorganization, often involving low morale and an unstable work environment.
- Large workloads, high performance demands and long work hours.
- 24/7 technology – e-mail, cell phones and wireless devices make it difficult to separate work from home.
- Work/life obligations, especially in instances where there are two-career families, single-parent households and elder care responsibilities.

Organizations can help create a less stressful work environment by applying the following practices:

- Allow workers to have some control over their schedules.
- Include their input in decision making.
- Balance responsibility with the authority necessary to complete the task.
- Set reasonable limits and timelines.
- Remember to recognize a job well done.
- Provide resources to help balance work/home issues, such as on-site/ near-site child care or elder care and Employee Assistance Programs.
- Continually review policies, processes and methods of organizing and distributing work; make sure they are fair and effective.

Employees can better manage workplace stress by implementing the following:

- Eat a balanced and nutritious diet starting with breakfast, and get a good night's sleep.
- Volunteer time and services; doing something for others can help a person forget their own problems and increase self-esteem.
- Seek professional help; use employee assistance programs or participate in special therapy that can teach ways to better manage the problems that are causing stress.
- Keep moving – studies show that exercising for 30 minutes a day reduces stress.
- Learn to express your feelings – you don't have to face problems alone.
- Determine the source of the stress; if it can't be removed from your life, learn to cope by developing a systematic and rational way of thinking through the situation and taking control by figuring out options to better handle the problem.

You will never completely remove stress from your life, but identifying and managing stressors can help you maintain a positive and healthy lifestyle.

30-4 Stress at Work

Have you ever experienced stress at work? How about at home? Have you ever brought your home stress to work? Or have you taken your work stress home with you?

Stress comes in all shapes and sizes and can drag you down or pump you up. Some people really enjoy stress. They are driven by deadlines and enjoy the constant push. This kind of stress is known as motivating stress. However, the other kind of stress drags you down, causes you to worry and can affect your sleep. This is known as unnecessary stress and will be the subject of this discussion.

Unnecessary stress in the workplace can cause workers harmful physical and emotional responses that can break down communication and lead to safety concerns.

Some of the causes of workplace stress are:

- **A lack of supervision** – workers who must work on their own without knowing or understanding directions from supervisors will always be wondering if the decisions they have made are correct. This causes unnecessary stress.
- **Too much work** – Workers who have a heavy workload with infrequent breaks and long work hours have no time to rejuvenate. Being tired and feeling fatigued causes unnecessary stress.
- **Poor communication** – When supervisors do not give explicit instructions of the job, workers do not know or understand their deadlines or their expectations and this causes unnecessary stress.
- **Home stress** – Workers who are having a bad time at home with divorce, a sick child or parent or are having money problems can be distracted at work and this can cause safety concerns and unnecessary stress for other workers.

Remember, stress is what happens when you have a reaction to a situation. If the situation persists, the stress builds until it overflows. There are some early warning signs to be able to tell if you or a co-worker are suffering from unnecessary stress.

- Fatigue – tiredness from lack of sleep
- Headache
- Difficulty concentrating or following directions
- Short temper, yelling, screaming or overly expressive.
- Upset stomach
- Low Morale

How do you deal with it?

Most of the time we cannot control the things that are causing us stress, but we can control how we react to it. There are three things we can do to lessen our stress and create a more positive outlook.

1. **Attitude** – When you are faced with a situation that is causing you stress, take a step back and ask yourself what is the worst thing about this situation? Is there anything good that can come of it? Can I learn anything from this or was there a different way for me to handle this?
2. **Perspective** – Are you worrying about things that will never happen? Is worry causing your stress? Again, take a step back and look at the situation, is there anything you can do to change it? Live in the moment and don't worry about the future.

Tomorrow will present an entirely new set of circumstances.

3. **Acceptance** – Are you stressing over things that are completely out of your control? Ask yourself how important is your stressor? Are you stressed because someone yelled at you? Was the cause of the yelling as important as the person thinks it is or perhaps that person is just stressed too. Either way, you cannot control the other person, so look at the entire situation and determine if you can do anything about it or perhaps you should think of it as a learning experience.

As a Commonwealth Employee you have a resource available to you that can help you seek help to reduce stress. SEAP – the State Employees Assistance Program is a free assessment and referral service that is designed to assist Commonwealth employees and their family members in resolving a wide variety of personal problems. All employees may access resources by going to this website: www.liveandworkwell.com access code Pennsylvania or by calling 800-692-7459 any time of the day and any day of the week. The service 24/7 – 365 days of the year and it is completely confidential.

30-5 Workplace Stress

Research from the New York-based Families and Work Institute found 41 percent of workers who responded to a survey on workplace stress reported experiencing stress “often” or “very often” on the job. Task design, management styles, work roles, interpersonal relationships, career concerns and issues involving the work environment can all cause workplace stress.

Although small doses of stress are not harmful, situations in which stress is very high or constant can create serious problems, according to the National Institute of Occupational Safety and Health (NIOSH).

Far from being a mere annoyance, stress can play a larger role in more serious, chronic illnesses when it persists for long periods of time, studies suggest. Stress can increase an employee’s risk of developing cardiovascular disease and musculoskeletal disorders, particularly in the back and upper extremities. High levels of workplace stress can increase on-the-job injuries by interfering with safe work practices.

Steps Workers can Take to Manage Stress

NIOSH recommends workers try to better manage their job stress levels by taking the following actions:

- Develop a strong social support system in the workplace. A co-worker or other ally who is available to talk through problems can help put things in perspective and minimize stress.
- Take a break to avoid “burnout.” Even something as brief as a walk around the block can help clear your head and distance you from stressors, enabling you to return to the job with a fresh outlook.
- Set realistic expectations for the amount of work you can complete in the time you have available. Do not attempt to take on more than you can reasonably handle.
- Recognize you are not perfect and every minor detail in your work will not be perfect either.
- Try to remain organized and keep your work area free of clutter, which can add to stress.
- Avoid negativity and negative people and try to maintain a positive attitude about your work and your co-workers.

Dealing with these issues is not easy. However, it is important to recognize their existence effects on a larger scale. If your head is not in the game at work, have a discussion with a co- worker or supervisor. And remember, SEAP is also there to help If needed. Call 800-692-7459 to talk with a specialist.

30-6 Workplace Violence

We all deserve to work in a safe environment. Unfortunately, there are situations where violence is present in the workplace. Today, we are going to talk about what to watch for and how to respond to that type of situation.

Workplace violence can occur at or outside the workplace and can range from threats and verbal abuse to physical assaults and homicide. It is one of the leading causes of job-related deaths. Incidents may be triggered by stress, increased workloads, financial problems, firing, or disciplinary actions.

Prevent workplace violence

Some basic planning and preparation strategies can minimize or avoid violent situations in the workplace. Here are some tips to help you stay safe:

- Never underestimate the potential for violence, and take every threat seriously.
- Create a supportive environment where violence and disrespectful behavior are not tolerated.

- Resolve conflict peacefully. Recognize signs of a troubled coworker, a disgruntled employee, or a victim of domestic abuse.
- If you feel threatened by a potential domestic abuser, arrange to walk into and out of work with a group of employees.
- Encourage communication of any worrisome situations or suspicious activities.
- Seek professional help if you feel threatened in any way.
- Work with local law enforcement to protect everyone from internal and external risk.
- Design, implement, and communicate a comprehensive workplace violence prevention program.

Recognize potentially violent behavior

The following are indicators that can signal the potential risk of violent episodes:

- Sudden and persistent complaining about being treated unfairly.
- Blaming of others for personal problems.
- Sudden change in behavior, deterioration in job performance.
- Statement that he or she would like something bad to happen to a particular individual.
- Paranoid behavior.
- Sudden increased absenteeism.
- Sexually harassing, or obsessing about a coworker: sending unwanted gifts, notes, unwanted calling, stalking.
- Increased demand of supervisor's time.
- Alcohol or drug abuse.
- Talking to oneself.
- Instability in family relationships.
- Financial problems combined with not receiving a raise or promotion.
- Poor relationships with coworkers or management.
- History of violent behavior.
- Previous threats, direct or indirect.
- Presenting and talking about reading material that is violent in nature.
- Carrying a concealed weapon or flashing one around.
- Quiet seething, sullenness.
- Refusal to accept criticism about job performance.
- Sudden mood swings, depression.
- Sudden refusal to comply with rules or refusal to perform duties.
- Inability to control feelings, outbursts of rage, swearing, slamming doors, etc.

If violence occurs

If workplace violence does occur, stay calm. Notify authorities as soon as possible. Avoid any aggressive response that may provoke the attacker, such as yelling or arguing. If you can do so safely and without aggravating the situation, evacuate the area.

If a crime was committed, secure the scene for law enforcement. Those affected should seek medical and crisis assistance, and possibly professional counseling. We all want to feel safe at work. If you notice odd behavior or think the safety of your coworkers could be at risk, report it to your supervisor, manager, or a Human Resources representative.

Section 31 - Tree and Brush Cutting

- 31-1 Brush Cutting Safety
- 31-2 Chain Saw and Bucket Truck Operations
- 31-3 Chain Saw Safety
- 31-4 Protect Yourself from Pesticides and Herbicides
- 31-5 Safe Operation of Mowers
- 31-6 Safely Using a Chain Saw
- 31-7 Tree Trimming and Brushing Activities
- 31-8 Tree Trimming and Felling Activities
- 31-9 Tree Trimming and Removal
- 31-10 Why We Wear Chain Saw Chaps
- 31-11 Wood-Chipper Safety

31-1 Brush Cutting Safety

Two employees sustained serious injuries, during the week of January 7th, performing brush cutting operations. In one instance, the employee notched the front of a tree that was to be felled and found the tree to be solid. When he proceeded to make the back cut, the center of the tree was found to be rotted. The tree split below the wedge cut, causing the tree to turn to its right, and it pinned the employee to the ground briefly.

In the second instance, the employee was a groundman carrying cut branches out to the wood-chipper. Before getting another branch, the employee looked up to ensure the sawyer in the bucket was not cutting another branch. The employee proceeded to gather more branches that were on the ground. The bucket operator moved in closer to the tree, looked below and did not see anyone, and cut another branch. A branch fell 13 - 15 feet and struck the groundman on the top of his hard hat as he was carrying branches to the chipper.

Both employees' injuries are classified as disabling (resulting in lost work time). The Department is doing more brush cutting and more tree felling, you need to do this operation as safely as possible.

During brush cutting operations, all workers near the bucket truck must maintain a safe distance from active cutting. Communication lines must be established before beginning the operation and maintained until the operation is completed. One employee should be designated as the groundman. This employee's responsibility is strictly communication between the ground crew and the person in the bucket.

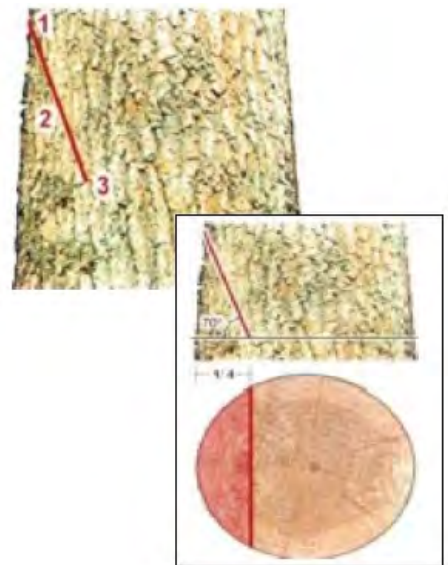
Tree felling is a very dangerous operation that requires careful planning, preparation, and following very specific procedures. You should always have two escape routes. Let's look at one aspect of this operation: the cut. Safe tree felling includes making three precise and strategic cuts. The first two cuts, the top and bottom cut, form a notch. The final cut is the back cut.

Described and illustrated below.

The Top Cut

The top cut is the first of two cuts that results in an open-faced notch. The notch is made on the side of the tree that faces the direction you want it to fall.

1. Starting Point Important - begin at any height if you allow enough room for the undercut.
2. Angle of Attack - cut downward at an angle of 70 degrees.
3. Ending Point Stop - When the cut reaches 1/4 to 1/3 of the trunk's diameter or when the cut reaches 80% of the tree's diameter at breast height.



31-2 Chain Saw and Bucket Truck Operations

On Monday, December 17, 2012, an Equipment Operator was cutting tree limbs from the bucket of a bucket truck. A limb fell, striking him on the shoulders and back. He was taken from the work scene by ambulance and sustained serious injuries.

According to OSHA, approximately 30 workers die each year from using aerial lifts. More than half of those involve bucket trucks. A tree can strike the bucket and throw the worker out. Power lines might touch the bucket or lift and electrocute the worker.

PLEASE follow the safety guidelines below when you are performing brush cutting operations with a chainsaw or bucket truck.

Chain Saws

- Always cut with a properly sharpened chain.
- Never use a chain saw with one hand or by yourself.
- Hold the saw firmly with both hands on the handles.
- Ensure safety devices, chain brake and guards are functioning prior to operation.
- Never operate a saw above your shoulders or at chest level.
- Avoid accidental contact or pinching of the bar to prevent kickback.
- Always stop the engine of the saw before setting it down.

Bucket Trucks/Aerial Lifts

- Do not operate a lift or bucket truck unless you have been properly trained and received a certification.
- Keep lift controls clean and legible.
- Always close the lift doors and chains.
- Stand on the floor of the bucket or lift platform.
- Do Not climb on or lean over guardrails.
- Do Not ride on bumpers.
- Do not ride in the bucket while the truck is in motion.
- Do not exceed the manufacturer's load capacity limits.
- Stay a minimum of 10-feet away from power lines.
- Set-up work zone traffic control as required.
- Do not modify an aerial lift.

Bucket Truck /Aerial Lift workers should wear the following Personal Protective Equipment:

- Hard Hat
- Safety Glasses
- Face Protection
- Ear/Hearing Protection
- Hand Protection

Please note – while cutting trees from a bucket truck or aerial lift, employees DO NOT need to wear chain saw chaps.

To prevent contact from falling objects, workers on the ground and in the vicinity of falling trees should maintain a safe distance from active cutting. Move the wood chipper away from the bucket truck/aerial lift, mark or flag the area where the trees are falling and have a ground guide in place to call work off while trees are being cut.

31-3 Chain Saw Safety

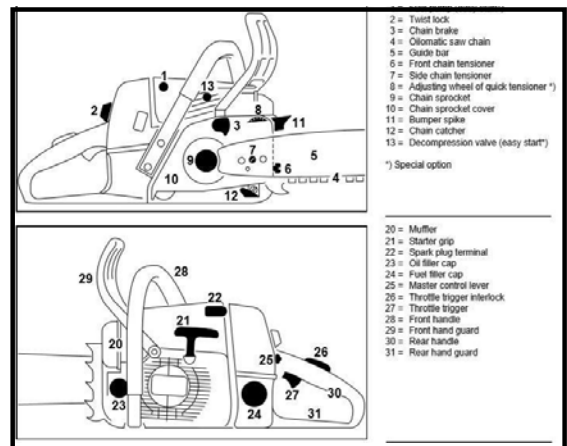
Operating a chain saw is inherently hazardous. Potential injuries can be minimized through the use of personal protective equipment (PPE) and safe operating procedures.

Before Starting a Chain Saw

- Inspect controls, chain tension, bolts and handles to ensure everything is functioning properly and are adjusted according to the manufacturer's recommendations.
- Make sure that the chain is sharp and the lubrication reservoir is full.
- Ensure that the chain brake is engaged and 10 feet away from the fueling area.
- Start the saw on the ground or in a standing position with a firm grip on the saw.

Starting a Chain Saw

- On the ground start
 1. Engage the chain brake.
 2. Place the chain saw on firm ground or other solid surface in an open area.
 3. Grip the front handle of the saw firmly.
 4. With the left hand and press down. For saws with a rear handle, level with the ground, put the toe of the right foot into the rear handle and press down.
 5. Using the right hand pull out the starter, grip slowly until a definite resistance is felt and then give it a brisk, strong pull.



- Standing start
 1. Engage the chain brake.
 2. Grip the front handle of the chain saw firmly with your left hand.
 3. Keep the arm on the front handle in a locked (straight) position.
 4. Hold the rear handle of the saw tightly between the legs just above the knees. Maintain a good balance and secure your footing.
 5. Pull the starting grip slowly with the right hand until a definite resistance is felt and then give it a brisk, strong pull.
- Drop starting a chain saw is not permitted.

Fueling a Chain Saw

- Use approved containers for transporting fuel to the saw.
- Dispense fuel at least 10 feet away from any sources of ignition i.e. welding or cutting.
- Do not smoke during fueling activities.
- Use a funnel or flexible hose when pouring fuel into the saw.
- Never attempt to fuel a running or HOT saw.

Safe Operating Procedures (not all inclusive)

- Clear away dirt, debris, small tree limbs and rocks from the saw's chain path. Look for nails, spikes or other metal in the tree before cutting.
- Shut off the saw or engage its chain brake when carrying the saw.
- Keep both hands on the saw's handles and maintain secure footing while operating the saw.
- Proper PPE must be worn when operating the saw, which includes:
 - Hard hat
 - Face protection (logger-type mesh screens are acceptable)
 - Eye protection (safety glasses or goggles)
 - Hearing protection (ear plugs or ear muffs)
 - High-visibility vest
 - Long sleeves
 - Gloves
 - Chain saw chaps
 - Above the ankle boots (metatarsal guards are available)
- No loose-fitting clothing is permitted.
- Be careful that the trunk or tree limbs will not bind against the saw.
- Watch for branches under tension, they may spring out when cut.
- To avoid kickback, do not make a cut with the tip of the chain saw.
- If equipped, keep the tip guard in place.
- No one may fell/trim a tree that is entangled or leaning on an overhead wire or guide wire.
- Maintain a minimum of 10 feet from all overhead wires.

Additional information can be found in PUB-445M Manual for Employee Safety & Health, Protocol 2.

CHAIN SAW SAFETY GEAR



31-4 Protect Yourself from Pesticides and Herbicides

Exposure to pesticides and herbicides happen most commonly to the applicator. Whether you're using pesticides at home or at work you need to know exposure can occur.

PPE

Personal protective equipment is always your first line of defense when it comes to pesticide or herbicide exposure. The type of PPE can be as simple as a pair of gloves and goggles or as complex as a full respiratory system. Always read the label for complete instructions and specific requirements. Remember, when applying pesticides or herbicides, the PPE on the label is NOT A SUGGESTION, it is a requirement for the minimum amount of PPE that must be worn.

Exposure Routes

A person can be exposed to pesticides and herbicides through three main entry routes: Dermal (exposure through skin or eyes), Respiratory (breathing the pesticide or herbicide into the lungs) or Oral (ingestion by mouth).

Dermal: Hands and forearms are the most common sites for pesticide accumulation during pesticide use. Unwashed hands can cross-contaminate other parts of the body. Eyes are extremely absorptive. Eye injuries can occur when pesticides or herbicides are splashed or sprayed on the face. Always wear gloves, long sleeves, face and eye protection when using pesticides and herbicides.

Respiratory: Inhalation of pesticides is very common. Exposure can occur during the mixing of the wet-table powders, dusts or granules. You can poison yourself while fumigating or spraying without a proper respirator. The type of respirator you use will depend on the type of pesticide you're using. It's always best check the SDS sheets to see the proper PPE that needs to be worn before use. Please remember, chemicals that are inhaled enter the bloodstream very quickly. If you have inhaled a pesticide call 9-1-1 immediately.

Oral: It seems silly to say avoid eating or drinking while spraying pesticides because you're working right? But if you eat after spraying without washing your hands or you smoke a cigarette or put in a chew while or after spraying it's the same as eating or drinking. You want to keep pesticides and herbicides away from your mouth. Thoroughly wash your hands after spraying or applying pesticides or herbicides prior to eating, drinking, smoking or chewing. This goes for chewing gum as well.

31-5 Safe Operation of Mowers

PennDOT's mission is to keep the roadways safe for the traveling public. Part of that safety mission is to keep sight distance clear at intersections and along the interstates. County Maintenance organizations do this through the mowing program.

Mower operators face serious hazards on the roadway each day. Current PUB 213 guidance indicates that a mower must have a shadow vehicle following it at all times. Motorists often do not understand the implication that they must stay behind the mower. Because of this, mower operators and shadow vehicle operators must always be on the look-out.

Other considerations for mower operators:

- Read the owner's manual for the machine you're operating and know and understand the controls.
- Disengage all attachment clutches and shift into neutral before attempting to start the motor.
- Know how to stop quickly.
- DO NOT CARRY PASSENGERS!
- Clear the work area of any objects that might be picked up and thrown.
- Disengage power to the mower and all attachments prior to leaving the mower.
- Do not stop or start suddenly when going uphill or downhill. Mow up and down the face of steep slopes.
- Reduce speed on slopes and in sharp turns to prevent tipping or loss of control. Exercise extreme caution when changing direction on slopes.
- When it is necessary to operate a mower near a ponds, creek or lake, evaluate the terrain and slope conditions. Establish a safety zone to ensure that the mower is operated at a safe distance from the hazard. Usually a distance of two mower widths are sufficient.

Safe operation of a mower is similar to the safe operation of a motor vehicle. Always drive defensively and expect the unexpected. Employees operating a mower should have completed training for the mower and be certified prior to operation.

31-6 Safely Using a Chain Saw

A chain saw's revving sound is unmistakable, and using one is "inherently hazardous.". In fact, data from the Centers for Disease Control and Prevention shows that roughly 36,000 people are treated annually in emergency rooms for chain saw-related injuries.

Before starting a chain saw, it's important to follow a few rules. First, check the controls, chain tension, and all bolts and handles to be sure that everything is in good working order according to the manufacturer's instructions.

Then, check that the chain is sharp and has enough lubrication.

When you're ready to begin, set the chainsaw on the ground-never drop-start it. Turn the tool on at least 10 feet away from a fueling area.

When fueling, a gas-powered chain saw, refrain from smoking. Use a funnel to pour fuel into the chain saw, and never fuel the tool when it is hot.

Other general safety tips include:

- Keep the path the chain saw will take clear. Remove any dirt, debris, nails, small tree limbs or pieces of metal before cutting.
- Use the saw's chain brake (or shut off the chain saw completely) when carrying it over rough or uneven terrain.
- Operate the chain saw only when you have secure footing and keep your hands on the handles.
- Wear necessary personal protective equipment, including hand, foot, leg, eye, face, head and hearing protection.
- Never wear loose clothing when operating a chain saw.
- Be aware that branches under tension may spring out quickly when cut.
- Be careful not to let tree trunks or limbs bind against the saw.
- Know the saw may kick back, and never saw with the tip. If one is equipped, keep the tip guard in place.

31-7 Tree Trimming and Brushing Activities

PennDOT does a lot of tree trimming. Maintenance crews cut hazardous trees from the right of way to keep them falling on passing motorists. Crews also cut and trim trees to daylight roadways to aid in the thawing process in the winter. Maintenance crews also cut grass and nuisance trees in collection basins along interstates and interstate lookalikes to keep them safe, clean and looking nice.

Tree trimming and felling can be some of the most dangerous activities performed by our maintenance crews if proper safety precautions are not utilized. The combination of hazard (potential source of harm) and risk (likelihood of injury) with these activities sets the stage for serious accidents if not controlled. According to OSHA, more people are killed while felling trees than during any other logging-based activity.

Protection of the Public

When you're cutting trees along the roadway and impacting passing motorists it is imperative that you set-up a proper work zone to safeguard the public from danger. If you must close a lane or a crosswalk for pedestrians, you must have flaggers in place to control both vehicular and pedestrian traffic. Make sure all crews work within the work zone set-up. If work moves past the flaggers, stop work and move the work zone.

Handling Tools

In addition to chainsaws, brushing operations also require employees to handle sharp tools such as pruners, handsaws and axes. These tools need inspected prior to every use. Foremen and employees should inspect the tools for sharpness, condition of the handle and adequate space with which to use the tool on the job. Co-workers should maintain a safe space out of the swing-zone for these types of tools. Foremen should make sure these types of tools are being properly transported and tied down or put into suitable racks or compartments.

Power Lines

Regardless of what type of tree or brush you're cutting, before you make your first cut, make sure there are no power lines entwined in the tree/vines/brush. If you see ANY type of utility line entwined in the tree, vines or brush stop cutting immediately. Call the utility company or a contractor to have this tree removed.

Working from the Ground

Employees need to be constantly alert to falling limbs, branches and trees. Crews should appoint a ground guide prior to cutting. This person will alert the crew when a branch or limb is coming their way. The ground guide will stop work on the ground while branches and limbs are being cut and then stop the sawyer while the limbs and branches are being picked up.

Only one person should be feeding the wood-chipper at a time. It's a best practice to feed the wood-chipper from the right-hand side of the machine. The wood-chipper should be at least three car lengths away from the cutting operation (farther if possible).

Tree Trimming/Brush Cutting PPE

All employees involved in a tree trimming or brush cutting operation must wear at least an ANSI class 2 vest, hard hat and above the ankle boots. Wood-chipper operators should wear a tear-away ANSI Class 2 vest and safety goggles. Sawyers must wear chain saw chaps, mesh- screen face protection, safety glasses and hearing protection.

Sawyers in a bucket truck or aerial lift are NOT required to wear chain saw chaps. All other PPE is still required.

Flaggers involved in a tree-trimming or brushing operation must wear an ANSI Class 3 Vest and ANSI Class E chaps.

31-8 Tree Trimming and Felling Activities

Tree trimming and felling can be some of the most dangerous activities performed by our maintenance crews if proper safety precautions are not utilized. The combination of hazard (potential source of harm) and risk (likelihood of injury) with these activities sets the stage for serious accidents if not controlled. According to OSHA, **more people are killed while felling trees than during any other logging-based activity.**

This December, the Department experienced three significant brush cutting incidents. One incident involved an employee having his foot fractured by a moving piece of equipment. The other two incidents involved employees being struck by falling trees. Fortunately, the injuries sustained from these accidents were not more severe than they were.

Worker proximity to moving equipment or the operation was a major contributing factor in all cases. In fact, most of our serious brush cutting accidents and injuries are the result of employees being in harm's way during the operation. In order to avoid these serious incidents, a balance between safety and productivity must be recognized. Procedures regarding employee proximity to the operations must also be implemented. Where employees are positioned during these operations is critical to preventing these types of injuries. **These accidents can be avoided!**

PLEASE follow the safety guidelines below when employees are operating a chainsaw or engaged in tree trimming/felling operations. Discuss any other incidents or near misses with the crew. Include any additional ideas on how to avoid these types of injuries.

Planning

- Conduct job planning to include hazard assessments/inspections, necessary crew members, equipment, safe work procedures, PPE, job assignments, and safety talks.
- Ensure operators have the proper training and experience in safe chain saw use and cutting techniques to safely fell and remove tree limbs.
- Clear the work area and plan an escape route before any cutting is started (45 degrees from the sides and back on either side).
- Establish and agree on a means of communication between the chainsaw operator and the rest of the crew (air horns, hand signals, etc.). Ensure employees are aware of each other before any cutting begins.
- Create and mark exclusion zones where no one but the chainsaw operator is allowed during cutting.

Felling/Trimming

- Determine the felling direction and how to deal with forward lean, back lean, and/or side lean. Make sure the felling path is clear of other trees and obstructions.
- Ensure bystanders or coworkers are at least 2 tree lengths away from anyone felling a tree or performing tree trimming activities.
- Use proper felling techniques. Never allow coworkers to push on trees to get them to fall in the desired direction. This practice puts several people in danger of severe injury.
- Determine the proper hinge size and use the proper technique when making cuts.

- Consider wind force/direction and other weather-related factors.

Hazardous Trees

- Hazardous trees can cause severe injury from the unpredictable shifting of bent, twisted, tangled, or hung up trees.
- Trees that are rotten, split, hollow, or frozen may fall or break in an unexpected direction.
- Use extreme care when a tree has not fallen completely to the ground and is lodged against another tree.
- Make sure employees are not working within the swing radius/path of the tree and cable combined when using equipment to dislodge, remove, or drag hazardous trees.
- Consider avoiding work on hazardous trees or rescheduling the work until specific procedures can be developed to safely handle the tree.

31-9 Tree Trimming and Removal

According to OSHA, more people are killed while felling trees than during any other logging-based activity. In most cases, these deaths could have been prevented by using proper safety procedures and equipment. In addition, approximately 36,000 people each year are treated in hospital emergency departments for injuries from using chain saws. During the past three years, PennDOT has experienced 187 personal injuries related to brush cutting operations. These accidents can be avoided.

To assist in preventing these types of injuries to our coworkers, PLEASE follow the safety guidelines below when you are operating a chainsaw or engaged in tree trimming/felling operations.

What can be done to avoid chainsaw accidents?

- Operate, adjust, and maintain the saw according to manufacturer's instructions.
- Wear the appropriate protective equipment, including hard hat, safety glasses, hearing protection, heavy work gloves, chain saw chaps, and safety footwear.
- Whenever possible, cut at waist level or below to maintain secure control over the chain saw. Do not cut directly overhead.
- Ensure bystanders or coworkers are a safety distance from cutting activities (at least 30 feet from anyone removing limbs or bucking a fallen tree).
- Beware of injury from the sudden release of bent trees or branches, such as spring poles (trees or branches that have gotten bent, twisted, hung up on, or caught under another object).

What can be done to avoid accidents to employees engaged in tree trimming/felling operations?

- Job planning to include hazard assessments/inspections, necessary crew members, equipment, safe work procedures, PPE, job assignments, and safety talks.
- Eliminate or minimize exposure to potential hazards found in the tree and in the surrounding area.
- Determine the felling direction and how to deal with forward lean, back lean, and/or side lean.
- Clear the work area and plan an escape route before any cutting is started (45 degrees from the sides and back on either side).
- Determine the proper hinge size and use proper felling technique in making the cuts.
- By-standers or co-workers should remain at least 2 tree lengths away from anyone felling a tree.
- Ensure operators have the proper training and experience in safe chain saw use and cutting techniques to fell and remove limbs from trees.
- Consider wind force/direction or other weather-related factors.
- Use extra caution when trees are rotten, split, hollow, or frozen because they may fall in an unexpected direction.
- Use extreme care when a tree has not fallen completely to the ground and is lodged against another tree.
- Avoid multiple cutting on the same felled tree. Be aware of others working in the area as limbs often roll/move during cutting and removal.
- Be aware of overhead utilities and avoid contact with power lines. Assume that All Power Lines Are Energized!

These safety precautions should also be shared with contractors to keep a safe work zone for everyone.

31-10 Why We Wear Chain Saw Chaps

The chain saw is one of the most efficient and productive tools when it comes to brush cutting and tree trimming/removal. It can also be one of the most dangerous. Recently, one of our employees was injured due to a chain saw accident. The moving chain made initial contact with the chaps in the thigh area. While the injury required multiple stitches or staples, the damage to the chaps indicates that the injury could have been far worse had the chaps not been worn.

OSHA states: “The employer shall provide and assure that each employee who operates a chain saw wears leg protection constructed with cut-resistant material, such as ballistic nylon. The leg protection shall cover the full length of the thigh to the top of the boot on each leg to protect against contact with a moving chain saw.” Therefore, our Safety Policy Manual (Pub 445) mandates that protective leg chaps must be worn while operating or servicing a chain saw. In addition, chain saw chaps must be carried on any vehicle that is carrying a chain saw.

How Chain Saw Chaps Work

When a moving saw chain comes in contact with the chaps, the outer shell quickly gives way and exposes the internal safety pad. Once in the safety pad, cutter teeth snag on its fibers. As the chain moves, some of the fibers are cut, while others get pulled from the weave. The fibers that are pulled from the weave slow the chain down. Many fibers get pulled into the sprocket cover on the saw motor, jamming it. All of this happens quickly, but often buys the chain saw operator just enough time to react and avoid serious injury. Even when an injury is not avoided, the chaps will typically reduce the severity of the injury and perhaps save a life.

How to Care for Chain Saw Chaps

With use, chaps get dirty. They may also get soaked with gas, oil, and sweat. This reduces their cut protective qualities. To remove mud or dirt from the outer shell, first allow the garment to dry, then brush off with a stiff bristle brush. To remove perspiration, light oil, or stains, it is important to follow the instructions listed on the manufacturer’s label.

When Chain Saw Chaps Should Be Replaced

Any time a chap is cut; it must be taken out of service and replaced. While it is easy to understand that the garment will not protect against another cut in the same location, what many chain saw users don’t realize is that even a small cut can reduce the effectiveness of the entire safety pad. This is because any cut will sever some of the protective fibers and pull others from the weave. Even if the next cut occurs in a different place on the chaps, some of the fibers will be missing and the remaining ones might be cut strands. Cut strands won’t offer the same braking effect as those that are full length, because it is easier to pull them from the weave. Even a small cut can significantly reduce a chap’s protective qualities. So, if your chaps are cut, they’ve done their job. Don’t patch them – replace them!

31-11 Wood-Chipper Safety

Wood-Chippers are one of the most dangerous machines we use a department. The chipper discs or drums that cut and chop the wood spin between 1,000 and 2,000 rotations a minute. Workers who are feeding branches and wood into the chipper need to be very careful around this equipment. If an employee trips, or leans in too far, they run the risk of becoming entangled in a branch and being pulled into the chipper. Workers also run the risk of being struck by debris being thrown by the wood-chipper if hoods aren’t properly latched or damaged.

To prevent being injured follow these tips:

- Train all workers in proper procedures around the wood-chipper and in accordance with the manufacturer’s recommendations.
- Before starting the machine, check to make sure all safeguards and controls, including the emergency shut-off are working properly.
- Be sure the hood covering the chippers knives is completely closed and latched prior to starting the machine.
- Assign at least two workers to remain in close contact when operating the wood- chipper.
- Wear close fitting clothes, gloves without cuffs, skid resistant boots and a class 2, tear- away vest.
- Feed limbs and brush into the hopper butt-end first and be sure to keep hands and feet outside of the hopper.
- Stand at the sides of the machine when feeding brush to minimize the risk of entanglement and to gain greater access to the shut-off device.
- Once the feed mechanism has grabbed the brush, walk away from the machine.

Section 32 - Vehicles, Equipment and Operations

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32-1 Bridge Weight Restrictions

Limiting size and weight on vehicles is sometimes necessary to ensure public safety and to safeguard our bridge infrastructure. Because bridges are a critical link for transportation in PA, bridge restrictions must be prudently established and followed.

Through our bridge safety inspection program, structures are routinely recommended for re-analysis of safe carrying capacity. Posted bridges are inspected annually while newer non-weight posted bridges are inspected every two years. Safety is our number one priority and if a bridge is found to be unsafe structurally, its weight posted. Bridge closure is the most severe form of weight posting. If a bridge can only carry certain loads, it's restricted.

There are three basic types of restrictions placed on vehicles crossing over or under bridges:

- Weight restrictions based upon the condition of the bridge.
- Weight restrictions based upon traffic conditions.
- Vertical clearance restrictions.

If a bridge has a weight restriction, only vehicles weighing no more than the posted weight limit can legally cross the bridge without a permit. PennDOT vehicles are not exempt from posted bridge weight restrictions. Informational weight limit signs are located within 25' of the structure and at the intersection nearest each end of the restricted bridge to allow drivers to avoid the restricted bridge.

For Department bridges, all vehicles, including snowplows and emergency vehicles, that exceed the bridge weight limit imposed are required to have a permit issued in accordance with Chapter 191 of the PA Code. County Managers with posted bridges in their area may need to adjust equipment assignments or obtain the necessary permits. The permit approval process includes a structural analysis for the bridge in question and the axle weights/spacing for the specific vehicle being permitted. An issued permit authorizing a vehicle to exceed a posted weight limit must always be carried with the vehicle.

The Bridge Inspection Analysis Engineer should be contacted if any operation requires over-posted weight vehicles to cross a structure. Dependent on overall weight, size, and axle spacing an overweight vehicle can be permitted and safely cross a structure.

Applicable law can be found in the Pennsylvania Code under Title 75 Chapter 49 – Size, Weight and Load and in Title 67 Chapter 191 – Authorization to Use Bridges Posted Due to Condition of Bridge. These laws apply to all Pennsylvania motorists; PennDOT vehicles are not exempt regardless of operations.

While we tend to think of the larger dump trucks used for winter services (DM# 17-31 – Bridge Winter Services Permits for Crossing Weight Posted Bridges), the weight of many of our crew cabs, inspection and design vans exceed the posted limits of some of our older and potentially historical structures that were not built to sustain today's design loads.

Attached is a chart of approximate vehicles weights. The average unloaded crew cab weighs an approximate 4.5 tons. These are approximate numbers, and if you are questioning if you are over the restricted limit, the best idea is to turn around and use an alternate route.

32-2 Circle of Safety

Complete the circle of safety before entering the vehicle.

Identify any potential risks for injury or damage.

Remove all debris or items around tires and/ or doors.

Carefully walk around the entire vehicle.

Look for pre-operational damage.

Ensure you inspect every time.

The “Circle of Safety” requires that prior to entering the operator’s station (cab) of any vehicle, the operator must walk completely around the vehicle. This procedure must be completed every time the operator enters a vehicle to ensure safety as well as identify pre-existing conditions (i.e. damage).

Circle of Safety – Where to look?

- Under the wheels
- In front of the vehicle
- The rear of the vehicle
- Underneath the vehicle
- Ensure the bed, boom, bucket, attenuator, etc. are down and/or properly secured before entering or exiting a building
- Vehicle contents
- Nearby potential hazards which include overhead obstructions, i.e. wires, doors, tree limbs etc.
- Observe pre-existing condition

32-3 Do Not Ride on Equipment

PennDOT Maintenance does various jobs that require us to use a stone chipper, paver or shoulder widener. These three machines specifically have had their share of mishaps resulting in multiple employee injuries and at last two fatalities since 2011. The primary cause of injury and death was riding on the equipment.

PennDOT Safety Policy States:

Employees are not permitted to ride on vehicles and equipment unless specifically designed for the purpose of transporting employees. Only those personnel required to operate a piece of equipment and actively engaged in the operation of that equipment are permitted on the equipment while it is in motion.

Note: Employees are actively engaged in the operation of equipment when that equipment is actively performing the specific function for which it was designed, such as a paver actively applying asphalt.

If active engagement in the operation of equipment is suspended briefly while the equipment is in motion to reposition, the personnel required to operate it may remain on it as long as the speed and configuration of the equipment and the positioning of the employees are the same as when the equipment was actively performing its function.

Active Instruction

During active instruction, an equipment operator instructor will be considered actively engaged in the operation of equipment only on self-propelled pavers, wideners and stone chippers. No other equipment is designed with a relatively safe place for an instructor to be on the equipment while in motion.

Transporting Employees

Only vehicles with an enclosed cab that are equipped with seating and seatbelts for each occupant are permitted to be utilized to transport employees when they are not actively engaged in the operation of equipment.

For reasonable distances, and where it is safe to do so, walking is an acceptable alternative for relocating employees.

Tramming

When equipment is being trammed (moved under its own power from one location to the next) no other personnel, except the operator will be allowed to ride on equipment.

Do not be a statistic, do not ride on equipment to take a shortcut, or because you're too tired to walk. Hitching a ride has proven to be deadly. Walk or ride in the crew cab from one location to the next. Be safe and go home to your family tonight!

32-4 Dump Truck Tailgate Safety

Recently a serious accident occurred to a PennDOT employee while assisting with lowering a truck tailgate. The tailgate fell, striking him on the head and knocking him to the ground. The employee was transported to the hospital by ambulance. All too often these types of accidents have very serious outcomes. Tailgates are heavy, bulky and awkward and have pinch points that operators need to be aware of.

To ensure EVERYONE goes home safely at the end of the day, PLEASE follow the guidelines below when you are reconfiguring a tailgate to a "prone or horizontal" position.

At times, it may be necessary to alter the standard tailgate configuration on a dump body. This activity requires the use of additional equipment to safely reconfigure the position of the tailgate.

First, find a level area on which to park and secure the truck before beginning this process. The parking brakes should be set, and the wheels chocked. The vehicle should be turned off and the keys removed from the ignition.

The use of a forklift, a front-end loader or overhead crane or boom lift is necessary to safely secure the top of the tailgate before the pins are removed. The apparatus chosen should be chained to the top of the tailgate to ensure control of the tailgate upon removal of the pins.

The chains should be adjusted to the appropriate length and securely attached BEFORE removing the pins. Ensure the bottom tailgate latches are closed, because the gate will hinge on the lower tailgate pins if the latches aren't closed. Once you're ready to remove the pins, clear all personnel from the area behind the tailgate to minimize risking an accident.

Remove the top pins with the tailgate being supported by the piece of equipment chosen to assist with the operation. Once the pins have been removed, slowly allow the tailgate to be lowered. If the chains are not properly adjusted, take the weight off the tailgate by lifting slightly with the controlling piece of equipment and readjust the chain to allow the tailgate to be moved slightly upward when in the final (chain secured) position.

To place the tailgate back in the "normal" operating position reverse the above steps also using an auxiliary piece of equipment to support and control the weight of the tailgate.



32-5 Excavating Equipment Safety

The Employee Safety Division recently learned of two fatalities involving excavators in other states.

In Oregon, the operator had leaned forward to get a better view of a mechanic working on a conveyor and when leaning back got his coat pocket stuck on the left-side control handle for the boom and activated it. This caused the boom to suddenly drop, swing and crush the mechanic.

In Tennessee, an employee was hooking up chains to lift tanks into the back of a truck when the operator's jacket got caught on the control causing the boom to pin and crush an employee to the bed of the truck.

To prevent these types of incidents from happening at PennDOT follow the below tips when operating or working around excavating equipment:

- Loose clothing should not be worn while operating machinery.

- Tools should be stored outside of the cab. During lifting operations, individuals working near the point of operation should reposition themselves away from pinch points and the potential swing pivot area of machinery.
- Know the swing radius of the arm and bucket and never allow anyone to enter the pivot swing area.
- Use a designated signal person in complex and limited sight lifts/picks.
- When working around machinery, always work facing the machinery.
- Never assume the operator can see you.
- Equipment operators should be trained on their specific piece of equipment.
- Follow the manufacturer's specifications and recommendations.
- Equipment should be maintained and repaired regularly.
- Stay a minimum of 10 feet from overhead power lines and be sure the PA One Call is notified before beginning any excavation.
- Scan the work area for workers before moving equipment.
- Maintain clean windows and mirrors for operator visibility.
- Ensure audible alarms and flashing lights are functioning properly.
- Complete the M-614.
- Place the boom in an extended and lowered position when there is a need for someone to be in close proximity.



32-6 Guiderail Operations

Now that the summer months are upon us, it's time to install, repair and replace guiderails. Along with this operation come many hazards. There were 20 reported injuries between May and October 2011 that occurred while performing guiderail operations.

- As with any operation, specific details of the day's work and possible hazards should be discussed at the start of every shift.
- Proper PPE should be worn. This includes eye protection (safety glasses or goggles), hard hat, reflective apparel, hearing protection (ear plugs or muffs) and gloves.
- Like many summer operations heat, poisonous plants and insect bites are a concern. Be sure to drink plenty of water to avoid heat related illnesses. Use appropriate skin barriers to avoid contact with poisonous plants and insects.
- Cuts, punctures and scrapes are a possibility while transporting guiderail materials. Be sure to wear gloves while handling guide rail materials.
- To prevent overexertion injuries seek assistance carrying beams and panels. Communication is essential. Time the lift, placement and release, to ensure there are no unexpected movements or dropped material.
- Many guiderails are installed near sloped ground and uneven surfaces. Be aware of surroundings when working in these areas.
- When securing guide rail, be alert to the possibility of the rail springing back and striking you or your coworkers.



32-7 Heavy Equipment Hazards

The use of heavy equipment on a jobsite is vital and necessary to the overall success of a construction or maintenance project. However, unauthorized or unwise use of heavy equipment can result in personal injury, loss of life, or severe loss to materials needed to complete the project. Keep yourself and your crew safe from hazards associated with heavy equipment by following the safety rules below.

Workers

- Always be alert to the position of the equipment around you. Only authorized personnel are to operate the equipment.
- Never ride the equipment unless it is designed to be ridden upon.
- Never walk under suspended loads.
- When performing as a spotter, be aware of all overhead power lines.
- Keep crane booms at least ten (10) feet from all power lines.
- Never take naps, breaks or lunch around heavy equipment. You never know what might happen.

Equipment Operators

- Be sure that all bi-directional equipment is either accompanied on site with a spotter or has an operational back-up alarm.
- Be aware of all overhead power lines and the possible effect on equipment operating within the close vicinity.
- Keep crane booms at least ten (10) feet from all power lines. Always lock out/tag out the equipment before it is to be lubricated, adjusted or repaired.
- Always replace gear, belts and any other guard after repair or adjustment. Always secure and lock out/tag out equipment upon its completion of use.
- Be sure to protect the glass areas of cabs with either metal grates or wood covers.

Who are the certified equipment operators?

32-8 Heavy Equipment Operation

PennDOT uses heavy equipment in many of its operations. This equipment is very effective for the job it was designed to do, but it can also be very hazardous if not used properly, in accordance with manufacturers recommendations and PennDOT safety policies and protocols. Proper work planning as well as operating equipment within its designed limits, are important basic steps for a safe operation.

Hazards of Heavy Equipment

- Struck-by hazards- Heavy equipment is responsible for many injuries and fatalities in the workplace. Employees working near and around heavy equipment need to be on the lookout for the heavy equipment as much as the equipment operator is on the lookout for the people on the ground. See and be seen! Make eye contact with the operator before walking around the equipment. Always wear your hard hat and vest.
- Property damage- When an operator backs into buildings, materials, utility poles, etc., damage occurs to not only the PennDOT equipment but also to whatever was hit. Make sure you're using a spotter anytime you're backing.
- Contact with powerlines- Equipment should stay at least 10 feet away from powerlines and poles. When line voltage increases, the distance to stay away from lines needs to increase as well. Be sure to mark power lines prior to work with a pink flag or cone so drivers and operators are aware of their locations.
- Equipment failure- Hydraulic or other systems that fail, can cause a major incident. Be sure to do a circle of safety every time you get in your vehicle. Make sure you fill out your 614, daily and note any defects. Do an air brake check, daily. If you have an equipment failure, call your supervisor or county equipment manager immediately.

Discussion points:

- What risks are we still facing onsite regarding heavy equipment operation?
- What steps can we take to create a safer work environment?

32-9 Hydraulic Brake Failure

The first thing you should do every day at the beginning of your shift is do an air brake test. This is probably one of the most common shortcuts PennDOT drivers take daily and is also one of the deadliest. Hydraulic brake failure will ruin your day and the day of the person or family you hit. So, do your air brake test every day!

Remember, brakes that are kept in good condition rarely fail, and PennDOT mechanics are very good about making sure your equipment is in good operating order. But your truck is working every day and there could have been something happen to it since the last time it went into the garage for a PM. So, again, do your air brake test every day!

There are a couple reasons for brakes to fail.

1. A loss of Hydraulic Pressure
2. A loss of Air Pressure
3. Poorly Adjusted Brakes
4. Overheated Brakes
5. Worn Braking Components

How do you make sure your brakes are working?

Do your air brake test every day! By doing your air brake test, you'll be able to determine if the air pressure is building properly and quickly enough. You'll want to look for leaks in the hydraulic system, take a look at the shoes and see if there are any cracks or unusual wear. You'll also be able to check your low air warning device is working properly when you do your air brake test.

If you experience a brake failure while you're driving there are a few things to keep in mind.

- Don't panic.
- Downshift to slow your roll.
- Pump the brakes – sometimes this will generate additional hydraulic pressure to stop the vehicle.
- Use the parking brake. The parking brake is on a separate system from the hydraulic air brake system.
- Find an escape route – While you're slowing down, look for an escape route, an open field, side street or escape ramp.
- Slow down before you go down a hill. If you're already going slow before you start down the hill, it will be easier to stop.

Remember, your best defense is to check your brakes every day, you'll be able to find defects that will affect your ability to stop and to be safe.

32-10 Inspecting Mobile Equipment

There are multiple types of mobile equipment used throughout PennDOT. Mobile equipment receives routine maintenance according to manufacturer's recommendations, but issues can arise while in the field. Performing a pre/post- operational inspection (M-614) is important to identify unexpected issues.

Why is Inspecting Important?

Reporting deficiencies in mobile equipment as quickly as possible can prevent near misses, incidents and property damage before they happen. Proactive measures such as completing a pre/post-operational inspection identifies deficiencies that can lead to quick corrective actions.

Visual Checks:

- On each piece of mobile equipment there are several visual indicators that can point to a deficiency. Items to check include:
- Obvious damage or leaks
- Tire/tread condition
- Engine oil level
- Radiator water level
- Broken or damaged lifts chains/hydraulic cylinders

Operational Checks:

- Along with performing visual checks; operational checks are necessary prior to using mobile equipment.

Operations to check include:

- Seatbelt latch
- Horn function
- Steering wheel response
- Brake operation
- Back-up alarm function
- Hydraulic controls function, if applicable



After the Inspection:

Any deficiencies identified must be reported to their Foreman immediately for follow-up actions. Defective equipment shall be tagged out of service and not used until corrective actions are taken.

All pre/post-operational inspections must be documented on the M-614 prior to and at the end of each shift.

Review PUB-177 Equipment Maintenance and Management Policies Manual, Chapter 4, pages 4-11 regarding pre/post operational inspections.

32-11 Know Your Height and Width

Every year PennDOT has drivers have a multitude of accidents that are directly related to height and width issues. They say they don't know how high their truck is or they weren't sure how far the bucket extended on the loader. The following quiz will help you remember how tall and wide most of our trucks are.

Welcome to Know your Height and Width Trivia Game with your host...The Foreman!

Loader Trivia – see if you know how tall and wide your loader is.

1. Do you know how wide the loader bucket is?
2. Do you know the total length of the loader with the bucket?
3. What is the height of a loader with the bucket up?
4. And what is the height of the loader from wheel to cab?

Answers will be revealed at the end of the game. Keep track on a piece of paper, the inside of your hat or on your hand...

Single Axle Dump Truck Trivia – See how you do with this one.

5. What is the width of a single axle dump truck from mirror to mirror?
6. What is the total length of a single axle dump truck from the plow hoist to the end of the bed (without the spreader)?
7. What is the height of a single axle dump truck with the bed down?
8. What is the height of a single axle dump truck with the bed up?

Keep track of those answers...

Crew Cab Trivia – yes foremen, it's your turn.

9. What is the height of a crew cab?
10. What is the total length of a crew cab?
11. What is the width of a crew cab?

Tandem Dump Truck Trivia without a middle tank.

12. What is the total length of tandem dump truck without a middle tank without a spreader?
13. What is the width of a tandem drum truck without a middle tank, mirror to mirror?
14. What is the height of a tandem dump truck that does not have a middle tank with the bed up?
15. What is the height of a tandem dump truck that does not have a middle tank with the bed down?

Tandem Dump Truck Trivia WITH a middle tank.

16. What is the width of a tandem dump truck with a middle tank, mirror to mirror?
17. What is the height of a tandem dump truck with a middle tank with the bed down?
18. What is the height with the bed up?
19. What is the total length of a tandem with a middle tank from plow hoist to bumper (without a spreader)?

Wait there are still some items for your consideration.

- Did you know that when you attach a front plow to ANY truck that you will add about 7 feet to the entire length?
- Did you know that changing the angle of the plow will change the width of the truck?
- Did you know that a fully extended wing plow will widen your truck by about 10 feet?

Okay – you’ve waited long enough... The Answers

1) 9-feet, 2) 25’ 6 “, 3) 16’ 8”, 4) 11’ 5”, 5) 10’ 4”, 6) 24 feet, 7) 11 feet, 8) 16’ 7”, 9) 7’ 3”, 10) 22’ 8”
11) 9’ 1”, 12) 27’ 5”, 13) 10 Feet, 14) 19’ 3”, 15) 11’ 1”, 16) 9’ 11”, 17) 10’ 8”, 18) 16’ 10”, 19) 29’ 7”

32-12 Loader and Backhoe Safety

PennDOT uses loader-backhoes in a variety of jobs, and they aren’t alone. The Loader-Backhoe is one of the most common pieces of machinery used in all construction projects. Unfortunately, because of its extended use, these machines are responsible for various incidents at any time of the year.

There are three types of accidents that are common with these machines:

Struck-by Incidents – All too often, loader operators find themselves in a situation where a roof truss, salt building wall or a crew cab was in their blind spot and they end up hitting the object.

Caught-in or between – Ground workers can find themselves caught between the loader bucket and a wall. The operator can’t see in front of the bucket and could pin someone walking on front of them. It is the responsibility of the operator but also of the ground worker to make sure the operator knows he/she is there.

Tip-Overs – If an operator has overloaded the bucket, they run the risk of tipping the machine over. This can happen when loads are too heavy, if they are operating on uneven terrain or at unsafe speeds.

Loader Operation Safety Tips

- Adjust the seat, fasten the seat belt, set the brake and place the transmission in park or neutral before starting the engine.
- Start the engine, check the horn and back-up alarm.
- If the backhoe is attached, be sure to use chains and locks to prevent it from swinging.
- Keep the working area clean and as level as possible. Use the bucket to grade the area frequently.
- Always carry the bucket low for good visibility and stability.

Backhoe Operation Safety Tips

- Keep the loader bucket on the ground while operating the shovel.
- Level the machine for stability.
- Operate the backhoe only from the seat.
- Never swing the bucket over a truck cab.
- Dump the bucket uphill if operating on a slope. If you must dump downhill, swing slowly to avoid tipping.
- If you’re using the backhoe as a hoist, do so with the weight over the back of the machine, never the side, to avoid tipping.
- Be sure the load you’re lifting is balanced and move the boom slowly to avoid swaying the load.

Can you think of any other best practices that should be followed to avoid an accident with a loader-backhoe?

32-13 Out of Service Tag Process

Faulty hand and power tools and vehicles that need to be repaired must be tagged so no one else uses the faulty device. Seems to make sense, right? Unfortunately, there are many times that a vehicle or hand or power tools go untagged and someone else will attempt to use it, even though it's broken resulting in additional damage or potential injury.

The following procedures must be used when vehicles or hand and power tools need repaired so other employees don't attempt to use them.

- County Maintenance Managers are responsible to ensure that all employees are aware of this policy and are trained in its use.
- Equipment Managers are responsible to see that the tags are being utilized properly as it related to equipment and tools under their direct control.
- Assistant County Maintenance Managers are responsible to see that the tags are utilized properly in the field to correctly identify deficiencies in equipment that is or should be dead- lined.
- Employees must report any Department hand tools, power tools or motor vehicles that need repair or servicing due to a mechanical or electrical problem, damage or a defect to their supervisor.
- Supervisors must ensure that such hand tools, power tools or motor vehicles are taken out of service by attaching an Out-of-Service Tag to it. The Out-of-Service Tag must be attached to the item where it is highly visible, such as on a handle, next to an on/off switch, or on a steering wheel. The Out -of-Service Tag must clearly indicate that the item it is attached to must not be used or operated. The person attaching the tag should legibly print on the tag his/her name, the date, and the reason the item is being taken out of operation.

All Department hand tools, power tools and motor vehicles that need repair must be tagged to protect against accidental or inadvertent operation when such operation could cause injury to personnel. Tags must be removed only by the garage personnel responsible for ensuring that the item has been fixed and can be operated safely.

After servicing and/or maintenance are completed and the item is ready for normal operations, garage personnel must remove the Out-of-Service Tag. The Equipment Manager is responsible for tracking the arrival of tagged items, their repair and their return to service.

All motor vehicles in the shop for repairs or preventative maintenance that cannot be operated must have an Out-of- Service Tag attached to the steering wheel to visibly show any operator that the vehicle is not usable until necessary repairs have been made. A dead - lined magnetic strip or window decal may also be used, but not in lieu of the tag. Dead-lined magnetic signs or window decals may be purchased through a qualified vendor. Any truck that is not tagged or labeled as described in this paragraph is presumed to be operable in its present condition without any further mechanical work necessary to make the unit roadworthy and safe for operation.

32-14 Overhead Structures and Clearances

In the past year, there have been over 10 reported incidents of damage caused by raised truck beds hitting overhead structures including traffic lights, bridges and wash bays. These types of incidents, while easy to avoid, have become very common in the Department over the past few winter seasons.

Last year, a raised truck bed struck a bridge and the impact tore the bed from the truck. Luckily, the operator was not injured, but the truck was a total loss. Significant overhead structure collisions like this can result not only in significant damage to the Department vehicle and the overhead structure but may result in injury or death for our operator and nearby motorists.

Earlier this month, it was reported that a dump truck with its bed in the raised position hit an overhead bridge while performing winter operations. The operator had raised the bed to move material back to the auger for spreading and failed to return the bed to the rest position. We were very fortunate that there was only minor damage, no injuries and no need for a lane closure.



Failure to observe the following precautions before raising a truck bed can result in serious injury and/or death, as well as significant damage to Department equipment and overhead structures:

- Before dumping back, bring the truck to a complete stop in a safe location.
- Check the area for overhead obstructions (tree limbs, wires, etc.).
- When available, use a spotter or ground guide to negotiate overhead clearances.
- Make sure the truck is on a level surface. As the bed rises, the truck's center of gravity changes, and the truck becomes less stable and more apt to tip over. Where there is a slope, position the truck so that it faces straight up or down the slope. Never raise the bed with the truck parked parallel to the slope. A dump truck is much more apt to tip over or run into overhead obstructions when spreading material than when dumping a load.
- Make sure the spreader chains are not set if the intent is to dump the load.
- Be sure to have and use an approved bed prop or enough cribbing to provide adequate support to a raised bed before working under it, even if it is only for a short time. Never rely on the truck's hydraulic system to hold the bed up while working under it.
- Do not tamper with, disable or ignore safety devices designed to warn the operator that the bed is in an elevated position. Report any malfunctioning bed warning devices immediately.
- NEVER drive the truck with the bed in the raised position.

32-15 Paving Operations

Whether you work in Maintenance or Construction, you've probably been a part of a paving operation. As you know paving a road is hard work. It's hot, has time constraints so the asphalt doesn't cool too much and it can be dangerous if all safety protocols and precautions are not followed.

Precautions for paving equipment operations and crew:

- Asphalt material ready for application can cause serious burns. It should be treated as a hazard.
- All personnel must wear required Personal Protective Equipment.
- Make sure personnel involved in work are well trained for the job assigned and familiar with your crew's routine.
- Do not move between the paving machine and backing trucks.
- Do not work or stand near the hopper of the paving machine when a materials truck is making its initial dump. Asphalt packed or settled in the truck bed from travel may suddenly break free and discharge, cresting over the hopper.
- Exercise caution when trucks are delivering asphalt, the truck driver may not be familiar or have experience with paving operations.
- Idle down any piece of equipment and securely set parking brake before leaving the operators station, even if it's only for a short time.
- Do not leave a paving machine unattended while the screed is heating.
- Paving machine operators must signal any time they intend to resume travel from a stationary position.
- Never operate a paving machine at speeds which will cause ground personnel to work carelessly.
- Watch out for co-workers; personnel concentrating on their assigned duties may be completely unaware of possible hazards.
- When the paving machine is not in operation, (performing paving duties) employees are not permitted to ride on the machine to get from one location to another.

Paving is a necessary job at PennDOT. It is your job to follow the safety protocols and procedures and go home safe every day.

32-16 Equipment Deadline Items

Driving or operating a fleet vehicle or a piece of PennDOT equipment carries with it a responsibility to check the equipment prior to each use. As an operator or driver, you must report any deficiencies and understand what items will deadline the equipment. You must inspect your equipment daily and fill out the 614 at the start of every shift. You need to look at your brakes, listen for your bed-up beeper and check out your back-up alarm. The following items need to be examined every day.

Deadline Items

Prior to starting your shift, you must do an airbrake test...every day. The first five deadline items that will ground your truck or equipment are airbrake related.

You must look for a:

1. Leak Test - with a fully charged system identify how many pounds of air is lost in what amount of time. Should be no more than 2 psi in one minute (3 psi for combination vehicles).
2. Low Pressure Alarm - You must indicate if your low air warning device is operating. If not, your truck is deadlined. Remember, the alarm needs to come on when the air pressure drops below 60 psi.
3. Make sure your emergency brake activates when your air pressure dips. Be sure to indicate at what air pressure the E-brake activated. This should happen between 20 and 40 psi.
4. What was your air PSI buildup rate? How long did it take? This should be between 85 and 100 psi in 45 seconds. If not, call the garage – your truck is deadlined.
5. How many pounds of air pressure did you have when the governor cut out?

Items six through fifteen will also stop your truck if not checked.

6. Parking Brake Resistance Test – With your parking brake on, pull forward against the brake to see how much resistance you have. You shouldn't be able to move.
7. Service Brake Pull Test – Wait for the normal pressure to build-up, release the parking brake and move the vehicle forward slowly and apply the brakes – note any pulling to one side, an unusual feel or delayed stopping action.
8. Bed/Body Up Warning Device – When you lift your bed, you should hear a very loud and very annoying warning sound coming from your dashboard. If you do not hear it or see a red flashing light when you lift the bed – your truck is deadlined. Do not drive it.
9. Seatbelts – Check your seatbelt every day. Make sure it retracts correctly when pulled hard and be sure there are no cuts in the webbing.
10. Clutch/Neutral safety switch. Be sure that when you push in the clutch, your truck goes into neutral. It should not pull at all.
11. PA State Inspection – Make sure the tag is up to date. If not – call the garage immediately.
12. Fire Extinguisher – It is a federal requirement to have a fully charged fire extinguisher in all CDL vehicles. Make sure the one in your truck is tagged and up to date.
13. Speedometer – Check your speedometer and make sure it is functioning properly.
14. Tire Pressure – Check your tires daily. Make sure there are no cuts or gashes taken out, have good tread and that the pressure is even all around the vehicle.
15. Back-up Alarm – Drop your truck into reverse and make sure you hear your back-up alarm. If this device is not functioning properly, your truck will be deadlined.

These items are found in the top box of your 614 and should be examined daily. Failure to do so could result in an accident, injury or death of you or a co-worker. Make sure your truck or equipment is ready to go to work before you go to work every day!

32-17 Permit Required Confined Space

What is a confined space? Some could consider it the back of a crew cab, when there are three of you sitting there, but that doesn't meet the definition. According to OSHA (29 CFR 1901.146) and to PennDOT's PUB 445 M (Manual on Employee Safety and Health – MESH), a confined space is:

- Large enough for a person to enter.
- Has limited ways to enter and exit.
- Is NOT designated for continuous human occupancy.

Some examples of a confined space that you might encounter are: Tanks and sewers, pits, culverts, inlets, pipes and pipelines, trenches deeper than 4-feet, manholes, utility vaults, bridge box beams and sewage digesters.

If you as an employee must enter a confined space, you must first find out if it's safe, has breathable air and has been classified as being able to be entered.

Classifying and Cataloging Confined Spaces

PennDOT has designated employees who are specially trained to evaluate and classify confined spaces. These employees determine the specific procedures that must be followed to ensure safe entry into a confined space.

There are two types of confined spaces:

- **Non-Permit Required Confined Spaces:** These are spaces that meet the basic definition of a confined space as outlined above but present no additional hazards. These spaces require no additional actions before entry.
- **Permit-Required Confined Spaces that can be Reclassified:** These spaces contain physical or mechanical hazards that must be addressed before entry.
- **Permit-Required Confined Spaces that can be Entered Using an Alternate Entry Point:** This type of space contains atmospheric hazards that would include low levels of oxygen, or high levels of a dangerous gas or gases. These hazards must be controlled prior to entry by either natural ventilation or forced air ventilation and must be continuously monitored.
- **Full Permit Required Confined Space:** These are spaces cannot be reclassified or entered using alternate procedures. These spaces have hazards that cannot be effectively controlled. **IMPORTANT:** Entering these spaces requires a confined space permit, rescue personnel on site, and specialized training and equipment. **Entry into a Full Permit-Required Confined Space is prohibited by PennDOT personnel.**

32-18 Power Broom Safety

General Safety

1. To avoid serious injury or death, do not modify equipment.
2. Never defeat a safety device to make a task easier.
3. Never deface or remove factory-installed safety labels. If a label ever becomes lost, damaged, or illegible, report this condition to a supervisor.
4. Always wear proper apparel when operating equipment; safety glasses, face shield or goggles, ear protection, dust mask, hard hat and vest.
5. Never operate equipment with covers or guards removed. Rotating parts can cause severe injury.
6. Keep hands, feet, hair, jewelry and clothing away from all moving parts.
7. Understand the operation of hydraulic and pneumatic controls.
8. Understand which adjustments are operator and which are maintenance adjustments.
9. Always shut OFF equipment when left unattended.

Required Operator Training

ALWAYS review the provided manual and any needed safety training before operation.

The Operator Must Understand:

- How to operate all controls
- The functions of all controls
- How to STOP in an Emergency
- Speed Ranges

Work Area

1. ALWAYS check overhead and side clearances carefully before operation.
2. ALWAYS be aware of traffic when operating along streets and curbs.
3. Keep area of operation clear.
4. Stay alert for hidden hazards.
5. DO NOT run engine in an enclosed area.
6. Abnormal Vibrations are a warning of trouble and striking a foreign object can damage unit. If these occur: Stop unit and engine, wait for all moving parts to stop then inspect unit and make any necessary repairs before restarting.

7. Protect eyes, face, and head from objects that may be thrown from unit.
8. Wear appropriate hearing protection.
9. Always use water to avoid excessive dust.
10. Avoid Sharp Edges. Sharp edges can cause serious injury.
11. Wear gloves to service unit when handling sharp edges.
12. ALWAYS keep hands and feet away from all moving parts during operation. Moving parts can cause serious injury or death.
13. Be aware of the surroundings. Look for blind spots from which pedestrians or vehicles may suddenly appear.
14. Locate the emergency stop on the vehicle.
15. Do not operate in crowded pedestrian areas.
16. Never clean, lubricate, or adjust equipment while it is moving, has the potential to move or when engine is running.
17. Always release pressure from pressurized systems before disassembling

Maintenance Safety

1. Do not remove guards while operating. After maintenance work, be sure all guards and other safety devices are installed and in proper working order.
2. Never clean, lubricate, or adjust equipment while it is moving, has the potential to move or when engine is running.
3. Always release pressure from pressurized systems before disassembling.
4. Allow ample time for heated components to cool before working on or working close to them. Use temperature sticks or other appropriate devices to test temperatures.
5. ALWAYS maintain unit in safe operation condition.
6. Check the conditions of the unit at the end of each day and repair any damage or defects.
7. Keep all fasteners properly torqued and in safe operating condition.
8. Before maintenance, adjustments, or service (except where specifically recommended), shut off engine, and secure from moving.

32-19 Preventing Equipment Damage Incidents

The goal of operating safely is firstly to protect life and secondary is protecting property. The construction industry can not only be hazardous to workers, but equipment damage incidents can be frequent and costly. Anytime there is equipment damage not only is there an associated cost, but there is also the chance for injury for the operators or ground personnel in the area.

Common Examples of Heavy Equipment Damage

- Broken windshields/ windows
- Damaged tires
- Damaged hoses/ lines
- Damaged tailgates
- Dings/ dents

Causes of Equipment Damage

There is a multitude of ways and reasons why heavy equipment is damaged on a construction site. While wear and tear is normal over time, many of the mentioned types of incidents above are fully preventable. Consider the best practices below to prevent damage to heavy equipment at your worksite.

Best Practices to Avoid Equipment Damage

1. Operate heavy equipment within its design limits. Pushing the equipment past its limits or operating in an unsafe manner leaves you at risk for injury or damage. If you are not trained for a specific piece of equipment or do not feel comfortable with a task stop work and talk to a supervisor.

2. Many incidents occur when completing a task outside of normal operation or during an emergency. For example, an articulating dump truck gets stuck in a dump area with his bed tilted. A dozer comes up to the bed and instead of just making sure the bed does not go over the operator decides to push on the bed without a spotter and damages the lift mechanism of the bed rendering it inoperable. The operator instead should have stopped work to notify a supervisor of the situation. Getting a second opinion on how to correct the situation or having a spotter there could have prevented the equipment damage to the bed.
3. Like the situation above, anytime there is an issue with a task or the equipment itself stop work and get the right personnel involved. Taking the few minutes to reevaluate a work task or to inspect the equipment can make the difference in an incident occurring or not.

Summary

Think about the equipment damage events you have experienced on this job or on past jobs. What was similar about each incident? What could have been done differently to prevent it? What situations may arise here that could result in damage to heavy equipment?

32-20 Preventing Equipment Damage

Our Goal: Protect Human Life and limit property damage.

Our work is dangerous. Hazards exist for us and for the equipment we work with. Those hazards can be something we have done, or they can be completely out of our control and be caused by a private motorist. Unfortunately, a lot of our equipment and fleet vehicles are damaged. Although this is costly, the more important aspect is that an injury can occur as the result of a fleet or equipment accident.

Common examples of damage:

- Broken windshields
- Damaged tires
- Damages to hoses or lines
- Damaged tailgates, trailers
- Dents and scrapes



Causes of the above equipment damages include wear and tear on the equipment (which is why the 614 should always be completed, every day), Improper backing, poor clearance and judgement and too fast for conditions. Always do a circle of safety prior to operation.

Operate the equipment within its limits. Do not operate against manufacturer's specifications. Doing so leaves you at risk for injury and you could damage the equipment. Remember, If it isn't working correctly, STOP the job and tell your foreman.

If you're unsure about how to complete a task and you're in doubt, stop and get a second opinion on how best to do the task.

Make sure you have a spotter when backing and that by-standers are not near or standing around your equipment.

Think about the equipment and the events you have experienced on this or past jobs...what was similar? What could have been done to prevent the incident?

WORK SAFELY TODAY AND EVERYDAY

32-21 Refueling Equipment

Refueling equipment in the field is necessary on most construction and maintenance projects. It is important that this operation be conducted in as safe a manner as possible. Remember that gasoline and fuel oils are manufactured to cause an explosion (hopefully in the engine). To keep yourself and your crew safe during refueling, follow the safety rules below.

Refueling Safety

- Concentrate on the task to be performed. Don't walk away or talk on your cell phone while you're refueling equipment.
- Never smoke during refueling operations.
- Don't refuel near an open flame or near a sparking situation.
- Keep a fire extinguisher within 25 feet and no closer than 6 -feet.

- If you believe there is a chance for the equipment to move, chock the wheels.
- Always shut off the engine of the vehicle being refueled.
- If necessary, allow the engine to cool. (chain saws, generators other small engines etc.).
- Be sure both fuel dispensing tank and equipment are grounded.
- Don't spill the fuel. (Spilled fuel is a safety, health and environmental hazard).
- Don't overfill the fuel tank. On hot days, allow for expansion.
- Always clean up any spills.

Remember: If there is a refueling area, be sure it is always clearly marked and keep the area free of garbage and debris. Whether you are filling a bulldozer, or a chain saw, it's better to do it properly than to risk an explosion that could ruin or end your life and the life of those all around you.

32-22 Riding on Equipment

On March 11, 2002, a safety policy was issued stating, "Employees are not permitted to ride on vehicles and equipment unless designed for this purpose." That policy was reissued in 2010 soon after an employee fatality. Two equipment operators were standing on the edge of a widening box that was secured to the blade of a grader, while the grader was moving between locations where material was to be placed. The operator that was positioned closest to the grader was attempting to remove some material from the bottom of his work shoe by kicking it against the box, when the loader tire caught his leg and pulled him under it.

In the past year, we have had two accidents involving multiple employees riding on equipment that resulted in equipment damage and multiple injuries. Both accidents involved a widener with three to four employees on it. The widener was pulling out from the staging area and moving to the starting point of a widening operation where it would begin to put material down on the road. In both cases, the operator temporarily lost control of the widener and one employee jumped off the widener. In the case pictured here, the widener came to rest against a tree and several employees were injured.

PennDOT has highway construction equipment that appears to have ample space to accommodate passengers, but it is not designed for that purpose. Examples include the self-propelled widener, paver, and stone chip spreader. This equipment may involve having an operator or two standing on the equipment to operate it, but those operators should only be on this equipment when they are actively engaged in the operation of that equipment. Any other time that the equipment is in motion, only the operator sitting in the seat and at the controls should be on that machine.

Staff from the Fleet Management, Maintenance Performance, and the Employee Safety Divisions came together to address this issue. PennDOT policy will be reworded as follows: Only those personnel required to operate a piece of equipment and actively engaged in the operation of that equipment are permitted on that equipment while it is in motion. When any piece of equipment is being trammed (moved under its own power from one location to another), no other personnel except the operator shall ride on the equipment.

Only vehicles with an enclosed cab that are equipped with seating and a seatbelt for each occupant is permitted to be utilized to transport employees when they are not actively engaged in the operation of equipment. For reasonable distances, walking is also an acceptable alternative.

32-23 Roller Safety

Workers who operate or work around roller/compactors are at risk of injury from a machine rollover or being struck by the machine or its components. Injuries and deaths can be prevented through rollover protective structures (ROPS) and seatbelts on roller/compactors. Additionally, training, establishing and adhering to safety plans, safe work practices, and using appropriate personal protective equipment will increase the safety of all operators.

Site Set-Up

- Develop site-specific safety plans for all aspects and stages of the job.
- Minimize the presence of workers on foot near machinery.
- Provide all workers on-site with training in site-specific safety procedures and in hazards they may encounter at the site.
- Continually evaluate safety plans to address changing conditions at the worksite.
- Provide appropriate personal protective equipment (PPE) such as high visibility reflective vests and hardhats and ensure that workers use and maintain them.

- Use machinery equipped with ROPS and seat- belts and ensure their use. Replace seatbelts if they are damaged, worn, or too small.
- Ensure that machines are not operated on grades steeper than those specified by the manufacturer.
- Replace worn or damaged warning labels on machinery.
- Ensure that operators' manuals are reviewed by the operator.
- Make sure that all the manufacturers' safety features are operational.
- Ensure that all site workers comply with all applicable requirements of machine warning labels and operator manuals.

Equipment Operator

- Take training in safety procedures at the site and in the proper use of the equipment.
- Check work areas for workers on foot in the machine's path before moving the machine or changing the direction of travel.
- Use spotters or barriers where necessary. Be aware of equipment blind spots.
- Be aware of the hazards associated with operating machinery on non-level surfaces. A competent person should continuously evaluate grades on which machinery is being operated to prevent rollover.
- Do not operate machinery without the ROPS and seatbelts supplied by the manufacturer.
- Do not remove the ROPS or seatbelts.
- Wear the seat belt and do not jump from the equipment in the event of a rollover.
- Keep knees and elbows close to the body, hold on firmly, and lean away from the impact to avoid being crushed by the ROPS.
- Conduct daily or pre-shift visual and operational checks on all equipment systems and operating controls before working the machine.
- Make sure that all the manufacturers' safety features are operational.
- Comply with all warning labels.

Other Site Workers

- Take training to recognize and avoid unsafe conditions and follow required safe work practices that apply to the work environment.
- Be aware of the hazards and blind spots associated with working near moving equipment.
- Before each work shift begins, review and confirm communications signals to be used between equipment operators and workers on foot.
- Do not approach machinery without first signaling the operator to shut down the equipment and receiving acknowledgment from the operator.
- Do not ride as a passenger on rollers or similar mobile equipment.
- Wear PPE that is provided, such as high visibility reflective vests and hard hats, to increase visibility.

32-24 Dump Truck Operation

PennDOT uses a lot of dump trucks. Single axle, Tandems and Triaxles all make up our fleet. A fully loaded dump truck, regardless of the size is a heavy piece of machinery, and there are a lot of associated hazards that accompany these trucks. As an operator of a dump truck, it is important not to let your guard down and always keep an eye on your task as well as anyone working near you on the ground.

Injuries and Incidents Associated with Dump Truck Operation

- Back over incidents of people or other equipment. OSHA states that dump trucks followed by semi-trucks and ordinary pickups are responsible for most back over incidents in the past 10 years on the job.
- Tip over of entire truck or the bed of an articulating dump truck. Tip overs can cause serious injury to both the operator and ground personnel.
- Property damage incidents. Due to the sizes of these trucks and lack of room of some job sites, there is a lot of money lost due to property damage incidents.

- Contact with electrical lines.
- Slips, trips, and falls. Climbing on and off the equipment multiple times a day puts an operator at risk for falling while getting in and out of the cab.

Best Practices When Operating and Working Around Dump Trucks

- Avoid backing up whenever possible. Many incidents result from unnecessary backing up. Set up work areas so that operators can pull through instead of backing.
- Use a spotter when it is necessary and safe to do so. Spotters need to stay out of blind spots as well as away from the truck in case of tip over.
- Always dump on flat even ground. After the load is dumped pull up just enough to clear the load and put the bed down before driving off. Leaving the bed up while driving can result in contact with electrical lines as well as tip over.
- Always inspect your truck thoroughly before the start of the shift.
- Always wear your seatbelt.
- Complete inspections of work areas to look for any hazards that can create conditions unsafe conditions for operation.
- Complete a walk around of your truck any time before you get back into the cab. Check around the truck to ensure no person, vehicles, or materials are in your blind spots.

Human Performance Considerations

When you operate a dump truck every day, or for that matter when you do anything over and over, every person has a tendency to become very comfortable with that task. It is important not to fall into a complacency trap. Maintain focus while operating a dump truck. Stop work if you do not feel trained or comfortable with the task at hand. Take breaks when needed and get out to stretch if fatigue or boredom sets in. The consequences of not paying attention behind the wheel are serious and your life depends on it.

32-25 Safe Excavations

Excavations are common on construction sites across the United States and can be very hazardous if employees do not make every effort to keep safety in mind while working. Excavations can be made safe by following basic safety guidelines.

Some major hazards of excavations:

- Cave in and collapses
- Water accumulation (drowning)
- Falls into the excavation
- Utility strikes
- Poisonous gases collecting in an excavation

Ways to Mitigate Excavation Hazards

Follow OSHA's guidelines for protective systems to protect employees entering the excavation. Often the soil being excavated is referred to Type C which is the most hazardous for employees to enter.

- Excavations or trenches over 5-feet should be sloped back using a ratio of 1½: 1. Trench boxes and shoring are other options to protect employees entering the excavation.
- Prohibit equipment and other employees from working above anyone working in the trench or excavation.
- Keep water out of the excavation. Use pumps to remove water from the excavation and do not allow employees to be in any excavation or trench that has water accumulating in it. Water affects the integrity of the excavation.
- Never leave the site open when work is not being performed in the area. Use barricades, fencing, and signage to protect both employees and anyone passing by from falling into the excavation or driving into it.
- Always Call before you dig. Use the 811 – PA ONE CALL service to ensure there are no utilities in the proposed excavation areas or have utilities properly marked prior to digging.
- When there is a chance for a hazardous atmosphere in and excavation ensure gas, testing is done including any low points where gases can collect.

32-26 Skid Steer Safety

A skid steer is a very versatile piece of machinery. It pulls it's weight on a construction site and can be used for many different purposes, but with this versatility comes a great many safety challenges that PennDOT employees need to be aware of prior to operating a skid steer.

Common Hazards

- **Struck-by Hazards** – Skid steers have a lot of blind spots, are used in tight places within the work zone and do a lot of backing. All of these put together cause struck-by hazards to be the number one cause of injury with a skid steer.
- **Crushed-by Hazards** – Workers who are on the ground around this machine run the risk of being pinned by the bucket. Operators of this machine run the risk of being caught between the lift arm and the frame. It is important for both operators and ground workers to have a heightened awareness around this machine.
- **Tip Overs** – Tip overs or roll overs are the leading cause of fatalities while using this machine according to NIOSH. It is important that your machine's ROPS is operational and that you use seat belts when provided.
- **Pinch Points** – Pinch points are very common and can lead to various injuries. Operators should always wear gloves when operating this machine.

Best Practices for Operating a Skid Steer

- Always follow manufacturers guidelines for operation.
- Never operate a skid steer without proper training.
- Do not work under or allow anyone else to work under the raised arm of a skid steer.
- Always put the bucket on the ground before exiting a skid steer.
- Stop work anytime you lose sight of a co-worker working next to a skid steer.
- Never overload a skid steer – this will cause roll overs.
- Always wear your seatbelt or engage the restraint bar if it is equipped with one.
- Stay seated when operating a skid steer.
- Never allow any riders or lift anyone with the attachment.
- Inspect safety equipment prior to use, and always do a 614.

32-27 Stay Safe Around Heavy Equipment

Heavy equipment is designed to handle large volumes of heavy loads, such as dirt, rocks, anti-skid etc. At PennDOT we use heavy equipment throughout the year, whether we're digging a trench or benching salt, we use these powerful pieces of machinery to make our jobs easier. But these machines can be dangerous to use and be around if they are not operated correctly. It is important to remember the proper methods to operate them as well as to transport them from one place to another during the workday.

- All crew members must remain alert when equipment is moving.
- PPE is required for all crew members...hard hats and vests – see and be seen!
- Stay clear from the movement of equipment and stay out of the blind spots. Make eye contact with the operator.
- Do not ride on equipment that is not meant to be ridden upon. You must have a seat and a seat belt. If you are not the operator, you are not permitted to "catch a ride" to the next location.
- If you must walk along with the equipment, make sure the driver or operator knows you're there. Make eye contact with the driver or operator and walk in an area where the driver or operator can see you at all times.

If equipment must be transported:

- Inspect all equipment each time you move it.
- Provide adequate protection to the public and your crew.
- Wear appropriate PPE – footwear - above the ankle, leather boots, hard hat and vest.
- Know your center of gravity for the item being loaded.
- GO SLOW.

- Check the trailer and make sure it is heavy and large enough to support the equipment being moved.
- Use proper tie down techniques as trained. NO SHORTCUTS.

32-28 Top Ten Safe Operating Practices for Grader Operations

1. Personal Protective Equipment

- Hardhat and high-visibility clothing to be worn when not inside the cab.
- Safety boots in good condition, properly laced, must be worn always. Worn-out soles and heels could lead to slips and falls.
- Eye protection will be worn where there is danger of falling or flying debris from equipment or loads, especially in windy conditions.
- Hand protection will be worn when handling cable or any other material where there is danger of cuts or puncture injury.
- Hearing protection will be worn when exposed to noise levels exceeding 85dBA.

2. Mounting and dismounting

- Three-points of contact will be used to mount and dismount equipment.

3. Inspection and repairs

- Graders will be inspected prior to use to ensure good mechanical condition.
- When working under or around graders, for inspections or repairs, the grader must be locked and tagged out, and immobilized and secured against inadvertent movement.

4. Housekeeping

- Cabs, steps, windows, windshields, and mirrors must always be kept clean. All debris should be removed.

5. Parking

- The grader must be parked on level ground, clear of hazards, to allow ease of access.

6. Traveling

- Proper gear selection must be used to maintain control. Drive according to road or terrain conditions.
- Be aware of protruding objects.
- Make sure blade is properly positioned; slow down when crossing railroad tracks; be on lookout for hazards such as bridge joints etc.
- Plan ahead, to minimize the need for backing.
- When working on a roadway, always communicate your location.

7. Danger zone

- Danger zone is defined as the area around operating machines or working personnel, in which there is potential for being struck by moving equipment or objects. The danger zone may vary according to the machine or work being performed. Operators must make sure that all persons, vehicles and equipment are clear of the danger zone before the vehicle or its components are moved.

8. Lockout

- Lockout procedures must be followed during mechanical service, repairs or inspection for the protection of employees and equipment.
- Refer to company and manufacturer's procedures on lockout.
- Communications while assisting in mechanical repairs – When operators are assisting mechanics to repair machines, clear communications must be established prior to starting the tasks. The operator and the mechanic must each know who will be responsible for:
 - Starting or moving a machine.
 - Ensuring that anyone involved is in a clear and safe position.
 - Directing the movement of the machine.
 - Ensuring that it is safe to resume working and that all guards are in place.

- d) The operator must have a clear understanding of what is to be done and follow the specific lockout instructions and instructions given by the mechanic responsible for performing the job.

9. Fueling

- a) Shut off the engine while fueling. No smoking. Be aware of slip and trip hazards.
- b) Beware of spills and splash-back. Return hose to its proper storage position when fueling is completed.

10. Hazardous materials

- a) Read WHMIS label. If there is no label, contact supervisor. Refer to MSDS if further information is needed.
- b) Use protective equipment and follow safe handling instructions as outlined on WHMIS label.

32-29 Trench Excavations

Data from OSHA indicates two workers a month, nationwide, are killed in trench collapses. Being prepared and planning before you dig is the best way of keeping coworkers and yourself safe when performing excavation and trenching activities.

Safety Tips

- Classify the soil type before digging to determine what means of protection is needed.
- Locate and de-energize utility lines before digging. Manually dig when working within 3' of utilities. Ensure there is an active One-Call ticket for the area being excavated.
- Ensure excavations 4' or greater in depth with workers inside have a safe means of access and egress, such as ladders, stairways or ramps at least every 25'.
- Keep excavated soil (spoil piles) at least 2' from the edge of the excavation.
- Immediately exit an excavation when there are signs of water accumulation, tension cracks, bulging and toppling.
- Barricade the area when not in use to prevent unauthorized access.
- When operating heavy machinery, utilize a spotter when views are obstructed or working under overhead utilities.
- Never work under suspended loads.

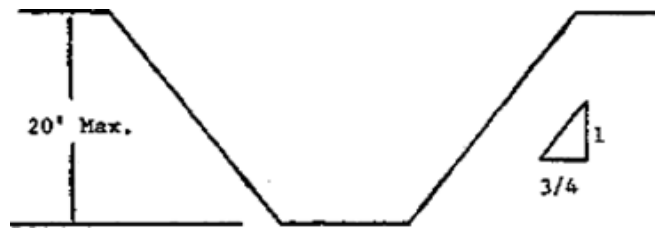
Means of Protection

- Protective measures are required when an excavation reaches or exceeds 5' in depth. At 20' of depth a registered professional engineer must design the protective measures system. Protective Measures include sloping, benching, shoring and shielding.
- Sloping means excavating to form sides of a trench that are inclined away from the excavation to prevent cave-ins (See back for details).
- Soil slope (w:h): Type A Soil – ¾:1 Type B Soil – 1:1 Type C Soil – 1½: 1
- Benching involves excavating the sides of a trench to form one or a series of horizontal levels or steps.
- Shoring is a structure that supports the sides of an excavation to prevent a cave-in; such as aluminum hydraulic shoring or timber shoring.
- Shielding is the use of a trench box which protects the worker in the event of a cave-in; trench boxes cannot sit more than 2' from the bottom of the trench.

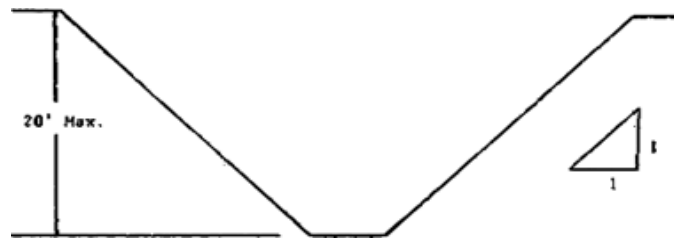
Soil Classifications

Before performing an excavation, a competent person must identify the type of soil being disturbed to determine the appropriate protective measures. Soil is classified by its cohesiveness, or how strong it bonds together. To get a general idea of the soil type, press your thumb against the soil, if the soil is difficult to penetrate it's probably Type A and if easily penetrable the soil is most likely Type C.

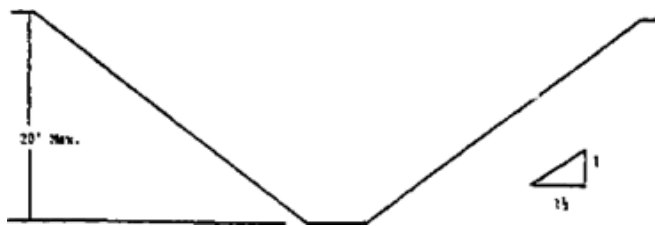
Type A soils are the most cohesive of the three classes and are usually made up of clay or silty clay (Note: Soil that has been previously disturbed, subject to vibration or shows signs of fissuring, is never considered Type A).



Type B soils are cohesive soils that hold together tighter than sand, but less than clay; type B soils generally consist of angular gravel or silt.



Type C soils have minimal cohesive strength, such as sand and gravel or wet soils.



32-30 Trench Safety

On Thursday, April 12, 2012, a potentially fatal accident occurred on a PennDOT operation, putting an employee in grave danger. The crew was digging for a pipe using a track hoe. The employee jumped into the excavated area, the deepest point was 12 feet, to investigate possible damage to the pipe. Almost immediately after jumping in, one side of the excavated area collapsed and buried the employee over his head. Crew members reacted quickly, and the employee was able to be pulled out. He did not suffer life threatening injuries but was hospitalized for several months from his injuries and secondary infections.

To ensure EVERYONE goes home safely at the end of the day, PLEASE follow the guidelines below when you are involved with a trenching operation.

According to OSHA, 2 workers are killed every month, nationwide in trench collapses.

What can be done to avoid trench collapses?

- Keep heavy equipment away from trench edges.
- Inspect trenches at the start of each shift.
- Keep excavated soil and other materials at least 2 feet from trench edges.
- Do not work under suspended or raised loads and materials.
- Inspect trenches after any occurrence that could have changed conditions in the trench.

When necessary, use one of the below protective systems:

- o Benching - a method of protecting workers from cave-ins by excavating sides of an excavation to form one or a series of horizontal levels or steps, usually with vertical or near-vertical surfaces between levels.
- o Sloping – involves cutting back at the trench wall at an angle inclined away from the excavation.
- o Shoring – requires installing aluminum hydraulic or other types of supports to prevent soil movement and cave-ins.
- o Shielding – protects workers by using trench boxes or other types of supports to prevent soil cave-ins.

Safe access and egress are required to be within 25 feet of any employees working in an excavation that is 4 feet or greater in depth. These include ladders, steps, ramps, or other safe means.

32-31 Trenches and Excavations

On July 7, 2015, a 37-year old worker was killed on a contracted bridge construction project in Columbia County when the side of an excavation collapsed and pinned him against a bridge abutment. In 2012, PennDOT also had an employee buried in an excavation. We are so grateful that he survived, and we continue to hope that he will be the last. Unfortunately, the statistics are not in our favor. Labor statistics indicate that nationwide, two workers are killed every month in trench collapses.

This time of year, Department forces engage heavily in bridge repair and box culvert/pipe replacement, which means we will be excavating earth with the potential of creating cave-in hazards across the Commonwealth. Anytime we have someone working in an excavation we need to ensure that they are protected against this and other hazards in accordance with OSHA 1926, Subpart P. We cannot possibly cover all the requirements and considerations of this regulation in one safety talk, but we will cover some of the basics.

If employees will be working in excavations that are 4 feet or more in depth, we must:

- Protect employees from excavated or other materials or equipment that could pose a hazard by falling or rolling into excavations by placing and keeping such materials or equipment at least 2 feet from the edges of the excavation.
- Prohibit employees from positioning themselves below suspended or raised loads and materials.
- Inspect and monitor the excavation for any signs of potential cave-in and of an atmospheric hazard that would make the air in the excavation unsafe to breathe.
- Prevent surface water from entering the excavation and remove any accumulated water before entering the excavation, as it may undermine the sides and make it more difficult to get out of the excavation.
- Provide safe access and egress to all excavations, including ladders, steps, ramps, or other safe means of exit within 25 feet of all employees working in the excavation.

If employees will be working in excavations that are more than 5 feet in depth, we must use one of the following systems to protect employees from the cave-in hazard.

- **Sloping** involves cutting the excavation walls back and inclined away from the excavation, typically with a minimum slope of 45 degrees from the bottom to the top edge of the excavation.
- **Benching** is like sloping with the same minimum slope requirements but involves one or a series of horizontal levels or steps, usually with vertical or near-vertical surfaces between levels.
- **Shoring** involves the installation of aluminum hydraulic or other supports meeting OSHA requirements that apply pressure to the excavation walls to prevent soil movement and cave-ins.
- **Shielding** involves the installation of a structure that is engineered to provide a barrier between the worker and the walls of the excavation and to withstand the forces of a cave-in (e.g. trench box).

32-32 Truck Bed Safety

In the past year, there have been many reported incidents of damage caused by raised truck beds hitting overhead bridges and utility lines. These types of incidents, while easy to avoid, cause severe damage, are extremely costly and can cause serious injury to you, and to any motorist sharing the road with you at the time of the incident.

Earlier this month, a dump truck with its bed in the raised position hit an overhead bridge after performing litter pickup operations. After loading debris onto the bed of the truck, the operator preceded to move the vehicle forgetting that the bed was raised. He drove under a bridge overpass and the lifted bed caught the underside of the bridge. The collision caused the bed to become completely disengaged from the truck. The operator received minor injuries.

Failure to observe the following precautions before raising a truck bed can result in serious injury and/or death, as well as significant damage to Department equipment and overhead structures:

- Before dumping back, bring the truck to a complete stop in a safe location.
- Check the area for overhead obstructions (tree limbs, wires, etc.).
- When available, use a spotter or ground guide to negotiate overhead clearances.

- Make sure the truck is on a level surface. As the bed rises, the truck's center of gravity goes up, and the truck becomes less stable and more apt to tip over. Where there is a slope, position the truck so that it faces straight up or down the slope. Never raise the bed with the truck parked parallel to the slope. A dump truck is much more apt to tip over or run into overhead obstructions when spreading material than when dumping a load.
- Make sure the spreader chains are not set if the intent is to dump the load.
- Be sure to have and use an approved bed prop or enough cribbing to provide adequate support to a raised bed before working under it, even if it is only for a short time. Never rely on the truck's hydraulic system to hold the bed up while working under it.
- Do not tamper with, disable or ignore safety devices designed to warn the operator that the bed is in an elevated position. Report any malfunctioning bed warning devices immediately.

NEVER drive the truck with the bed in the raised position.

32-33 Vehicle and Equipment Rollovers

The most significant environmental factor that contributes to the majority of vehicle/equipment rollovers is working near an edge of a road or embankment. Significant rain allows the soil near the edge of the road or embankment to become soft, resulting in "soft shoulder", allowing the shoulder to give way.

To prevent rollover incidents, operators must first understand what leads to rollovers and how to prevent them.

Causes of Rollovers

There are a few causes that lead to rollovers:

- Environmental factors
 - o Soft shoulders
 - o Steep slopes
 - o Roadway curves
- Human factors
 - o Excessive speed
 - o Lack of training
 - o Overcompensating
 - o Complacency/distractions
- Vehicle/Equipment factors
 - o Mechanical failures
 - o High center of gravity

When a Rollover is Occurring:

- Do not try to escape the vehicle.
- Immediately remove your feet from the pedals to prevent ankle breakage.
- Release the steering wheel.
- Cross your arms against your body deep into the seat.
- Make sure not to lean forward during the rollover.

Once the Vehicle/Equipment Rollover Stops:

- Brace your feet against the floor to stabilize your body in stillness and assess the damage to yourself and any passengers.
- Have everyone involved check for broken glass, blood or severe injury that may not be immediately noticed in the event of a traumatic incident.
- Take a few deep breaths to recalibrate your nervous system.
- If anyone is injured, do not move them.
- Call 911 and seek help immediately.

Vehicle/equipment that have a Rollover Protection System (ROPS) such as an enclosed cab and a seat belt are less likely to suffer from catastrophic injuries. In the last nine (9) years, PennDOT has had 53 rollovers with construction equipment.

Additional information can be found at the National Highway Traffic Safety Administration and PUB-445M Manual for Employee Safety & Health.

32-34 Vehicle Operations at the Work Site

Most work sites don't have adequate space to move the vehicles around. Therefore, it is important that all the space we have is conserved and safely used to its maximum. We can and should expect congestion and that increases the likelihood of accidents.

How to avoid fleet and equipment accidents:

- Keep your equipment inspected and in good running condition.
- Always do a circle of safety after your 614.
- Tag oversize loads so everyone is aware.
- Identify and tag overhead lines with pink flags or cones. Watch out for them and each other.
- No employee can ride on equipment not designed for that purpose. NO EXCEPTIONS!
- YIELD the right of way...who has the safety access first?
- Avoid backing up. If you must back up, you must use a spotter.

Check the work area prior to the start of work and inform your fellow crew members of areas of concern.

WORK TOGETHER, WATCH OUT FOR EACH OTHER AND STAY SAFE!



32-35 Working Around Heavy Equipment

75 percent of construction related struck-by and run-over fatalities involve heavy equipment. The use of such equipment is essential on nearly every PennDOT project.

The following equipment is commonly used on PennDOT job sites.

- Dump Trucks
- Milling Machines
- Woodchippers
- Aerial Lifts
- Loaders
- Excavators
- Forklifts

- Backhoes
- Skid Steers
- Graders
- Pavers
- Hot Boxes
- Chipping Machines
- Wideners
- Broom
- Private Motorist

Working in the presence of heavy equipment applies to all PennDOT employees, contractors and visitors including pedestrians and bicyclists traveling on the road.

Safety Tips

Safely working around any heavy equipment requires the shares responsibility of both the equipment operators and their co-workers. As with all PennDOT jobs, each project must have a prepares and well-articulated safety plan. This plan can be a written document or a shared dialog with all PennDOT employees and subcontractors at the beginning of each shift.

With each safety plan make sure consideration is given to issues related to working around heavy equipment:

- Inspection of the equipment prior to operation to be sure it is working properly.
- Have a defined route and clear visual path for the operator when moving equipment.
- Make sure workers are always using three points of contact – never jump off heavy equipment.
- Know and understand the danger zone around heavy equipment. (The area where personal injury may happen during operations).
- Use a spotter when heavy equipment is in motion.
- Agree on hand-signals by all spotters or use two-way radios to make safe movements in the work zone.
- Always walk on the driver's side of the vehicle because the driver may not see you in the blind spot that exists on the passenger side of the vehicle.
- Workers need to keep a safe distance outside the danger zone while heavy equipment is in operation.
- Be aware of the swing radius on certain equipment and, if possible, restrict access to workers and other drivers.
- Always wear high visibility Personal Protective Equipment (PPE).
- Never walk under a suspended or overhead load.
- Always stay alert.

Many workers have been hurt because they thought they could be seen by the equipment operator, when they were not seen. Always make eye contact with the operator before walking into the path of heavy equipment. Good communication will keep everyone from getting hurt.

32-36 Working in a Confined Space

Working in a confined space is a unique and serious hazard. By definition, a confined space is one that is large enough for a person to enter, has limited or restricted entry or exit and which is not primarily designed for human occupancy.

Primary Hazards

- Oxygen deficiency.
- Exposure to toxic substances. Combustible or Explosive.

Safety Procedures

Before entering:

- Test for oxygen deficiency.
- Sample for combustible gases. (Most combustible gas meters will not work in oxygen deficient atmospheres).

- Continually monitor for toxic substances (i.e., gases) as work progresses.

Making a Confined Space Workable

- If space can be vented, continually flush out the space with fresh air either by natural ventilation or forced air.
- Be aware that spark producing equipment should never be used to flush out confined spaces.
- If the space is unable to be vented – DO NOT ENTER!

Basic Rescue Procedures

- Never rush to the aid of a fellow employee in a confined space. If you go after your co-worker without knowing the toxicity of the air, you could both die. Instead call 9-1-1 Immediately if a co-worker is unresponsive.
- Always be sure that someone is watching work in a confined space outside of the space.
- All workers in a confined space must work with a lifeline attached outside of the space.
- All rescuers must be competent in the use of rescue equipment and self-contained breathing units.

32-37 Working Safely in Trenches

OSHA defines a trench as any man-made cut, cavity or depression in the earth's surface formed by earth removal. PennDOT creates many trenches through pipe replacement, bridge and culvert repair and replacement and general road maintenance.

According to OSHA, two workers are killed every month, nationwide in trench collapses. For this reason, workers need to be protected from cave-in's as part of OSHA 1926 Subpart P.

Specific safety measures must be taken and implemented prior to the dig and while the dig is in process to keep all workers safe.

Call Before you Dig

Before you excavate, call PA One Call (811) to investigate the area to determine if there are any underground utilities that could be harmed during excavation.

Keep All Employees Safe

- Employees must not work in excavations where water is accumulating, unless adequate precautions have been taken to protect workers from the water. These precautions can include support shielding systems to prevent cave-ins or water removal.
- If you're digging between structures, support systems like shoring, bracing or underpinning must be used to ensure the stability of the structures and protect employees.
- Do not undermine structures or roadways unless a support system is in place to protect employees from collapse of the structure or roadway.
- Employees must never be placed underneath loads handled by digging or lifting equipment and must stand away from any vehicle being loaded or unloaded to avoid being struck by spillage or falling materials.
- Place and keep materials at least 2-feet away from edges of excavations. Adequate protection must be provided to protect employees from anything that could pose a hazard by falling or rolling into the excavation.

Soil is classified as either A, B or C type. A type soil is the most stable, C type soil is the least stable. C type soil has been disturbed and is the type that PennDOT encounters the most often. One cubic yard of soil can weigh as much as 3,000 pounds, that's the same weight as a car.

If you have a trench that is 4-feet or more in depth you must:

- Provide a safe way for employees to get out within 25 feet of each employee in the trench. You can use a stairway, a ladder or a ramp.
- Continuously monitor for signs of potential cave-in. If signs are present (dirt falling, water moving creating movement of dirt) then a protective system is required.
- Atmospheric testing is required when a hazardous atmosphere is expected or anticipated to exist such as a confined space or near where hazardous substances are stored.

If you have a trench that is 5-feet or more in depth, in addition to the above guidelines, you must also:

- Use protective systems to guard against cave-ins.

- Do daily inspections of the excavation, the adjacent areas and the protective systems prior to starting work, after a rainstorm. You must check for evidence of a possible cave-in, failure of the protective systems or hazardous atmospheres. Evidence of any of these must be addressed and corrected before any employee will be permitted to work in or near the excavation.

Protective Systems

There four protective systems or methods designed for protecting employees from cave-ins. You must do at least one of these if your excavation is greater than 5-feet.

- **Sloping:** Excavating to form sides of a trench that are inclined away from the excavation to prevent cave-ins.
- **Benching:** Excavating the sides of a trench to form one or a series of horizontal steps, usually with the vertical or near vertical surfaces between levels.
- **Shielding:** A structure that is designed to withstand the forces imposed on it by a cave-in and thereby protect the employees in the trench (Trench Box).
- **Shoring:** A structure that supports the sides of an excavation to prevent a cave-in.

32-38 Working With and Around Heavy Equipment

Working around heavy equipment can be dangerous. Operators of the equipment are doing multiple things in addition to making sure they aren't running anyone over in the process. Regardless if you are an operator or someone working on the ground near heavy equipment you need to know how to move these pieces safely and how to work around them properly.

General Rules When Heavy Equipment is Nearby

- Always remain alert to the equipment moving around you. Do not get near moving equipment.
- Never ride on equipment unless it has been designed to carry you. This means it must have a seat and a seat belt.
- Do not walk along or beside equipment. If it is necessary to travel with a piece of equipment, walk in front or behind it.
- Try to stay in view of the operator. Make sure you can make eye contact with the operator before you move.

Rules for Transporting Heavy Equipment

- Inspect all transporting equipment and make sure it is all in good working condition.
- Always provide for the protection of the public.
- Estimate the center of gravity for the equipment to be loaded. Always load equipment slowly onto its carrier.
- If equipment is to be driven off-site, make sure the steering, braking and light systems are in good operating condition.
- Tightly secure the piece of equipment to its carrier and use proper tie-downs.
- Be sure that the boom or any other extensions of the equipment are tightly secured. If working with others, be sure to work as a team.
- Keep your hands dry and free of grease and oil as possible. Always keep the loading area free of debris and unnecessary tools.

Remember: When working with or around heavy equipment you must always be on the lookout. Make sure you are wearing your PPE, (Hard hat, vest and above the ankle boots) you want to be seen by the operator and the operator needs to be able to see you. When backing, agree on hand signals and designate one person to help the operator back throughout the job.

Section 33 - Mandatory Safety Talks From Safety Division

- 33-1 Dangers in Packages
- 33-2 Inspecting Mobile Equipment
- 33-3 Transporting Mobile Equipment
- 33-4 Work Attire and Personal Protective Equipment
- 33-5 Flooding
- 33-6 Working Together with Heavy Equipment
- 33-7 Bicycle Safety
- 33-8 Blind Spots & Improper Positioning
- 33-9 Danger Zones – Heavy Equipment & Complacency
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- 33-11 Employee Engagement & Safety Culture
- 33-12 Hard Hat and Safety Vest Inspections
- 33-13 High Visibility Apparel
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- 33-15 Loader Safety
- 33-16 Managing Heat When Working Outdoors
- 33-17 Moving, Handling and Storing Materials
- 33-18 Personal Safety
- 33-19 Preparing for Spring Operations
- 33-20 Safe Backing and Proper Clearances
- 33-21 Slips, Trips, Falls, & Common Inspection Concerns
- 33-22 Vehicle Safety Overhead Structures and Clearances
- 33-23 Winter Safety Snow Removal
- 33-24 Auger Safety
- 33-25 Burn Awareness
- 33-26 Snowplow Safety
- 33-27 Proper Stretching
- 33-28 Spring Ahead
- 33-29 Carbon Monoxide
- 33-30 Manual Lifting
- 33-31 Importance of Spotters
- 33-32 Personal Protective Equipment
- 33-33 Chain Saw Safety

33-1 Dangers in Packages

Recently you may have seen on the news, suspicious packages have been mailed to high ranking government officials and well-known individuals in the US. While, all of these packages were intercepted and rendered safe prior to delivery to the intended recipients, employees should remember to be on the lookout for suspicious packages being delivered to Central, District or County Offices. We do not believe there is a threat or risk to the department; however, we want to ensure all employees are aware and taking precautions in accordance with Commonwealth policy.

Characteristics of suspicious letters or packages:

- Mailed from a foreign country or no return address.
- No postmark or postmark does not match the return address.
- Excessive postage or no postage.
- Addressed to a title only (such as Director) or has the wrong title associated with an individual's name.
- Excessive weight, rigid, bulky, lopsided or uneven.
- Misspelled words, poorly typed or handwritten.
- Excessive tape or string, restrictive markings, odor, oily stains or discoloration, protruding wires or aluminum foil.
- Ticking sound.



Precautions for opening letters or packages:

- Do not handle or open mail with your bare hands; wear gloves and use a letter opener or other device.
- Open letters with the top of the envelope positioned away from your body.
- Once opened, turn the envelope upside down over a trash can and pull open one side (if any foreign substance is inside, it should fall out).
- Always wash your hands using soap and hot water after handling mail.
- Do not open mail in areas of high ventilation or in front of a fan.
- Immediately notify your supervisor or other manager if a letter or package seems suspicious. Management will determine whether the item should be reported to law enforcement authorities.



Handling a suspicious letter or package:

- Do not open, move or smell the item.
- If the item is already being handled, place the item in a plastic bag or other type of container to prevent leakage of the contents (if a container is not available, cover the item with anything that is available, such as a piece of paper, trash can, clothing etc.).

See Management Directive 720.7 Bomb Threats and Suspicious Packages for additional information.

33-2 Inspecting Mobile Equipment

There are multiple types of mobile equipment used throughout PennDOT. Mobile equipment receives routine maintenance according to manufacturer's recommendations but issues can arise while in the field. Performing a pre/post-operational inspection (M-614) is important to identify unexpected issues.

Why is Inspecting Important?

Reporting deficiencies in mobile equipment as quickly as possible can prevent near misses, incidents and property damage before they happen. Proactive measures such as completing a pre/post-operational inspection identifies deficiencies that can lead to quick corrective actions.

Visual Checks:

On each piece of mobile equipment there are several visual indicators that can point to a deficiency. Items to check include:

- Obvious damage or leaks
- Tire/tread condition
- Engine oil level
- Radiator water level
- Broken or damaged lifts chains/hydraulic cylinders

Operational Checks:

Along with performing visual checks; operational checks are necessary prior to using mobile equipment. Operations to check include:

- Seatbelt latch
- Horn function
- Steering wheel response
- Brake operation
- Back-up alarm function
- Hydraulic controls function, if applicable



After the Inspection:

- Any deficiencies identified must be reported to their Foreman immediately for follow-up actions. Defective equipment shall be tagged out of service and not used until corrective actions are taken.
- All pre/post-operational inspections must be documented on the M-614 prior to and at the end of each shift.
- Review PUB-177 Equipment Maintenance and Management Policies Manual, Chapter 4, pages 4-11 regarding pre/post operational inspections.

33-3 Transporting Mobile Equipment

Properly securing mobile equipment such as a road widener, loader, backhoe, grader or track excavator to transport from one location to another, is very important to the traveling public and to employee safety. Many times, these operations are completed by utilizing a lowboy or equipment trailer. Failure to secure mobile equipment prior to transit can result in employee injury, loss of life, damages and/or issuance of citations to the operator.

Loading/Unloading:

- Operators shall be trained to load/unload mobile equipment onto a lowboy/trailer.
- The lowboy/trailer operator, the foremen and the assistant should discuss any safety concerns and requests, including spotters prior to loading/unloading.
- Check to make sure the lowboy/trailer is wide enough for the mobile equipment to be loaded.
- Ensure the lowboy/trailer is parked on level, stable ground before loading/unloading.
- Set the brakes and turn off the motor of the lowboy/trailer truck prior to loading/unloading the equipment.
- Once loaded/unloaded and before the operator exits the mobile equipment, they shall apply the parking brake and should lower any attachments to the deck or ground.



Securement:

- Utilize the appropriate number of tiedowns (minimum of four) each rated for a working live load of at least 5,000 lb. Restrain the equipment side-to-side, forward, rearward and vertically.
- Inspect the tiedowns before each use to ensure they are in good working order. Any tiedowns observed to have knots, distress, weakened parts, weakened sections or obvious damage shall not be used and tagged out of service.
- Any accessory equipment such as a blade, plow or bucket shall be lowered and secured with tiedowns. Booms are to be folded in tight and any articulating equipment shall be secured to prevent articulation.
- Attach tiedowns either at the front and rear of the mobile equipment or at the mounting points on the mobile equipment designed for that purpose.
- It is recommended that if mobile equipment has been deadlined due to the brakes, wheel chocks should be used during loading/unloading to prevent unexpected rolling of the equipment. If chocks are left in place during transport of mobile equipment they must be secured to the deck.
- Any questions or concerns regarding securement of mobile equipment for transit, contact your foremen or supervisor immediately.



In Transit:

- Operators of the lowboy/trailer shall inspect the mobile equipment before transit and immediately address inadequacies with height and or securement, if found.
- Operators of the lowboy/trailer shall inspect the mobile equipment securement and make adjustments as necessary; within the first 50 miles of the start of the trip, when the duty status of the drive changes and after three hours or 150 miles, whichever occurs first.
- If adjustments need to be made during any inspection, the operator of the lowboy/trailer must make them by utilizing additional tiedowns.

Keep in Mind:

- Employee's should avoid entering areas where the load can move and pinch them between the load and another structure or piece of equipment.
- This safety talk is not all inclusive but provides awareness when transporting mobile equipment to employees.
- Reference Pub 177 Equipment Maintenance and Management Policies Manual, Chapter 8 for additional information.

33-4 Work Attire and Personal Protective Equipment

All PennDOT employees are required to wear proper work attire and personal protective equipment (PPE) according to PUB-445M, Protocol 2 PPE. Recently, employees were observed not wearing proper work attire, hard hats and chainsaw chaps while performing operations requiring appropriate PPE.

Work Attire Policy:

All employees engaged in or entering any field operation involving maintenance, construction, design, surveying, inspections, etc. (on or off state right-of-way) must dress appropriately for the hazards to which they are exposed. Proper work attire is required and considered a condition of employment.

Do's:

- High-visibility t-shirts, sweatshirts, raincoats or jackets which meet ANSI Class 2 or 3.
- Shirts with unaltered sleeves that are six inches or longer from the seam.
- Full length trousers.
- Work shoes must be above the ankle design and have good tread to help prevent slips, trips and falls (ASTM committee recommends replacing a shoe if there is worn tread in an area larger than two pennies).



- Safety glasses are required when employees are operating or working near tools or machines that may throw particles such as woodworking tools, power tools, chippers, jack hammers, etc. (Prescription safety glasses are available upon request).
- Safety goggles are required whenever there is a need to protect the eyes from particles, dust and mist/splash which cannot be stopped by wearing safety glasses.

Prohibited:

- See through clothing
- Sneakers, tennis shoes or open toed shoes
- Shirt sleeves that are less than six inches from the seam
- Shorts, sweatpants, capris
- Prescription or reading glasses that do not have the ANSI Z87 impact rating or side shields shall not be used in place of safety glasses.

Hard Hat Policy:

All employees must wear a hard hat, when one of the following criteria applies:

- When engaged in or entering any field operation involving maintenance, construction, design, surveying, inspect ions, etc. (on or off state right-of-way).
- When there is a clear and present danger of falling objects.
- When exposed to overhead electrical conductors.
- At the direction of a supervisor/foreman.

Employees must not wear anything underneath the hard hat such as a baseball hat and may not be worn backwards or sideways. Only PennDOT issued and approved decals may be adhered to the hard hat.

Chainsaw Operations Policy:

All employees who are performing chainsaw operations in addition to proper work attire and a hard hat must wear the appropriate PPE including but not limited to high visibility apparel, hand protection, eye protection, face shield and chainsaw chaps.

Additional Points to Consider:

- It is the responsibility of the foremen to address work attire and PPE issues prior to conducting the work for the day to their crew. If an employee is not wearing the proper work attire or PPE, the employee shall be directed to comply with department policy; or be sent home for the day.
- Review PUB-445 Safety Policy Handbook, Work Attire and Personal Protective Equipment.
- This safety talk does not address all required PPE. If you have any questions or concerns, please contact your respective safety coordinator.

33-5 Flooding

When weather conditions make a turn for the worse, PennDOT employees are on the front lines battling the hazardous conditions. However, employee safety needs to remain a priority no matter the circumstance. Below are a few potential hazards that may be created due to hazardous weather conditions such as flash flooding or downed overhead utilities with recommendations for safe practices.

What to do in a flash flood:

Flash floods can occur within minutes or hours of excessive rainfall. When flash floods are predicted, or conditions are right for flooding:

- Go to high ground immediately if water starts collecting around you.
- Remain clear of areas subject to flooding, such as low spots, canyons, washes, etc.
- Do not attempt to cross a flowing stream on foot. Six inches of water, when moving at a high rate of speed, can be enough to knock someone off their feet.
- Never drive through flooded areas or standing water. Shallow, swiftly flowing water can wash a crew cab or dump truck from the roadway, and the roadbed may not be intact under the water.
- If your vehicle stalls, abandon it immediately and seek higher ground. Rapidly rising water may engulf the vehicle and passengers. Dial 911 immediately, then notify your supervisor later.
- Be especially cautious at night when it's harder to recognize flood dangers.
- Understand the difference between a Flash Flood Watch and Flash Flood Warning.

Flash Flood Watch

- Flash flooding is possible along small streams and rivers. Be prepared to move to higher ground.

Flash Flood Warning

- Flash flooding is imminent and occurring. Seek higher ground immediately.

Important Reminders:

- Employees that have responsibilities to monitor bridges for potential flooding and stability issues are not permitted to enter the flood waters. Flood waters include both standing and flowing water.
- It is important for employees to contact their supervisor or manager immediately if a flood occurs.
- Additional information may be found at PA READY, PennDOT.gov and PUB 238 Bridge Safety Inspection Manual.

Downed overhead utilities:

Working around overhead utilities can be dangerous, especially if a line is pulled down because of weather conditions. If an overhead utility line does come down, keep the following in mind:

- Do NOT assume a downed line is safe simply because it is on the ground or is not sparking. Consider all lines energized until proven otherwise.
- Do NOT assume all coated, weather-proof or insulated wire is just telephone, television or fiber-optic cable.
- Never go near a downed or fallen electric power line. Touching it could be fatal.
- Electricity can spread outward through the ground in a circular shape from the point of contact. As you move away from the center, large differences in voltages can be created.

33-6 Working Together with Heavy Equipment

Working with and around heavy equipment is a large part of many PennDOT employees' everyday work environment. When something is consistently part of our work environment it is easy to become complacent. It is every employee's responsibility to remain aware of the location of the equipment in relation to themselves and others. Everyone has a role in each other's safety. Keeping an eye out for one another helps to ensure everyone goes home safe at the end of the day.

Operators:

- Adjust all mirrors to help compensate for blind spots.
- Inspect the equipment at the beginning of each shift in compliance with the M-614. This includes brake systems, audible warning systems (horn and back-up alarm), lights and windshield wipers.
- Determine the route of travel to ensure ground workers are clear of equipment before operating.
- Use spotters when moving equipment.
- Acknowledge and pause to allow safe passage to ground workers.
- Stay alert of the surrounding environment and watch out for ground workers.

Ground Workers:

- Wear all applicable personal protective equipment including high-visibility clothing.
- Ensure the operator sees you before entering swing radius of the equipment (alert the operator and make eye contact before approaching).
- Maintain a safe distance from equipment when in use.
- Avoid entering the operator's blind spot, if you can't see the operator, they can't see you!
- Never walk or work under a suspended load.
- Stay alert and let others know if they are too close to the equipment or standing in the path of travel.



Pre-Planning (when applicable):

- Refer to the Job Safety Analysis (Pub 517) for potential hazards and recommended action or procedure for the equipment used in the operation.
- Develop a vehicle path site plan to help avoid or limit vehicle/equipment backing.
- Set up a limited-access zone or swing radius around heavy equipment.
- Increase visibility and lighting during night work.

33-7 Bicycle Safety

Bicycling is becoming more popular nation-wide, whether for commuting, exercise or fun and has grown by 47% in the last decade. With increased popularity it is important to remember bicycles on the roadway have the same rights and responsibilities as motorized vehicles by law.

Use caution on the road if the proper precautions are not taken, in 2018 alone there were 857 bicyclists killed in traffic incidents across the U.S. Below are tips on what to do if you are a bicyclist, and reminders for motorists when encountering a bicyclist.

Preparing for a Ride:

- Ensure all parts of the bike are in good condition and properly working.
- Use the right equipment by wearing a helmet that sits properly and riding a bike that fits you. If the bike is too big for you it will be harder to control.
- Carry all items in a backpack or strapped to bike in a safe location.
- Plan your route in advance.
 - When using the road choose a route with less traffic and slower speeds or use a bike lane or bike path.
- Do not wear loose clothing.
 - Tuck in your pant legs and tie shoes before tucking-in the laces.
- Always wear protective equipment including a bike helmet, bright colors, and reflective gear.
- Check your local laws to determine if sidewalk riding is legal.
- Refer to the Department of Conservation and Natural Resources (DCNR) when looking for bike trails.



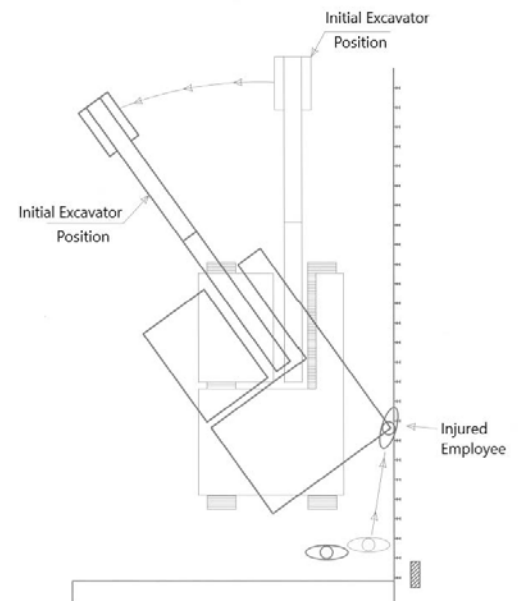
33-8 Blind Spots & Improper Positioning

Caught-in and struck-by hazards are among the top four leading causes of fatalities in construction. PennDOT has seen a recent increase of incidents with these types of hazards due to vehicle/equipment blind spots and improper positioning of employees. This is a major hazard that could result in serious injury or a fatality. The following information is imperative to remember when working with or near heavy equipment.

- Do not go into the danger zones (directly in front of or behind large trucks and/or heavy equipment). The ONLY time someone may enter these areas is after receiving both verbal and visual confirmation from the operator.
- Listen for back-up alarms, horns or other signals warning of nearby vehicles.
- Know the blind spots of the vehicle and/or equipment you are working with or are working around.
- When operating heavy equipment, always use a spotter and check your mirrors when backing.
- Avoid distractions such as listening to music or using a cell phone.
- Don't permit yourself to walk with your back turned to closely approaching vehicles or equipment.

In the diagram to the right is an example of an incident where a PennDOT employee was lucky enough to not have been seriously injured. The employee entered into a blind spot of an excavator, when the operator swung the boom the employee became caught between the guide rail and the excavator. Other employees in the vicinity were able to notify the operator before the employee could become seriously injured.

This is just one of many recent incidents that has occurred due to blind spots and employees being in improper positions. PennDOT wants to ensure employees know and understand the seriousness of these types of incidents to help everyone return home safe at the end of each day.



Be Constantly Alert to Potential Hazards Such As:

- Narrowed or sloped shoulders that have limited surface area for secured footing.
- Passing traffic and PennDOT vehicles such as rollers and excavators.
- Fixed objects such as guide rail panels, bridge parapets, and/or utility poles that limit escape paths.
- Swing radius (swivel range) of excavators.
- No direct line of sight with operator(s).
- Lack of awareness regarding truck or equipment navigation or travel path.

Before Operating Heavy Equipment:

- Conduct a circle of safety around the equipment.
- The foremen and the employees should review the hazards associated with heavy equipment that they will be working with that day (i.e. blind spots, swing radius).
- Use a spotter to maintain communication and designate hand signals if needed.
- Where feasible, block off danger areas around the equipment.

Working with or around heavy equipment can be dangerous if current safety procedures and protocols are not followed. Be attentive to specific workplace hazards. Be knowledgeable on your job and aware of your position at all times, especially when working around heavy equipment. Recognize that as work progresses blind spots and hazardous locations change. As an equipment operator who is responsible for evaluating and understanding these changing hazards, consider pausing the operation to quickly discuss the new conditions with the crew as they arise. If you think something is unsafe speak up!

33-9 Danger Zones – Heavy Equipment & Complacency

On Monday, June 15, 2020 a District 5 employee was the ground guide for a shoulder cutting operation. The employee suffered a serious leg injury that required immediate emergency treatment. It appears the ground guide was walking too close to the moving grader when the first front right rear tire ran over the employee's left foot causing the employee to fall to the ground. By the time the employee got the attention of the operator to stop, the tire had the employee's foot and leg wedged to the ground.

Unfortunately, this is not the first time this has occurred in PennDOT's history, District 2 had a similar incident in 2019. Both situations had very similar factors leading to the incidents, including:

- Employee position as it relates to danger zones of moving equipment.
- Loss of direct communication with operator (either visually or verbally).
- Lack of proper pre-planning for potential hazards.
- Coworkers allowing observed unsafe activities to continue.
- Crew complacency or distractions.

Complacency occurs when we become too comfortable in our jobs, and we take our safety for granted. When you are performing a task that is repetitive, or when you are performing regular job duties that have become second nature, your mind can wander. When you are not concentrating on the task at hand, you open the door to mistakes that can cause accidents and injuries. Your mind is your most important safety device.

At times, we can all become complacent, but there are techniques you can use to fight complacency and refocus your attention to the task at hand. Two things everyone can do to combat complacency are:

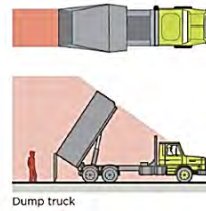
1. Pay specific attention to each step of the process, regardless of how many times you have performed the task.
2. Look for signs of complacency by your co-workers. Crew members know each other well and should be able to tell when a co-worker has become too comfortable or overconfident. Signs of complacency include:
 - ✓ Overlooking details
 - ✓ Taking shortcuts to complete routine tasks
 - ✓ Appearing disinterested when someone is talking to them

If you witness any of these, PLEASE say something to YOUR co-worker or foreman. By doing this simple act, YOU may be able to prevent another serious injury from occurring to a member of our PennDOT family.

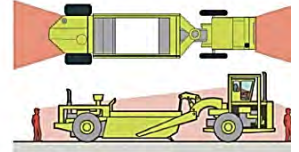
Safely working around any heavy equipment requires the shared responsibility of both the equipment operator and their coworkers. The below list also provides additional safety tips for employees when working with or around heavy equipment.

- Inspect the equipment prior to operation to ensure that all lights and audible alarms are working properly.
- Use three points of contact when mounting and dismounting heavy equipment - NEVER JUMP OFF ANY EQUIPMENT.
- Establish a danger zone, that is; the working area where contact could result in personal injury or damage during operations.

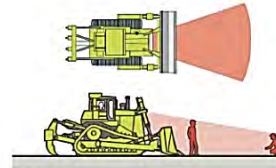
- Identify hand signals or use two-way radios between the operator and person in charge of the work crew to accomplish any and all movement.
- Maintain a clear line of site between the operator and workers. Blind spots are common. If you can't see the operator, they can't see you.
- Use a spotter when heavy equipment is in motion. This requires communication between the operator and workers to maintain safe movement.
- Always try to walk on the driver side of equipment as the passenger side has a larger blind spot.
- Workers should keep a safe distance from all sides of the heavy equipment while it is in use.
- Be aware of the swing radius on certain equipment and, if possible, cordon off the area with barriers or caution tape.
- Wear high visibility clothing and personal protective equipment.
- Never work under a suspended or overhead load.
- Always stay alert.
- Employees are not permitted to ride on vehicles and equipment unless specifically designed for the purpose of transporting employees. Only those personnel required to operate a piece of equipment and actively engaged in the operation of that equipment are permitted on that equipment while it is in motion. Additional details on PennDOT's riding on equipment policy can be found in Pub 445 Safety Policy Handbook, Pub 445M Manual for Employee Safety & Health or Pub 177 Equipment Maintenance and Management Policies Manual.



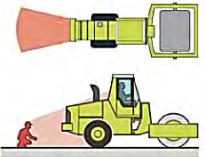
Dump truck



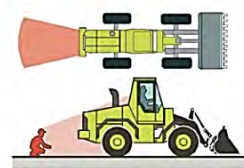
Tractor scraper



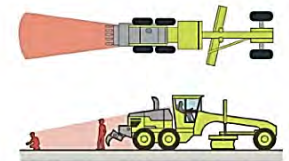
Bulldozer



Articulated roller



Articulated loader



Grader

Many times, you may be in a blind spot or the operator has been driving in a designated travel path for a period of time and the only thing that has changed is **YOU!** Make eye contact with an operator before relocating and always work intelligently around equipment.

33-10 Electrical Safety

According to the U.S. Bureau of Labor Statistics (BLS) there were 739 worker fatalities between 2012 and 2016 from exposure to electricity. No matter what type of setting employees work in, electrical safety is important for everyone. Working near or with electricity can be very dangerous if you do not follow proper safety precautions. To ensure your safety when working near or with electricity it's imperative to know the common electrical hazards, common electrical injuries, and tips to stay safe when working with or near electrical equipment.

Common Electrical Hazards:

- Overhead powerlines
- Faulty equipment
- Working on energized equipment
- Improper grounding
- Damaged insulation



Common Electrical Injuries:

- Burns are the most common nonfatal injury that occurs from touching electrical wiring or equipment that is improperly used or maintained.
- Electrical shocks are received when electrical current passes through the body. Example: When two wires have different potential voltages, the current will flow between them if they are connected by a conductive material. If you touch both wires at the same time your body acts as that connection.
- Falls often occur when working at heights or on an elevated surface and sustaining an electrical shock, the shock will cause the body to react and the person could lose balance and suffer a serious or fatal fall.
- Electrocution results from being exposed to a potentially lethal amount of electrical energy and can often result in death due to cardiac arrest.

Electrical Safety Tips:

- Remain at least 10 feet from overhead powerlines and add more distance if the voltage on the lines increases above 50 kV.

- Call your local 811 (PA One Call) three to ten days prior to digging.
- Inspect all electrical cords for damage such as worn insulation or missing prongs. If you notice a cord is damaged or defective, remove it from service and report it to your supervisor immediately.
- Never work on electrical equipment in wet conditions.
- Follow lockout/tagout procedures prior to working on electrical equipment.
- Do not overload or daisy chain extension cords or multi-outlet plugs.
- Extension cords are for temporary use only.
- Keep power cords away from heat sources, water, and other hazardous liquids.

Check for hazards before working with or near electrical equipment to prevent electrical injuries.

33-11 Employee Engagement & Safety Culture

Engaging employees in safety at PennDOT improves not only the safety culture but also performance. The following is a list of ways employees can get involved in safety and improve PennDOT's safety culture:

- Fix hazards or report them to your supervisor Avoid becoming complacent performing repetitive tasks.
- Set a good example by following safe work practices.
- Increase your situational awareness by utilizing your senses.
 - o Sight, smell, taste, touch, and hearing
- Display management support for safety initiatives.
- Suggest safety improvements to a supervisor/safety committee.
- Take advantage of opportunities to get involved in safety.

PennDOT's safety culture is a team effort and requires every member of PennDOT to do their part when it comes to keeping safety first in all that we do.



Safety culture is the overall attitude, belief, perception and values that all employees have towards safety within PennDOT. It can be defined as: "the way we do things around here". Working towards a good safety culture takes time. It is important to understand the four A's to safety and that safety is a personal decision.

The four A's to safety:

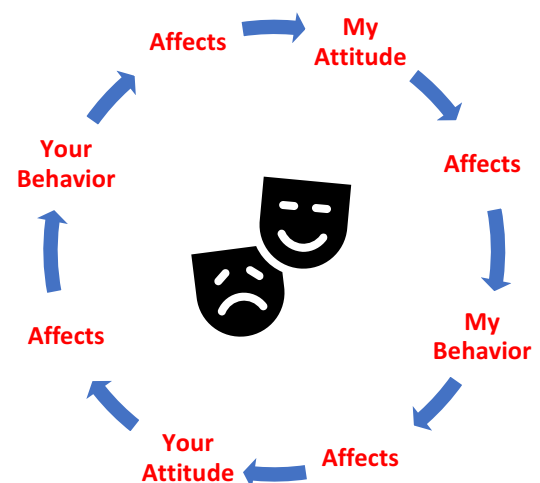
- Attitudes
- Awareness
- Accountability
- Action

Your attitude towards safety plays a big role towards PennDOT's safety culture. Your attitude can affect your co-worker's attitudes towards safety. The Betari Box model is a good example of this: my attitude affects my behavior which affects your attitude which affects your behavior.

Awareness involves knowing the expected safety requirements and behaviors for the tasks and operations you are performing. Ways awareness is communicated to employees by management include policies, warning signs/posters, and training. While employees can help spread awareness by reminding each other of safety requirements during operations or helping new employees as they adjust to the work.

Accountability is understanding that safety needs to be a personal value. It is choosing to be safe versus just complying with a policy. An example of this would be: I want to wear my safety glasses because I want to be safe verses, I have to wear my safety glasses because if I don't there will be consequences.

Action is doing your part to ensure the safety of yourself and your co-workers. It is recognizing and reporting safety hazards, maintaining good housekeeping, working safely, using the proper personal protective equipment (PPE) and making the most out of what is taught in safety trainings.



Remember safety is a personal decision, every choice you make impacts those around you. You choose whether or not to report safety hazards or wear your PPE. Make safety a personal value so it can't be easily influenced by others or circumstances. Know the four A's of safety: attitudes, awareness, actions and accountability and together as a team we can improve the overall safety culture here at PennDOT.

33-12 Hard Hat and Safety Vest Inspections

Foreman and employees are required to inspect personal protective equipment (PPE) prior to starting work, particularly hard hat suspension and safety vests. PennDOT policies and crew checklists require routine inspection for the safety of employees in the workplace. In a group setting, consider letting the crew check their co-worker's vest from a respective social distance. Employees should inspect their own safety hard hats and guide them through the following safety steps:

Hard Hat Suspensions/Shell:

- Check the date of the hard hat. Frequently worn hard hats should have the suspension replaced every 12 months in accordance with manufacturer recommendations.
- Inspect the suspension for:
 - Cracks
 - Frayed or cut straps
 - Torn headband
 - Loss of flexibility
 - Damaged stitching
 - Other signs of wear
- Inspect the shell for:
 - Brittleness
 - Dents, breaks or cracks
 - Dullness of color
 - Chalky appearance



Note: Hard hats have a five-year in-service life once issued for use. If it is not known when the hard hat was put into service and there was no date written inside with a sharpie, refer to the date inside of the hard hat and add 5 years.

Safety Vests

- It is a best practice to have someone other than yourself inspect your safety vest. Either put on the vest or hold out the vest for another employee to visually inspect.
- Inspect the vest for:
 - Cleanliness
 - Fading of color/reflectivity
 - Tears or other damage
 - Front closure defects
 - Other signs of wear and tear

If you notice that the hard hat suspension or safety vest is in disrepair seek a replacement as soon as possible from your supervisor.

It is imperative that each employee inspect their safety vest and hard hat suspension prior to starting work. Be sure to report any damaged or out-of-date items to your supervisor. Not conducting either of these inspections, is putting yourself at risk of getting injured.



33-13 High Visibility Apparel

According to the U.S. Bureau of Labor Statistics (BLS), “The most common event associated with fatal occupational injuries incurred at a road construction site was worker struck by vehicle, mobile equipment.” High visibility apparel is the most common control used to help protect employees from struck-by injuries and death. Listed below are the different classes of high visibility apparel and PennDOT’s current policy to help employees understand the requirements of their personal protective equipment (PPE).

Class 3



Class 2



High Visibility Apparel Classes:

The pictures to the upper right demonstrates the different classes of ANSI high visibility vests that PennDOT approves. It is important to understand and know the different classes of high visibility apparel.

Current PennDOT Requirements:

- All employees engaged in or entering any field operation involving maintenance, construction, design, surveying, inspections, etc. (on or off state right-of-way) or exposed to moving vehicles and equipment are required to wear high visibility vests, t-shirts, sweatshirts, raincoats or jackets which meet the ANSI Class 2 or 3 safety garment requirements.
- A vest must be worn over at least a shirt with long or short sleeves.
- All vests must be yellow-green with orange stripes and grey reflective trim.
- ANSI Class 3 vests are required for flagging and nighttime operations. A class 2 vest may be paired with Class E chaps to meet Class 3 requirements. The single color high visibility yellow reflective raincoat may be worn instead only during inclement weather.
- ANSI Class E Chaps (yellow-green or red-orange) are also required when performing flagging duties. The single-color high visibility yellow reflective rain bib overalls may be worn instead of this garment only during inclement weather. Leggings are not acceptable.
- Inspect all PPE at the beginning of each shift for excessive dirt, discoloration, or wear and tear. PPE is currently not allowed to be shared and must be cleaned frequently due to the COVID-19 pandemic.
- Employees are responsible for the following:
 - o Proper donning and care of garments.
 - o Keeping the reflective strip facing outward and that the front of the vest is always closed using the Velcro tabs (this is to ensure 360-degree visibility).
 - o Follow proper storage practices as well as laundering procedures.
 - o Ensure that nothing is worn over top of the vest or chaps.
- Additional information on where to purchase high visibility PPE, rainwear, jackets, and chaps can be found in Publication 445M, Manual for Employee Safety and Health.

The need to be seen is critical for our workers, which is why PennDOT stresses the importance of wearing the proper PPE. If you are ever unsure of what PPE you need for a certain task, want additional information on the purpose of the PPE required or have any concerns about your PPE talk to your supervisor/manager.

¹ PennDOT has recently updated Chapter L, Recognition, Rules and Enforcement of the Manual for Employee Health and Safety (MESH) as well as the Seat Belt section in the Safety Policy Handbook.

² Source for this information: <https://www.cdc.gov/features/heartmonth/index.html>

³ Source for this information: <https://nyc.heart.org/2017/12/14/american-heart-association-warns-snow-shoveling-health-hazards/>

33-14 Mindful Driving



How many times have you driven and when you got the location you realize that you don't remember your car ride there? It happens to everyone at least one. We are so busy in our everyday life that sometimes that tasks we do everyday become mindless to us and we don't realize it.

When you get behind the wheel is there anything that is more important at that time then the task of driving? Our minds are lost in thought 47% of the time. It is so easy to let our minds wander.

What is mindfulness?

Mindfulness is the act of being intensely aware of what you're sensing and feeling at every moment — without interpretation or judgment.

A person is mindful when they are aware of their surroundings, actions, and emotions. Being mindful is not simply being alert. Instead, it is paying attention very carefully to your environment. You can train yourself to be more mindful. Mindfulness can have a positive impact on both your personal and professional life. There are many steps you can take to becoming more mindful.

Exercise for you to try: Practice being mindful during your routine activities.

For example, pay attention to each step as you make your morning coffee. Then, be aware of how your senses react while drinking your coffee. Each day try being mindful of a new part of your routine. Take the time to actually think about your senses. Pay close attention to the first person you encounter that day. Listen closely to their words. Watch their mannerisms. Take note of their facial expressions. Think about their meaning and uniqueness of their vocabulary. Aim to develop a habit of understanding others and delaying your own judgments and criticisms.

What are the benefits of mindfulness exercises?

Being more mindful will make you less distracted. Being distracted creates unsafe situations. If you practice being more mindful there are many possible benefits, such as reducing stress, anxiety and depression; less negative thinking and distraction; and may even improve your mood.

33-15 Loader Safety

Loaders are a common piece of mobile equipment used in our daily operations. However, any type of mobile equipment can be dangerous if the proper precautions are not followed. Below are precautions to follow prior to operations, and when operating/moving, loading/unloading or parking a loader.

Prior to Operations:

- Read and follow the operator's manual.
- Conduct a circle of safety.
 - Complete the circle of safety before entering the vehicle.
 - Identify any potential risks for injury or damage.
 - Remove all debris or items around tires and/or doors.
 - Carefully walk around the entire vehicle.
 - Look for pre-operational damage.
 - Every time you enter a vehicle.
- Conduct a pre-trip inspection and fill out form M-614 Operator Daily Report for Mobile Equipment.
- Remember to maintain three points of contact when entering/exiting equipment.



When Operating/Moving:

- Ensure the area is clear of employees.
- Know the range of movement of the equipment and be aware of its blind spots.
- Maintain proper bucket position: a minimum of one foot off the ground or higher as needed for minimum clearance.
- Travel straight up and down inclines with the load or heavier end facing uphill.
- Use all included rollover protective structures (ROPS) and always wear a seat belt when equipped. Do not remove or disable any safety features on mobile equipment.
- NEVER stand, walk or work under or near a raised loader. Always wait for acknowledgement from the operator before approaching the equipment.

Loading/Unloading:

- Travel in a straight line.
- Operate the controls only when in a seated position.
- Never load while at the same time turning the equipment. Complete loading before repositioning.
- Ensure the load is evenly distributed in the bucket; never exceed the load limits as listed in the operator's manual.

Parking:

- Park the loader in a stable area, on a hard and level surface; if possible.
 - Avoid parking on inclines, and when necessary, chock the wheels.
- Ensure the bucket is fully lowered to the ground.
- Turn off the engine and remove the key prior to exiting the equipment.

Always follow these precautions when working with or near a loader. If you have any concerns be sure to talk to your supervisor.

33-16 Managing Heat When Working Outdoors

When working outdoors between the months of May to September, as the temperatures rise, those working outdoors may be putting themselves at risk of heat related illness if proper precautions are not followed. Even though heat related illnesses are preventable, according the Center for Disease Control and Prevention (CDC) heat related deaths are one of the deadliest weather-related health issues in the United States. It is imperative that everyone is aware of the proper precautions to help prevent heat related illnesses, the types and symptoms of heat related illnesses and understand the effect humidity has on heat.

Precautions to Help Prevent Heat Related Illness:

- ✓ Check the expected temperature and plan accordingly.
- ✓ Buildup your tolerance to the heat over several days, if you haven't worked outdoors in the past two weeks.
- ✓ Drink water frequently, every 15 to 30 minutes.
- ✓ Rotate employees who work around hot materials, perform excessive manual labor and/or are in direct sunlight for prolonged periods.
- ✓ Eat snacks to replace the body's loss of salt and electrolytes from sweating.
- ✓ Use sunscreen when working in direct sunlight.
- ✓ Take frequent breaks when needed, in shaded areas when available.
- ✓ Use the buddy system, to assist with watching for signs and symptoms of heat illness.
- ✓ Wear light, loose fitting clothes.
- ✓ Ensure adequate medical services are available and everyone is trained on what to do in the event of an emergency.

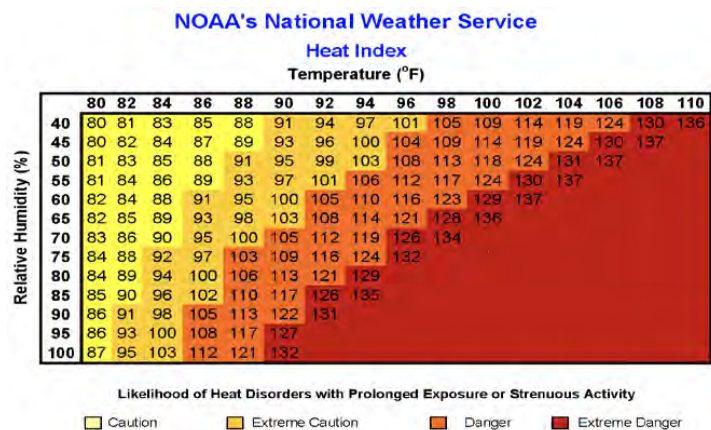


Water. Rest. Shade.

Illness	Cause	Symptoms
Illness	Occurs when sweat does not evaporate and becomes trapped beneath the skin, often caused by chafing from tight fitting clothing.	Clusters of small red blisters on the skin, most often found on the neck, chest, groin or the crease of the elbow.
Heat Cramps	Brought on by performing heavy work in hot environments as well as a loss of fluids and electrolytes in the body.	Painful, involuntary muscle spasms often accompanied by heavy sweating.
Heat Exhaustion	The body begins to overheat due to loss of water and salt from heavy sweating. Often occurs when people engage in	Weakness, headache, dizziness, nausea/vomiting, heavy sweating, rapid breathing, fast pulse and muscle cramps.
Heat Stroke	A life-threatening illness that can occur if the body temperature rises above 104°F. This condition requires immediate medical attention!	Similar symptoms of heat exhaustion but may also include flushed skin, lack of sweating, altered mental state or behavior (confusion, agitation, slurred speech, irritability and/or delirium), seizures, and/or loss of consciousness.

Humidity's Impact on Heat:

When working outdoors it is also important to account for the relative humidity. The body cools itself by sweating, but as relative humidity levels rise this becomes less effective as the sweat evaporates at a slower rate. The higher the humidity, the harder it will be for your body to cool itself and the hotter the temperature will feel. Refer to NOAA's National Weather Service Heat and Humidity Index Chart² to help prepare for the day ahead. Example: If the temperature outdoors is 94 degrees Fahrenheit and the relative humidity is 50% it's going to feel like 100 degrees outside versus 94 and extreme caution needs to be taken. The Heat & Humidity Index Chart is for general use only, for specific requirements on the effect of humidity on wearing face coverings in response to COVID-19 see Protocol 34, Heat Exposure & Wearing Personal Protective Equipment.



If you notice an employee becoming ill, move them to a cooler area and apply cool water to their skin, inform your supervisor. Call 911 if necessary and remain with the employee until help arrives. No matter if you're at work or at home follow the proper precautions to prevent heat related illness from occurring and always pay attention for symptoms of heat related illness when working in hot environments.

A great source for helping prevent heat related illness is the heat safety tool app. The Occupational Safety and Health Administration (OSHA) and National Institute of Occupational Safety and Health (NIOSH) have created a heat safety tool app (available for android and iPhone) which includes features such as planning outdoor work activities, location specific heat-index and hourly forecasts. The app also provides OSHA and NIOSH recommendations on how to prevent heat related illnesses.

33-17 Moving, Handling and Storing Materials

Injuries often occur when moving, handling and storing materials. We don't think twice before moving a box, how we handle it or where we put it. Back injuries and strains/sprains are just some of the injuries that can occur from improper lifting.

Here are some tips to remember when moving, handling or storing materials and, what to do if an incident does occur:

- Things to consider when manually moving material:
 - o Be sure you can lift the weight of the load.
 - o Grasp the load with your hand and not just your fingers.
 - o See the path of travel.
- Handles/holders can be attached to a load to reduce the chances of fingers being pinched or crushed.
- Use appropriate personal protective equipment (PPE):
 - o Gloves
 - o Safety glasses
 - o Protective footwear
- Store materials properly:
 - o Keep storage areas neat and organized. Do not store materials in designated walkways.
 - o Do NOT block exits, fire extinguishers, fire alarms, etc. Place combustible and flammable materials in their appropriate location.
 - o Reduce the size and weight of the objects being lifted, use mechanical lifting aid if needed, and/or change the height of the shelf.
- Consider the height, weight, accessibility, condition of container(s), and location of storage when storing materials.
 - o Load limits must be posted in storage areas.
 - o Check labels for height limitations.
- Take a few minutes to secure a lifting aid or ask for help to prevent an ergonomic injury.



Read this scenario:

An employee must move an object that is too heavy and awkward to hold. The employee needs to move this item across the room but is not going to take the time to ask for help or get a lifting aid. The employee decides to pick up the object and quickly moves it across the room. Unfortunately, the employee lifts with their back instead of their legs and feels a strain in their back. The employee keeps going but fails to see the "caution wet floor" sign when going across the room. The employee already has a strained back, then slips on the wet floor and twist their knee. Now the employee has a strained back and a strained knee because of not taking proper precautions.

Ask the audience:

1. What could the employee have done differently to prevent the employee from getting injured?
2. What should the employee do now after sustaining two injuries?

Potential Answers to Question One:

The employee could have:

- Got a lifting aid to move the item.
- Asked someone for assistance to move the object.
- Made the load lighter so that the employee was able to carry the load without needing assistance.
- Slowed down and checked the surroundings to notice that there is a wet floor.

Potential Answers to Question Two:

- All accidents, near misses and unsafe conditions/acts need to be reported to your supervisor immediately and employees are to follow the supervisor's instructions and proper procedures.
- If there is any doubt concerning the need for professional medical care, then it should be provided as a precautionary measure.

- If an employee requests medical treatment, it is the supervisor's responsibility to see that the employee receives it. If the supervisor determines that professional medical treatment is necessary, the injured employee must comply.

Note to Supervisors:

When injuries occur, information needs to be recorded in Pub 805 Grab and Go Packet. There were updates to Pub 805 (Work-Related Injury) and Pub 806 (Fleet & Equipment Accident):

1. Office of Administration documents were removed, and online links were provided (Page 1 of Pub 805).
2. Criteria for taking photos has been updated for supervisors (Page 7 of Pub 805 and Page 9 of Pub 806).

33-18 Personal Safety

Many times, attacks happen when you least expect it. Being safe and being aware of your surroundings at all times reduces the likelihood of becoming a victim.

Here are some tips to keep you safe.

- Carry few valuables. Any bag that you are carrying should be held close to your body, so it is harder to grab it.
- Keep your car keys handy when walking to your car so you are not fumbling for them when you get to your car.
- Press your car key fob panic button, this will sound an alarm.
- Keep your cell phone handy and well charged.
- Stay aware of your surroundings. Do not walk looking at your phone.
- Use Intuition – If you have a gut feeling that you are in danger, act on it. Get out of the area.
- Plan when traveling – Know what route you are going to take before leaving.
- Adjust your daily routine and alternate route of travel.
- Try not to walk alone – Ask co-workers/ friend/ security to accompany you on your walk.
- Keep distance between you and a stranger – Cross the street if you feel it is necessary.
- Stay in areas that are well lit.
- Avoid being stopped – Just keep walking.
- Walk with a purpose – you are less likely to be a target if you are walking at a brisk pace.

Self-Defense is a great tool to ensure you are safe. Here are some basic self-defense techniques that will help you if you are approached.

Look like a tough target

The aggressor is looking for a distracted target. Before an aggressor even thinks about striking, your best self-defense is to look as strong and confident as possible. Have a buddy walk with you when possible but keep your eyes up and alert when you're alone. Even if you're nervous, try not to let it show.

Make yourself hard to hold

If an aggressor comes from behind you and traps you in a "bear hug" with arms wrapped around your body, the key is to make yourself difficult to deal with, so the person can't carry you away. You want to drop your weight and lower your base. Bend your knees and drop your center of gravity so you become heavier and more difficult to move around.

Hit the most vulnerable areas

The groin, nose, and eyes will be equally vulnerable on anyone, so those are your best bets for doing damage. The aggressor will potentially become disabled, so you can get away as quickly as possible.

More information regarding personal safety is available in the links below.

<https://www.rd.com/advice/self-defense-moves/>

<https://mindfuldefense.com/car-keys-self-defense-weapon/>

<https://www.dgs.pa.gov/police/Pages/Crime-Prevention-Tips.aspx>

33-19 Preparing for Spring Operations

Spring is almost here which means time to switch over to spring operations. It is important to remember safety tips that go along with seasonal operations to maintain a safe work environment.

Preventing Building Damage

- Only operate equipment that you are trained and authorized to use.
- Operate equipment within its design limits.
- Take four seconds to think before acting.
- Seek assistance to clear the garage entrance.
- Use a spotter when backing.
- Conduct a circle of safety.

Working with Tools Safely

- Match the right tool to each job.
- Inspect all tools prior to use.
 - Tag defective tools as out of service.
- Use guards when applicable.
- Wear the appropriate personal protective equipment (PPE).
- Follow the manufacturer's instructions.



Conducting a CIRCLE of Safety

Ensure the safety of the driver, the public and others working in the area by performing the required circle of safety check.

Complete the circle of safety before entering the vehicle

Identify any potential risks for injury or damage

Remove all debris or items around tires and/or doors

Carefully walk around the entire vehicle

Look for pre-operational damage

Every time you enter a vehicle

Removing a Plow Safety Tips

- Be cautious when approaching a parking spot and maintain proper clearances from buildings, vehicles, and equipment.
 - If available use a spotter and coordinate hand signals.
 - Crushing injuries, amputations, lacerations and contusions are some of the potential hazards when removing a plow.
- Be sure to:
- o Keep feet, hands and fingers away from the plow blade.
 - o Do not place hands between objects/pinch points.
 - o Ensure feet are kept clear of the area under the plow frame.
- Use blocks to position the plow at the proper mounting height.
 - o Ensure the plow is put down evenly and centered on the blocks.



When preparing for the changeover of seasonal operations remember to take the time to spring ahead on safety by following all safety precautions!

33-20 Safe Backing and Proper Clearances

When operating any type of machinery such as a vehicle or mobile equipment it is imperative to use safe backing practices and know the proper clearances. As you can see in the picture of the excavator to the right there are five different potential clearance and backing hazards: 1- overhead utility lines, 2- utility pole, 3- trees, 4- another piece of equipment, 5- pipes. Ensure that all five of these items will not cause any clearance problems during the operation. If backing is necessary, use a spotter and plan out the area that will be used for the backing prior to starting work. Listed below are common causes of backing incidents, safety practices to follow prior to backing and proper clearance tips.

Common Causes of Backing Incidents:

- Backing without first looking behind or checking mirrors
- Missing or damaged mirrors
- Improperly positioned/adjusted mirrors
- Blind spots
- View obstructions such as signs, nearby buildings, or vegetation
- Turning while backing
- Distractions (Cell phones, music, etc.)
- Poor visibility (Lighting, weather, night work)

Safety Practices to Follow Prior to Backing:

- Familiarize yourself with the vehicle/equipment's blind spots.
- Remember mirrors can never give the whole picture and operators must always conduct a circle of safety prior to operations.
- Plan work in advance and try to avoid unnecessary backing.
- Remember that conditions are constantly changing even if you are on a site you have worked before, you still need to check for changes and/or new hazards.



Safety Tips on Proper Clearance:

- Don't rely on posted clearances, as the operator it is your responsibility to know the height of the vehicle/equipment and/or load.
- Use extra caution when traveling through bridges, tunnels and underpasses.
- Check for lights, signs and utility poles when on narrow streets/alleys.
- When entering/exiting any type of area such as garages ensure to know the height of the entryway versus the height of the vehicle/equipment and any lifting attachments. Prior to operations confirm that you are able to clear the entry/exit and utilize attachments as needed in enclosed areas. If you are ever doubtful of the proper clearances, stop and check before proceeding. According to statistics from the National Safety Council "one out of four vehicle accidents can be blamed on poor backing techniques". Remember the common causes of backing incidents and don't let one of these be the reason you are in a backing incident, follow the safety practices prior to backing and proper clearance safety tips.

33-21 Slips, Trips, Falls, & Common Inspection Concerns

Slips, trips and falls are a concern within PennDOT, especially during the fall and winter seasons. According to National Safety Council (NSC) data from 2018, falls from heights and falls on the same level in the construction industry accounted for 10,650 injuries and 320 deaths nationwide. Here are some tips on how to prevent slips, trips and falls and the proper technique when falling to help prevent injury.

How to Prevent Slips, Trips, and Falls:

- Maintain good housekeeping: clean up spills and keep walkways free of tools, equipment, and clutter.
- Close all drawers and cabinets.
- Keep loose cords, cables, and hoses out of walkways.
- Be aware of uneven floors, steps and surfaces with different traction.
- Ensure adequate lighting.



Proper Falling Technique to Help Prevent Injury:

- If you feel yourself start to fall don't tense up, roll into the fall and don't try to catch yourself.
- Protect your head: if falling forward turn your head to the side, while if falling backwards tuck your chin to your chest.
- Try to land on the muscles of your body not the bones, landing on your back, buttocks or thighs will decrease any potential damage. If you can't land on one of these areas keep your elbow and knees bent and use your legs and arms to absorb the major force of the fall.

Slips, trips and falls are preventable. For more information on how to prevent slips, trips and falls reference Pub445M, Protocol 12- Slip, Trips, and Fall Prevention. PennDOT has also recently conducted a survey on the garage, stockpile and crew inspections from 2018 to 2020. The survey was to determine what were the major concerns identified during inspections. Two major concerns identified for garages, stockpiles and crews were first aid kits and fire extinguishers. Here are some tips on first aid kits and fire extinguishers.

First Aid Kits:

- Must be easily accessible at all times.
- Need to be completely stocked without any outdated or unauthorized items in accordance with Pub445M, Chapter N Medical Supplies and Services.
- Shall be kept in a clean and orderly condition.

Fire Extinguishers:

- Need to be properly mounted at least three and half to five feet above the floor in marked locations with appropriate signage.
- Are inspected monthly to ensure the fire extinguisher is fully charged, that the pin is in place, that the extinguisher has not been damaged, and marked with a tag that must be initialed and dated for each monthly inspection.
- Must always be easily accessible in the event of an emergency, never block access to fire extinguishers with equipment, garbage cans, etc.

First aid kits and fire extinguishers are used in the event of an emergency. PennDOT hopes these items are not used frequently, but in case they are needed it is imperative they are accessible, up-to-date and maintained in working condition.



33-22 Vehicle Safety Overhead Structures and Clearances

In PennDOT's history there have been numerous examples of overhead strikes involving our dump trucks. One example was with a dump truck that struck an overhead bridge while involved in plowing and spreading operations. Failure to observe the proper safety precautions before raising a truck bed can result in serious injury and/or death, as well as significant damage to Department equipment and overhead structures. Keep in mind the following safety points when operating any PennDOT vehicle/equipment:

- Bring the truck to a complete stop in a safe location.
- Check the area for overhead obstructions (tree limbs, wires, proper clearances, etc.).
- Know and document all over head obstructions during dry run activities. Identify safe dump back areas if applicable.
- When available, use a spotter or ground guide to negotiate overhead clearances.
- Make sure the truck is on a level surface.
 - As the bed rises, the truck's center of gravity goes up, and the truck becomes less stable and more apt to tip over.
 - Where there is a slope, position the truck so that it faces straight up or down the slope.
 - Never raise the bed with the truck parked parallel to the slope.
- A dump truck is much more apt to tip over or run into overhead obstructions when spreading material than when dumping a load.
- Make sure the spreader chains are not set if the intent is to dump the load.
- Be sure to have and use an approved bed prop or sufficient cribbing to provide adequate support to a raised bed before working under it, even if it is only for a short time. Never rely on the truck's hydraulic system to hold the bed up while working under it.
- Do not tamper with, disable or ignore safety devices designed to warn the operator that the bed is in an elevated position.
- Report any malfunctioning bed warning devices immediately.
- NEVER drive the truck with the bed in the raised position.
- Always conduct a circle of safety before moving any vehicle, especially looking out for overhead hazards and raised truck beds.



The above bullet points are not all inclusive but provides a general list of safety tips to follow when operating any state vehicle as it pertains to knowing and understanding proper vehicle clearance heights and how they relate to common overhead hazards and obstructions.

33-23 Winter Safety Snow Removal

Now that the winter season is here it can produce conditions such as snow, ice, and wind that create additional hazards both at work and at home. It is imperative to follow the proper safety precautions when snow blowing, shoveling, and keeping warm. Below are some safety tips to keep in mind during the winter season.¹

Blowing Snow:

- Read the operator's manual before operating the snow blower.
- Inspect the area to be cleared prior to use.
- Remove any debris or other obstacles.
- Wear the proper personal protective equipment: gloves, protective goggles, hearing protection, and slip-resistant boots.
- Keep hands away from moving parts. If the blower gets clogged, immediately turn off the blower and remove the obstruction using an item, such as a wooden rod.
- Never leave a running snow blower unattended.
- Avoid starting or running the equipment in areas that are not well ventilated.
- Be cautious of the muffler as it gets hot when the equipment is in use.



Shoveling Snow2:

- Take it slow and stretch prior to shoveling.
- Push the snow out of the way rather than lifting.



- If you do need to lift the snow, only partially fill the shovel.
- Always lift with your legs and not your back.
- Stay hydrated by drinking water when shoveling for an extended amount of time.

Keeping Warm/Layering:

- Dress in layers to control body temperature and to maintain body heat while outdoors.
 - o Base layer: The first layer is worn next to the skin to manage moisture by removing perspiration from the skin to help prevent hypothermia. It should be made of moisture wicking material such as polyester or wool.
 - o Mid layer(s): The insulation layer(s) serve to help retain heat and should be made of materials such as fleece or other natural fibers.
 - o Outer layer: The last layer is to protect from elements such as snow, rain and wind. It should be water repellent or wind/water resistant.
- Stay dry and if you start to feel too warm remove extra layers when needed.

The winter season presents additional hazards. Please take the time to know and understand the proper safety precautions prior to snow blowing or shoveling. Be sure to dress warm and wear layers when going outside. Go to www.PennDOT.gov winter section for additional winter safety information on driving, preparations and operations.

¹ Sources of Info: National Safety Council and Center for Disease Control and Prevention (CDC)

² Source for Shovel Photo: fullpotentialpt.com

33-24 Auger Safety

related to winter operations. One such hazard is working on or around augers. Incidents involving augers commonly result in serious or even life-threatening injuries. Those injuries can include severe cuts/lacerations and amputations. It is important for those working with augers to routinely review and reinforce safe use guidance.

When working near the moving parts of an auger:

1. Remove all power sources to the auger using established procedures. The operator shall place vehicle/equipment keys in their pocket when exiting to perform a walk around or when cleaning the spreader box.
2. If present, chock the vehicle/equipment's wheels.
3. Notify those around you that you will be working near the moving parts of the auger and secure the power sources with locks or other devices.
4. Disconnect the hydraulic hoses at the spreader, if equipped.
5. Lower the clean out plate.
6. NEVER place hands or other body parts into the auger area for any reason unless the auger has been locked out and power sources secured.
7. Keep loose fitting clothing and gloves away from an auger as they can become entangled and be drawn into the auger.
8. Be aware of residual hydraulic pressure. If there is a jam, any leftover pressure may cause the auger to turn several times once the jam is cleared.
9. When clearing auger jams: Use a longer piece of wood or other object that will break quickly and easily if the auger moves to clear material from the spreader auger (Never use a metal object). If a jam cannot be safely and easily cleared, ask for assistance and use the buddy system.
10. After any repair that has required the total disassembly of the spreader, the spreader box must be completely reassembled and shielded before functionality tests are performed on the unit.



Commonwealth Incidents:

In an example of a potentially catastrophic near miss (picture shown to right) the employee tried to clear a pinch point with their foot. In the process the employee's foot was caught between the pinch point and the auger. Residual hydraulic pressure can be released from clearing an auger jam and can cause the auger to rotate several times. Luckily, the employee

did not sustain a serious injury just a contusion to the foot. However, this could have been prevented had the employee used the proper tool to clear the jam. Fortunately, the auger was also properly disengaged/shut off. If the auger had not been disengaged/shut off the employee most likely would have sustained a catastrophic injury which could have included amputation. Be sure to always use an appropriate tool when clearing any obstruction in or near the auger.

In another example (picture shown to left) an employee had the auger engaged (still running) in the process of cleaning while spraying with a pressure washer in the wash bay. The employee lost their balance and fell towards the auger while it was running. This caused the pressure washer wand to become caught by and pulled into the auger while it was running. The pressure washer wand is metal and as you can see in the photo it was easily bent around the auger shaft. Luckily, it was not any part of the employee's body that was caught or pulled into the auger. Caution must be used when cleaning augers just as you would when performing any other work on it, ensuring that the auger is properly disengaged/turned off during cleaning. Fortunately, the employee did not sustain any serious injury. However, this could have led to a catastrophic incident such as an amputation and/or fatality.

Following proper safety practices with any piece of equipment can be the difference between going home healthy and happy or sustaining an injury that could change your life and the lives of others forever. The incidents listed above are a minor injury and a near miss which both could have ended very differently. Members of our PennDOT family have suffered catastrophic injuries from augers in the past, permanently impacting their lives and those of their families. Help us ensure these types of injuries never happen again.

33-25 Burn Awareness

According to the American Burn Association around 450,000 individuals receive hospital and emergency room treatment for burns and roughly 3,400 deaths are related to burn injuries each year. This year the first week of February is National Burn Awareness Week. To help prevent the number of deaths and injuries related to burns it is important to know the causes of burns, burn severity, treatment, and burn prevention.

Causes of Burns:

Heat: The most common cause of burns is coming in contact with exposed flames such as those used in welding or hot liquids or objects such as heated tar, running engines, radiators or exposed steam pipes. Flammable chemicals can also cause burns if they are not properly stored or handled.

Electrical: Contact with uncontrolled electrical discharge, often from damaged or misused electrical equipment or power sources, causes burns.

Chemical: Certain chemicals cause burns when coming in contact with the eyes or skin. Chemical burns also occur if they are inhaled or ingested.

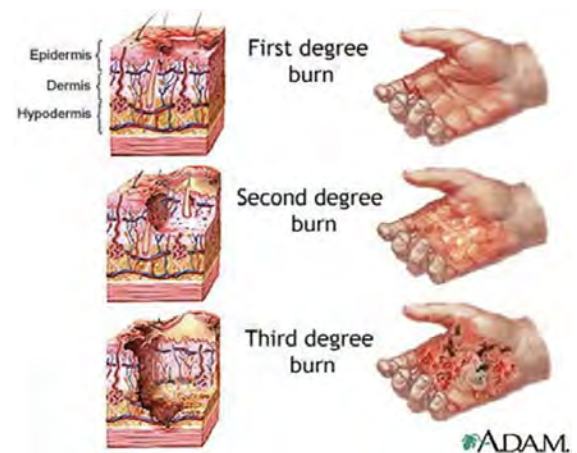
Radiation: Exposure to unshielded types of radiation such as thermal radiation, ultraviolet radiation, and ionizing and non-ionizing radiation sources such as those created by x-ray machines and used in ground penetrating moisture meter equipment. The most common type of radiation burn is caused by exposure to ultraviolet (UV) radiation from the sun. Even on cloudy days there is still the potential for sun exposure which can lead to sun burn.

Burn Severity and Treatment¹:

First-degree burns: The least damaging type of burn which involve only the outer layer of the skin. Signs of first-degree burns include redness, pain sensitivity to touch and mild swelling of the skin. To treat a first-degree burn, place the burned area under cool running water or apply a cool wet compress. Once cooled, cover the area with a sterile, non-adhesive bandage or clean cloth.

Second-degree burns: These burns extend beneath the outer layer of the skin to the inner layers. Signs of second-degree burns can include deep reddening of the skin, pain, blisters, a glossy appearance from leaking fluid and possible loss of skin in the damaged area. Treat the burn by placing the burned area under cool running water for 10 to 15 minutes or by using a cool compress. Do not apply ice, lotions, creams, butter or oil. Do not break any blisters that may form. Loosely cover the burn area with a sterile, non-adhesive bandage and secure it in place with gauze or tape. When necessary, seek medical attention.

Third-degree burns: These burns penetrate through both layers of the skin and permanently destroy tissue. Signs of third-degree burns can include the loss of skin layers, and a lack of pain. The skin may appear charred, dry and leathery, or have patches that appear white, brown or black. Treatment of third-degree burns requires immediate medical attention. The burned area should be covered with sterile, non-adhesive bandage; or if the area is large, by using a sheet or other piece of material that won't leave lint in the wound to help protect it during transport. Do not soak the burn in water or apply any ointments. Seek immediate medical treatment.



How to Help Prevent Burns:

- Ensure smoke detectors and fire suppression systems are properly maintained and tested.
- Have an emergency plan in place in the event of a fire. Designate exit routes and evacuation locations and ensure employees are properly trained.
- Always use the proper personal protective equipment (PPE) required for the task being performed such as a welding mask, apron, and gloves during hot work.
- When necessary, use shielding and insulation such as welding screens and fire blankets during hot work.
- Avoid contact with heated parts by turning machinery off and waiting for it to cool down before beginning work, such as engine maintenance.
- Ensure all radiators, steam pipes, heaters and other installed heat sources are properly insulated and that there is at least three feet of clearance.
- Ensure all electrical cords are in good condition and remove all damaged cords from use.
- Keep fuse boxes closed and report any damage to the electrical conduit to your supervisor immediately.
- Always review the Safety Data Sheet (SDS) prior to working with any chemical(s). Determine if special treatment is required for burns caused by the chemical and wear the required Personal Protective Equipment (PPE) such as rubber gloves and safety goggles when handling chemicals.
- Always wear sunscreen when outdoors for an extended amount of time. Apply sunscreen 30 minutes prior to going outside and reapply, every one to two hours, when sweating or performing work.
- When working with lasers, ensure eye protection meets the proper shade number requirements for the equipment in use.

Remember these safety tips to help prevent burn injuries from occurring. Also, keep in mind the different severities of burns require different treatment methods.

¹ Source of Information for burn severity and treatment: CDC.gov

33-26 Snowplow Safety

Snow removal is an essential job that PennDOT performs during the winter season. On top of the harsh weather conditions, snow plowing can present hazards to the operator and the public. Prior to snowplow operations, PennDOT employees should be knowledgeable of roadside hazards, conduct a dry run of the planned route and look for hazards that may be hidden by snow or ice. Operators should also be aware of wing plow specific safety and general safety tips when performing snowplow operations.

Roadside Hazards:

- Low-hanging limbs
- Utility lines
- Standing water/slush after a rain event
- Uneven road surfaces such as medians, manhole covers raised pavement and curbs
- Residential concerns, narrow streets, streets with parked cars, mailboxes, fire hydrants and street signs



Operators Should Conduct a Dry Run:

- Need to be done prior to winter and turned into your supervisors.
- During daylight hours to become familiar with the route.
- Identify the following items when conducting a dry run: drains, roadside obstructions, depressions, posted bridges, railroad crossings, assigned winter routes and safe locations to dump back and turn around.

Wing Plow Safety:

- Are to be utilized to clear pavements and shoulders of frozen precipitation. However, not permitted to be used to widen out shoulders.
- Ensure that the wing plow does not rub against the guardrail when performing operations.

- Keep in mind that when mounted to both sides of the truck wing plows can clear an additional eight to nine feet of lane width.
- It is not recommended to use the wing plow on unpaved surfaces, such as gravel shoulders.
- Check with your supervisor to see if your county has additional policies concerning wing plowing.

Additional Safety Tips:

- Always inspect the plow and all components prior to operations.
- Before stopping at intersections, begin slowing at a safe distance from the sign/signal to ensure the plow doesn't extend into the intersection.
- A loaded plow truck will not stop as easily as an unloaded plow truck.
- When plowing on bridges and overpasses, decrease speed so snow/ice is not pushed over the side of the structure onto traffic, pedestrians or waterways below.
- Remember that ice forms and snow will accumulate on bridges and overpasses before it does on adjacent road surfaces. Plowing and ice treatment are done on bridges and overpasses sooner than on roadways surfaces.
- Ensure all necessary personal protective equipment (PPE) is used when working outside of the vehicle and that plow trucks are equipped with emergency items.
- If possible, try to pull off the roadway in a safe location when experiencing issues with the truck.

PennDOT is committed to the safety of our employees. Please be sure to review the information provided when performing snowplow operations.

33-27 Proper Stretching

Stretching has many benefits including reducing fatigue, helping to prevent injuries and increasing energy. Whether you currently work at a desk, in the field or at a worksite, stretching prior to starting work and throughout the shift has overall health benefits. Below are a few recommended stretches that could be utilized throughout our workday. These stretches were selected from available information gathered from a physical therapist's article on verywellfit.com and from material available from the commonwealth's Office of Administration (OA) Safety.

Office Environment:

- **Chest Stretch:** In a seated or standing position, take your arms behind you and lace your fingers together. Lift your arms up until you feel a stretch in your chest and front shoulders. Hold this for 10 seconds, release and repeat several times. (Picture shown to the right.)
- **Shoulder Shrug:** In a seated or standing position, lift your shoulders up towards your ears squeezing them as hard as you can. Hold this for a second then roll the shoulders back as you relax. Repeat this 10 times and then roll the shoulders forward.
- **Torso Stretch:** In a seated or standing position, lace your fingers together in front of you and stretch them up towards the ceiling. Take a deep breath as you stretch up as high as you can, then release your fingers and exhale while you open your arms to the side slowly bringing them back down.



Repeat this 10 times.

- **Forearm Stretch:** In a seated or standing position, stretch your right arm out and palm down and bend your wrist so that your fingers point towards the floor. Use your left hand to gently pull the fingers towards you so you feel a slight stretch in the forearm. Hold this for 30 seconds and repeat on your left hand.
- **Neck Stretch:** While sitting in a chair, grab the side of the chair with your right hand and gently pull up while tilting your head to the left. You should feel a slight stretch down the right side of the neck and shoulder. Hold this for 30 seconds and repeat on the other side. (Picture shown to the right.)



Construction or Maintenance Environment

- **Side Bend:** Stand with your feet shoulder width apart with your hands at your sides. Slowly reach up overhead and slowly turn your body from one side to the other. Hold the position on each side and repeat on each side three times. (Picture shown to right.)

- **Hamstring Stretch:** While sitting or lying down raise your foot towards the ceiling and try to keep your leg as straight as possible until you feel some tension, have your arms assist to pull the leg upwards and hold position for five seconds. Switch legs and repeat this on each leg.
- **Quadriceps Stretch:** While standing near a wall or something secure to hold onto for balance, raise your right foot behind you until you can use your right hand to grab your foot or ankle. Hold this for five seconds and feel the pull in the front of your thigh. Repeat this on the opposite side and do this twice for each leg.
- **Toe-to-Ceiling Stretch:** Begin by standing with your feet together. Then reach down slowly and try to touch your ankles/toes. Hold this position for ten seconds, and then slowly stand back up. Next, reach your hands above your head elongating the spine and hold for ten seconds.
(Picture shown to right.)



Remember to take the time to stretch to help prevent injuries and reduce fatigue.

33-28 Spring Ahead

Winter is coming to an end and spring is right around the corner. The changing of the seasons means PennDOT will be switching over to spring operations, many will begin spring cleaning, and daylight savings time will be coming into effect. With those a new season means new hazards. Below are some tips to remember as we change into the spring season.

Considerations for Spring Operations:

- Ensure equipment and tools that are no longer needed going into the spring are properly stored.
- Beware of insects such as ticks, mosquitos and bees.
- Expect temperatures to increase which means there is a more likely chance of heat-related illnesses as well as more rainfall, and the increased potential for thunder and lightning.
- Review proper procedures for spring operations that haven't been performed recently such as crack sealing and flagger safety.

Cleaning Tips:

- Review your work area prior to cleaning and create a list of cleaning tasks.
- Think of items and areas that either aren't cleaned often or are used every day and may require a more thorough cleaning such as the sink, drawers, windows, shelves, brooms, furniture, etc.
- Create a schedule to ensure all necessary cleaning is completed, if needed.
- Be cautious when using cleaning supplies. Review safety data sheets prior to cleaning for instructions on proper use and appropriate personal protective equipment.



Daylight Savings:

- Reminder to switch clocks ahead an hour before going to bed the night before March 14, 2021.
- At home use this time to:
 - Replace the batteries in fire alarms and carbon monoxide detectors.
 - Check air filters to see if they need replaced.
 - Refresh/restock any emergency kits you may have in your personal vehicle or home.



Remember that the changing of the seasons may mean there is a change in operations and the potential hazards we face; but what never changes is PennDOT's commitment to the safety of each and every employee.

33-29 Carbon Monoxide

Gasoline, wood, coal, natural gas, propane, oil, or methane are burned. According to the Center for Disease Control and Prevention (CDC) more than 400 people unintentionally die from carbon monoxide poisoning every year. In order to protect our employees, it is important everyone be able to recognize potential sources of carbon monoxide, the symptoms of carbon monoxide poisoning and how to prevent it.

Potential Sources:

- Welding operations
- Confined spaces
- Portable generators
- Indoor forklift usage (non-battery powered)
- Powered tools and equipment
- Garage vehicle maintenance
- Gas stoves
- Furnaces/boilers



Symptoms of Carbon Monoxide Poisoning:

- Headache/dizziness/fatigue
- Nausea or vomiting
- Shortness of breath
- Confusion
- Blurred vision
- Loss of consciousness

If you or someone else is experiencing symptoms of carbon monoxide poisoning, relocate to an area with fresh air and seek medical attention immediately.

Preventing Carbon Monoxide Exposure at Home or Work:

- If you don't already have one, purchase a carbon monoxide detector with an audible alarm that alerts you when carbon monoxide levels are present.
- Ensure the batteries in your carbon monoxide detectors are replaced every six months (during daylight savings time is recommended).
- Only use fuel powered equipment in well ventilated areas.
- Use exhaust ventilation or extraction fans to remove machine exhaust from the work area if needed.
- Ensure all equipment and appliances are properly maintained by a qualified technician.
- Avoid the use of gas-powered tools in confined spaces, consider electric or compressed air, if available.
- Before entering a confined space check the air for carbon monoxide and other potentially hazardous atmospheres.
- Use caution when using space heaters and ensure adequate air flow in the area.

Since carbon monoxide is an odorless gas, ensure home and work areas where there is potential concern for carbon monoxide are well ventilated, monitored or are tested before entering the area.

33-30 Manual Lifting

Manual lifting is commonly done at work or home. However, when done incorrectly it can lead to injuries such as sprains, strains, and musculoskeletal disorders. Sprains and strains were the most common type of injury for PennDOT employees in the 2020 calendar year with 167 employees sustaining a sprain or a strain. It is imperative that everyone knows the correct lifting technique, risk factors to avoid, and strategies to help prevent injuries.

Correct Lifting Technique:

- Know the weight and size of the load to be lifted.
- Keep your feet shoulder width-apart with one foot slightly in front of the other.
- To lift the load squat down by bending with your knees (never bend with your back).
- Ensure you have a firm grip on the load.
- Maintain good posture by keeping your back straight.
- While lifting (slowly) straighten your knees and keep the load close to your body.
- If you must change direction while carrying the load, use the pivot technique, turn your body by using your feet in the direction of travel and not your waist.



correct
posture



incorrect
posture

Risk Factors to Avoid:

- Awkward postures such as bending, twisting, and reaching.
- Repetitive motions as in conducting the same motions over an extended amount of time.
- Forceful exertion by carrying and/or lifting loads that are too heavy.
- Pressure points from grasping loads awkwardly or from an unbalanced position.
- Static postures, by maintaining a fixed position such as standing or sitting for a long time.
- Environmental conditions such as poor lighting, extreme temperatures (hot or cold), excessive noise, and poor housekeeping.

Injury Prevention Strategies:

- Break a heavy load into several smaller loads when possible.
- Utilize another person, if available, to assist with lifting the load.
- Use lifting aids, when available, such as a pallet jack or a forklift. Only those properly trained and certified are allowed to operate a forklift.
- Take time to stretch prior to performing any manual lifting.

Manual lifting must be done with attention to correct lifting technique. Make this a habit to help prevent injuries.

33-31 Importance of Spotters

At PennDOT employee safety is a priority. Some tasks at PennDOT require extra oversight to ensure those performing the task are aware of hazards outside the operator's view. Spotters are used to identify and communicate those hazards to equipment operators. Spotters are used in a variety of tasks such as chainsaw operations, moving heavy equipment, forklift operations, and other tasks. A spotter's work is never easy, it requires focus, knowledge of potential hazards, and continuous communication with the operator. Below is a list of general spotter responsibilities.

Spotter Responsibilities:

- Remain visible to the operator for whom they are spotting and wear high visibility clothing appropriate for the operations.
- Remind the operator that if they lose sight of the spotter, they should stop immediately.
- Review the work area for any hazards prior to starting work.
- Be knowledgeable of any potential hazards such as blind spots/danger zones of the equipment for which you are spotting.
- Use hand signals or other appropriate communication (radios or cell phones).
- Establish eye contact with the operator before communicating signals.
- Remain focused and avoid distractions while spotting.
- Communicate with pedestrians or other equipment operators in the area.
- Move in a safe manner to avoid slips, trips, and falls. Spotters should avoid walking backwards.

- Do not attempt to perform additional duties during spotting operations.

Discussion Points:

- Have you ever been a spotter or know someone who has? Was it easy to be a spotter?
- For which jobs/operations do you think a spotter should be utilized?
- Do you think spotters need to be trained?
- Do you know of anyone who has been injured on the job because they were in a blind spot/danger zone?

When utilizing a spotter, it means working together as a team to ensure the safety of everyone at the job site. It only takes a moment to become distracted, so it is imperative spotters are constantly alert and focused on their responsibilities as the spotter.



33-32 Personal Protective Equipment

Personal protective equipment (PPE) is clothing or equipment designed to reduce employee exposure to hazards found in the workplace. PPE is important because it is the last line of defense in protecting employees when other engineering and administrative controls are inadequate to fully protect employees. PennDOT has specific PPE requirements depending on the task being performed. Anytime PPE is required it is because a hazard assessment identified specific PPE is required to help protect employees from hazards. Therefore, PPE is just as important as a machine guard or a ventilation system. PPE must be used and maintained properly in order to provide maximum protection to the wearer.

Tips for Use and Proper Maintenance:

- All PPE should be inspected prior to every use for any defects or damage.
- Reusable PPE such as safety glasses and reflective clothing must be cleaned regularly in accordance with manufacturer instructions, depending on frequency of use.
- All forms of PPE have different time frames for how long they last, although all PPE must be replaced if damaged or defective. Know the usage life of your PPE and/or its components and do not use them beyond the recommended time frame. For example, when a hard hat is in good condition the shell can be used for five years, but the suspension should be replaced every 12 months.
- Proper fit is often key. Ensure any type of PPE whether it is a high visibility vest, hard hat or gloves fits properly. If PPE does not fit properly the PPE itself could create a hazard to the user.
- PPE must be properly stored in a safe area away from chemicals and not in direct sunlight.
- Certain types of PPE must be taken out of use immediately after being activated, such as fall protection equipment and chainsaw chaps.
- Ask your supervisor if you are in doubt on when/where to use or clean PPE, what to do when it is damaged or defective, how to select the appropriate PPE, or how to properly put it on or take it off.

Discussion Points:

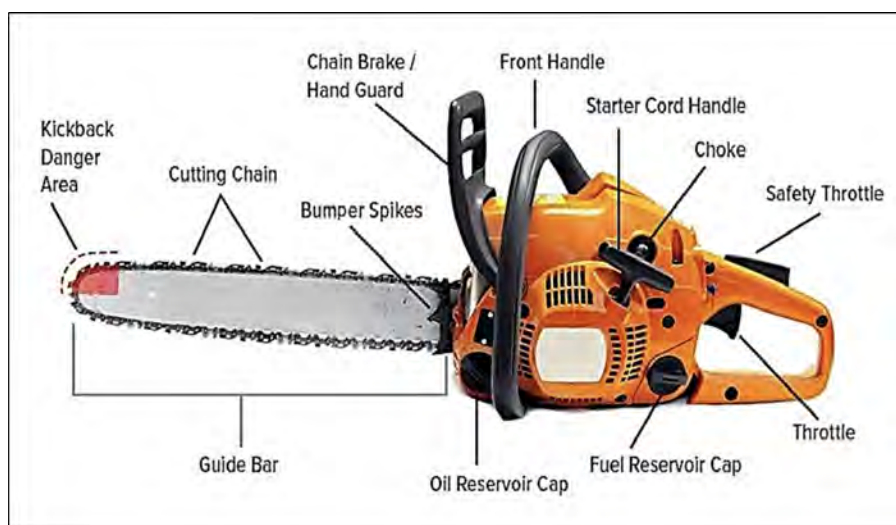
- What PPE are you going to be utilizing today?
- Does all of your PPE fit properly?
- Have employees demonstrate how they inspect their PPE prior to use.



PPE is an effective tool in the protection of employees from job specific hazards. It must be used, inspected and cared for to provide the intended protection from hazards.

33-33 Chain Saw Safety

Chain saws are a great tool both at home and in the workplace. It is imperative that those who operate a chainsaw are trained in the proper techniques and safety precautions and have reviewed the operator's manual prior to use. Chain saws, when not used correctly, can result in serious injuries or even fatalities. Below is a review of two Commonwealth injuries and chain saw safety tips to follow.



Commonwealth Incidents:

Incident 1: A crew was responsible for removing and disposing of hazard trees. Everyone on the crew was performing their assigned tasks. The planning for the tree felling operation took place the day prior to the work being performed and included establishing two escape routes. However, it wasn't noticed that the top of one of the trees was rotted/compromised. As the tree was falling it became caught on branches of the surrounding trees and the top (compromised) portion of the tree ended up snapping back. A 25-foot-long section of the tree, about 2 feet in diameter, struck the employee who had cut the tree. The employee was wearing the proper personal protective equipment and their injuries were limited to a large cut across their forehead and a concussion. However, this incident could have been much worse. There were some concerns identified during the accident investigation. The first concern was that the planning took place the day prior which is when conditions have the potential to change overnight. The second concern identified was that better escape routes should have been planned. One of the escape routes required travel uphill and the other one was behind the stump which required the employee to step off the stump causing a potential trip hazard.

Incident 2: A crew was removing trees that were hung up on other trees leaning toward the roadway. While cutting a tree that was entangled in a second tree, the tree being cut snapped off due to the weight of the second tree causing the first tree to fall unexpectedly. When the tree fell it struck a third tree causing it to fall towards the crew and strike an employee in the head. However, this employee was not as lucky as the one in the previous incident. The employee lost consciousness for two-three minutes and was flown to the nearest hospital, and to this date has not fully recovered from the incident. The investigation in this incident identified a flaw in the planning. When cutting multiple trees, the crew involved must be aware of and have a plan in place prior to starting operations, to ensure that the trees are being cut in the right order to avoid situations that would lead to future similar outcomes.

These are just two examples of chainsaw incidents that have occurred within the Commonwealth. Recently, there has been an increase in chainsaw incidents within PennDOT. It is imperative that employees know and understand PennDOT's procedures when it comes to chainsaw use. Refer to Pub 445M - Manual for Employee Safety and Health, Protocol 23 – Tree Trimming, Felling and Removal and Pub 445 Safety Policy Handbook, Chain Saw Operations.

Here are safety tips to always keep in mind when operating a chain saw.

Chain Saw Safety Tips:

- Always maintain a secure grip and footing while operating the chain saw.
- Wear the appropriate personal protective equipment (PPE): hard hat, eye and face protection, hearing protection, gloves,

safety footwear (above the ankle design with good tread) and chain saw chaps.

- Plan for the work prior to starting operations: choose a felling direction, evaluate the terrain, plan for potential hazards, identify the escape routes and ensure everyone understands their responsibilities.
- Keep people and equipment out of the fall/danger zone (two tree lengths away).
- Use a properly sharpened and tensioned chain.
- Be aware of overhead utility lines and the dangers they impose.
- Ensure all workers are aware of one another's locations and maintain communication.
- Be aware of potential kickback, pushback or pull in and how to prevent it from occurring.
- Follow proper starting, traversing, refueling, sharpening and storage practices.

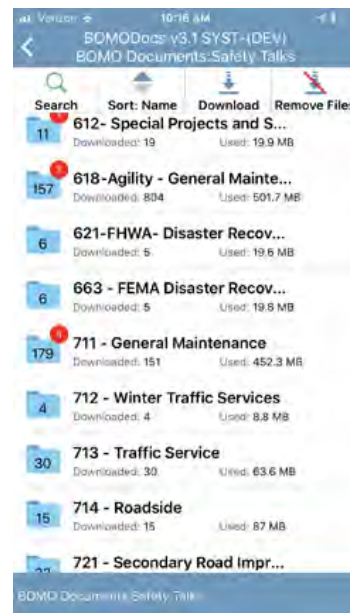
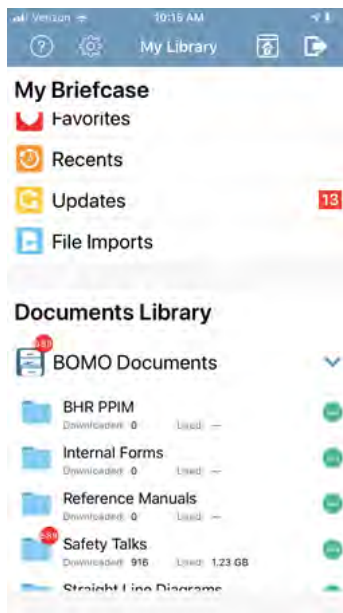
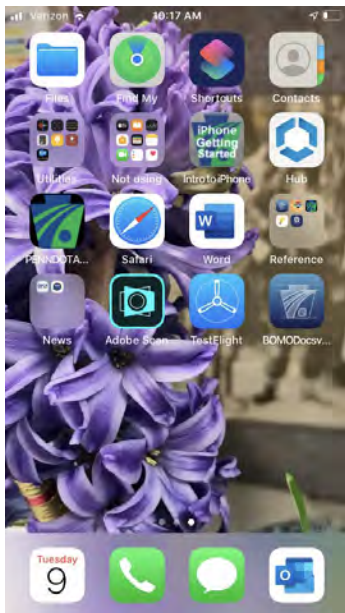
According to the National Institute of Health there are about 28,000 chain saw related injuries annually. It is imperative that any task where a chain saw is used, proper planning must take place prior to operations, only trained personnel should be utilized, and everyone involved should be knowledgeable in PennDOT's protocols/procedures.

SAFETY TALK PLATFORM (STP)

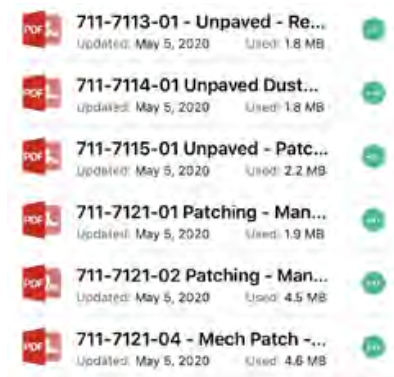
The electronic Safety Talk Platform (STP) has over 400 safety talks and can be found on the BOMODocs App which most Foremen already have downloaded on their tablet or Smart Phone.

To access: Simply go to BOMODocs

The safety talks have been arranged so that most relevant talks are associated with each assembly number.



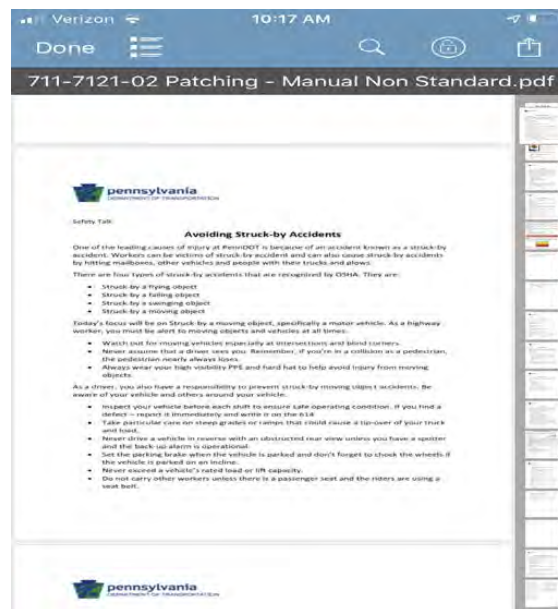
Click on the assembly number of the job you're seeking. Then click on a safety talk within that assembly number.





You can also search by a specific name, for instance if you'd like to give a talk on avoiding struck by accidents, type in "avoiding struck by accidents" to find that specific safety talk.

You can also do a free search of the entire platform by clicking on the Combined Pub 247 link at the bottom of the app.



The electronic safety talk platform can also be found on the Safety Portal at:

<https://spportal.dot.pa.gov/highway/safety/Pages/default.aspx>

