



# Safety On the Job

Second Edition

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# **Safety On the Job**

Some Guidelines for Working Safely

Second Edition

Developed by the  
Curriculum and Instructional Materials Center  
Oklahoma Department of Career and Technology Education  
[www.okcimc.com](http://www.okcimc.com)

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# Acknowledgments

Project Manager: Craig Maile  
Design: Amy Haney

This Second Edition of CIMC's *Safety On the Job* owes much to many people. Appreciation is due first to the people who helped to create the first edition, in 1989. I was the technical writer on that edition, and I still appreciate the foresight and the commitment of everyone involved. Also instrumental to this new edition is the work of the many writers, editors, and experts who collaborated to develop the reference resources consulted for this edition. (Those titles are listed on the "References" pages.) Employers and employees have a wealth of expert opinion and helpful information available to them in these and other publications, particularly those from the Occupational Safety and Health Administration (OSHA) and the National Institute for Occupational Safety and Health (NIOSH). Thanks are also due the teachers, trainers, employees, and employers in Oklahoma and across America who have relied upon *Safety On the Job* as a training resource and reference since 1989.

## SPECIAL THANKS

This publication could not have been printed without the expertise and commitment of the Printing Plant staff, under the supervision of Danny Darrow. Delivery of the final product was accomplished through the excellence of the Curriculum Customer Service staff, under the direction of Lana Austin, and the CIMC Warehouse staff, under the direction of Darrell Stiles.

Craig A. Maile  
CIMC Manager



# Purpose and Disclaimer

The purpose of *Safety On the Job* is to promote awareness of safe work practices. This greater awareness might contribute to reducing the costs associated with job-related accidents and injuries. As a supplement to existing safety training resources and standards, this book can also promote safety attitudes and help to support safety concepts. *Safety On the Job* should not be a substitute for comprehensive safety training in each of the areas discussed. Each job site and facility is different, and the job-related hazards at each workplace are different. The scope of this book is limited. To be complete, your training program should address the specific hazards and requirements for your workplace.

This publication relies upon information believed to be reliable and to represent current opinion on the subject of safety in the workplace. No warranty or guarantee is made by the Oklahoma Department of Career and Technology Education (ODCTE) or other contributors as to the absolute correctness or sufficiency of any material contained in this publication. The ODCTE and contributors assume no responsibility in connection herewith, and it cannot be assumed that all acceptable safety measures are contained in this publication or that other or additional measures may not be required under particular or exceptional circumstances.



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# Recognizing the Need for Safety On the Job

In this section, you will:

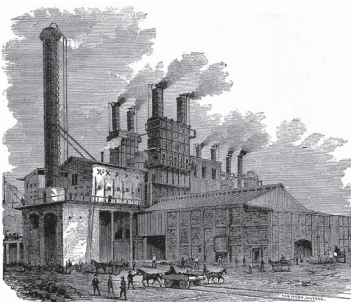
- Profile the history of safety on the job.
- Identify common workplace hazards.
- Identify some hazards common to specific industries or occupations.
- Identify the top causes of recent workplace fatalities.
- State responsibilities of employers and employees for safety.



## History of Safety On the Job

The workplace has always been a dangerous place. During the industrial revolution in the second half of the 1800s, people moved from rural areas to the cities, looking for work. The working conditions they often found were very poor: work areas were overcrowded, and 14- to 16-hour workdays were common. Working conditions were often a low priority. Illnesses and accidents—even deaths—caused by poor working conditions were accepted as inevitable.

The work itself was often brutal and unsafe. Early factories were dirty, noisy, and smelly. They were cold in the winter and hot in the summer. The work was repetitive, exhausting and dangerous. In 1900, the average workweek in manufacturing was 53 hours. Child labor was common at the time—and many families needed the income earned by their children. The 1900 census counted 1.75 million individuals aged 10 to 15 who were gainful workers. At that time, these children comprised 6 percent of the labor force. No government or employer aid existed if workers suffered job-related injuries or lost their jobs. If you were injured on the job in 1900, your only opportunity for compensation was to sue for damages. Such lawsuits were generally unsuccessful.

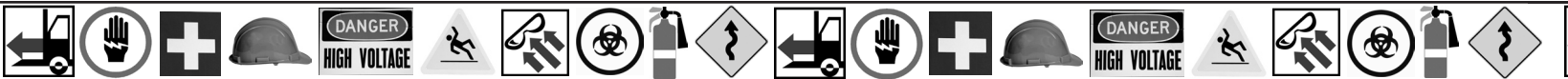


Until 1970, no uniform and comprehensive provisions existed for protecting workers against workplace safety and health hazards. The Occupational Safety and Health Act of 1970 authorized the Secretary of Labor to establish occupational safety and health standards in the workplace. Workplace safety has improved dramatically. Statistics show that workplace accidents are less common and that the workplace is a much safer place today.

# Common Workplace Hazards

Even though the workplace today is safer than it was 100 years ago, working is still dangerous. Nonfatal accidents happen every day. These accidents lead to injury and lost work time. Accidents happen because hazards exist in every workplace. The forms of these hazards vary; they may include sharp edges, falling objects, flying sparks, chemicals, noise, and many others:

- When handling materials, the potential hazards include using forklifts unsafely; improperly stacking materials; failing to use the proper PPE; and injuries from repetitive motions. Back injuries can result from improper lifting or lifting a load that is too heavy. According to the Occupational Safety and Health Administration (OSHA), about 100 employees are killed and 95,000 injured every year while operating forklifts.
- Using hand tools and power tools can create hazards. Powder-actuated tools act like a loaded gun! You must treat them with extreme caution. They are so dangerous, they must be operated only by employees who have completed special training.
- A head injury could affect you for life—it could even be fatal.
- Amputations are among the most severe and disabling workplace injuries. They often result in permanent disability. Machinery accounts for the majority of amputation cases in industry. Other safety hazards could affect the machine operator and nearby workers. Kickbacks can happen when a saw seizes the stock and hurls it back at the operator. The machine could also expose workers to chips and splinters that are flung by the machine’s cutting action. Parts of a machine, such as a cutter head, could also be flung at workers if they break, are poorly mounted, or become unbalanced.
- Your job-related activities may involve hazardous materials in different forms and amounts. These substances introduce risks to you in the form of health hazards and physical hazards. Physical hazards are present with combustible liquids, explosives, reactive (unstable) substances, water-reactive materials, and other substances. Health hazards are present with substances such as corrosives, irritants, carcinogens (cancer-causing materials), toxic agents, and others.
- Coming in contact with an electrical voltage can cause current to flow through the body. Electrical shock, burns, and death can result.
- Working outdoors involves heat and cold hazards. Unprotected exposure to the sun can lead to sunburn, skin cancer, and eye problems (such as cataracts and other damage). Prolonged exposure to heat can lead to heat cramps, heat exhaustion, and heat stroke. Heat stroke is a medical



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emergency that is potentially fatal and is the most severe type of heat-related illness. Working outside the normal hours of work can also affect your safety. Shiftwork involves both health and safety concerns. Sleep loss makes it much easier to fall asleep at inappropriate times. This affects your ability to perform safely and efficiently. Sleepiness can affect performance both on and off the job. Driving to and from work is a major concern. Sleepiness affects the ability to concentrate or pay attention, and driving requires you to pay attention at all times. So, if you are sleepy, it is easier to have an accident. Several jobs, such as those involving operation of dangerous machinery, also require you to pay attention at all times. Sleepiness can be risky in many different occupations. This risk is not simply a matter of falling completely asleep. After sleep loss, it is possible to have very brief periods of sleep that last only a few seconds. Most people may not even realize these short sleeps are happening. During those few seconds of sleep, they are not paying attention at all. If something dangerous happens at those times, you or someone else could get seriously hurt.

In addition to these general hazards, workers in specific industries and occupations experience more of a specific hazard. For example, workers in late night retail businesses—such as gas stations and convenience stores—face the hazard of violence more than many other workers. This is also true for workers in hospitals and other healthcare facilities. Assaults may occur in these settings when service is denied, when a patient is admitted involuntarily, or when the worker attempts to set limits. Workers in the construction industry must work with the risks of trench cave-ins, falls, accidents with tools, and being struck by heavy objects or equipment. They can often be struck by oncoming traffic in work zones. Workers in grocery stores often suffer from repetitive motion injuries due to lifting objects to stock shelves. In manufacturing, working with and around machinery may pose a risk of amputation.

*Agricultural production is the most hazardous occupation in America.* Each year, accidents in agricultural work cause thousands of injuries and hundreds of deaths. For young agricultural workers age 15-17, the risk of fatal injury is four times the risk for young workers in other workplaces. Health and safety hazards in agriculture include: chemicals/pesticides; cold; dust; electricity; grain bins; hand tools; highway traffic; lifting; livestock handling; machinery/equipment; manure pits; mud; noise; ponds; silos; slips, trips, and falls; sun/heat; toxic gases; tractors; and wells. The agricultural workplace is also unique from other workplaces. For many agricultural workers, the workplace is also their home. This often means that workplace safety issues must also address children and others who may be present. Because much of the work in agriculture takes place in rural areas, work-related accidents can have more serious consequences. Many rural communities may





not have the same access to emergency medical services as in many non-rural areas.



**Did you Know?** Falls from elevations occur in all industries, in all occupations, and in a myriad of work settings, from the ironworker connecting steel columns 200 feet in the air, to the laborer washing windows from a suspended scaffold 60 feet from the ground, to the stock clerk retrieving goods from a shelf using a 4-foot stepladder.

Source: *Worker Deaths by Falls: A Summary of Surveillance Findings and Investigative Case Reports*. U.S. Department of Health and Human Services, Public Health Service, Centers for Disease Control and Prevention, National Institute for Occupational Safety and Health, 2000.

Work can not only injure and disable you—work can kill. According to the U.S. Bureau of Labor Statistics, of the more than 5800 workplace fatalities in 2006:

- Transportation incidents accounted for 42% of the total
- Contact with objects and equipment accounted for 17%
- Falls accounted for 14% (nearly two in five fatal falls were from roofs or ladders)
- Assaults and violent acts accounted for 13%
- Exposure to harmful substances and environments accounted for 9%
- A higher percentage of fatal work injuries to women resulted from highway incidents and homicides than for men
- The industry sectors having the highest fatality rates (per 100,000 employed) are construction; transportation and warehousing; agriculture, forestry, fishing, and hunting; and mining



## Responsibilities for Safety

Maintaining a safe workplace requires a commitment every day to working safely. This commitment applies to employers as well as employees. Each has specific safety responsibilities on the job. Employer



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responsibilities that relate to the Occupational Safety and Health Act of 1970 include:

- General responsibilities
  - Complying with standards, rules and regulations issued under the Occupational safety and Health Act of 1970
  - Be familiar with mandatory OSHA standards and making copies available to employees for review upon request
- Employee communication responsibilities
  - Informing all employees about OSHA
  - Posting—in a prominent location in the workplace—the OSHA poster informing employees of their rights and responsibilities (OSHA 2203)
  - Using color codes, posters, labels, or signs when needed to warn employees of potential hazards
  - Not discriminating against employees who properly exercise their rights under the Occupational Safety and Health Act of 1970
- Hazard analysis and training responsibilities
  - Providing a workplace free from recognized hazards that are causing or are likely to cause death or serious physical harm to employees
  - Examining workplace conditions for conformance to applicable standards
  - Minimizing or reducing hazards
  - Making sure employees have and use safe tools and equipment
  - Ensuring that tools and equipment are properly maintained
  - Establishing or updating operating procedures and communicating those procedures to employees
  - Providing training required by OSHA standards
- Recordkeeping and reporting responsibilities
  - Keeping required records of work-related injuries and illnesses
  - Providing access to employee medical records and exposure records to employees or their authorized representatives
  - Reporting to the nearest OSHA office—within 8 hours—any fatal accident or one that results in the hospitalization of three or more employees
- Inspection responsibilities
  - Cooperating with the OSHA compliance officer during an inspection



- Posting OSHA citations at or near the worksite involved
- Abating cited violations within the prescribed period

**Employee safety responsibilities include:**

- Following all OSHA standards that apply to your work and workplace
- Following your employer’s safety and health rules and regulations
- Using the appropriate personal protective equipment
- Reporting any hazardous conditions that you become aware of
- Using the right tools for the job and using those tools in the right—safe—ways
- Reporting any job-related injury or illness to your employer and getting prompt treatment for it



**Did you Know?** OSHA Quick Cards are available for working with many types of hazards. They are available in PDF and HTML versions in both English and Spanish. To access the OSHA Quick Cards, go to: [www.osha.gov/OshDoc/quickcards.html](http://www.osha.gov/OshDoc/quickcards.html).



Notes...

# Summary

- The workplace has always been a dangerous place.
- The Occupational Safety and Health Act of 1970 authorized the Secretary of Labor to establish occupational safety and health standards in the workplace.
- Workplace safety has improved dramatically. Statistics show that workplace accidents are less common and that the workplace is a much safer place today.
- Nonfatal accidents happen every day because hazards exist in every workplace. The forms of these hazards vary.
- Safety hazards also exist for workers who work outdoors or who work in shifts.
- Workers in specific industries and occupations experience more of a specific hazard.
- Agricultural production is the most hazardous occupation in America.
- Transportation incidents top the list of causes of recent workplace fatalities.





# Lifting and Moving Materials

In this section, you will:

- Identify potential hazards from handling materials.
- Learn the steps for safe lifting, alone and as a team.
- Identify hazards when using handtrucks.
- Learn how to use a handtruck safely.
- Learn how to work with or around a forklift safely.



## Potential Hazards

Workers face a number of hazards when handling materials. According to the Occupational Safety and Health Administration (OSHA), the potential hazards include using forklifts unsafely; improperly stacking materials; failing to use the proper PPE; and injuries from repetitive motions.

Back injuries can result from improper lifting or lifting a load that is too heavy. Some factors that contribute to injuries from lifting are:

- **Weight**—Overestimating your physical abilities and lifting objects that are too heavy
- **Size**—Moving an object that you have the ability to move, but that is too long or high or wide to move safely
- **Shape**—Moving an object that you have the ability to move, but that has an odd shape that makes safe lifting or moving difficult
- **Obstructions**—Stacking materials so high that your vision is limited or blocked completely while moving the materials
- **Wrong position**—Twisting or turning into an awkward position while lifting
- **Wrong storage**—Storing heavy objects on the floor so that lifting results in strain
- **Unsafe reaching**—Using chairs, boxes, or other objects to reach items, instead of using a step or a ladder



## Steps for Safe Lifting

To lift objects safely alone:

1. Size up the load to make sure you can handle it alone.
2. Place your feet close to the object and about 12 inches apart.
3. Bend your knees, grip the object securely, the lift the load straight up. Push with your legs while keeping your back straight and keeping the load close to your body. If needed, wear the right gloves for a secure grip and wear safety shoes with steel toes.
4. To turn your body after lifting the load, turn with your feet. Do not twist at the waist.
5. Check your path of travel to be sure it is clear of people and objects.
6. Lower the load by bending your knees.

To lift objects safely as a team:

1. Stay close to the load.
2. Distribute the load equally. For long objects, carry the object at the same level and on the same side of the body.
3. Give directions while lifting and moving. Plan the job and the path of travel before you lift.
4. Watch out for the other lifter (if one of you must walk backwards).
5. Set the load down in the reverse order of lifting it.

## Using Handtrucks

Using a two-wheeled handtruck may seem simple, but it poses hazards to your safety:

- Handles—Jamming your hands against door frames, walls, stock, etc.
- Wheels—Crushing your feet by pulling the truck, instead of pushing it; running off the edge of raised surfaces
- Tongue (the part inserted under a load)—Hitting other persons with the tongue, stepping on the tongue when the truck is improperly left in a horizontal position



Notes...

To use a handtruck safely, you should:

- Keep a low center of gravity for the load. Place heavy objects beneath lighter objects.
- Tip the load forward slightly so the tongue can slide under the load.
- Push the tongue completely under the load. It should be covered completely by the load.
- Place the load so it will not slip, shift, or fall.
- Load the truck to a height that allows a clear view of the path ahead.
- Secure the load before moving it.
- Balance and push the load—let the truck carry the load.
- Carry the weight of the load on the axles, not on the handles.
- Face forward at all times. You must be able to see the truck and any objects in its path.
- Control the truck: keep a safe speed, hold onto both handles, and make slow and wide turns to avoid tipping.
- Store the truck properly after using it—stand it up in the designated area.

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**Did you Know?** OSHA requires operator training and licensing for forklift operators, as well as periodic evaluations of operator performance. Refresher training is required if the operator is observed operating the truck in an unsafe manner, is involved in an accident or near miss, or is assigned a different type of truck. The Fair Labor Standards Act, or FLSA, is the primary law that governs the employment of youth under age 18. The FLSA includes work declared hazardous for youth by the Secretary of Labor. Using forklifts and similar equipment in nonagricultural industries by workers under age 18 is prohibited.

Source: *NIOSH ALERT: Preventing Injuries and Deaths of Workers Who Operate or Work Near Forklifts* [DHHS (NIOSH) Publication No. 2001-109]. Department of Health and Human Services, National Institute for Occupational Safety and Health, June 2001.





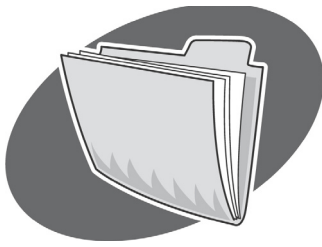
## Using Forklifts

According to OSHA, about 100 employees are killed and 95,000 injured every year while operating forklifts (also called powered industrial trucks). A large percentage of the fatalities are due to forklift overturns. If you operate or work near a forklift, you should follow these guidelines:

- Do not operate a forklift unless you have been trained and licensed.
- Wear seatbelts if they are available.
- If any damage or problems with the forklift occur while you are using it, notify your supervisor.
- If a sit-down type forklift is overturning, do not jump from it. Stay with the truck, holding on firmly and leaning in the opposite direction of the overturn.
- Exit from a stand-up type forklift with rear-entry access by stepping backward if a lateral tipover occurs.
- Use extreme caution on grades or ramps.
- On grades, tilt the load back and raise it only as far as needed to clear the road surface.
- Do not raise or lower the forks while the forklift is moving.
- Do not handle loads that are heavier than the weight capacity of the forklift.
- Operate the forklift at a speed that allows you to stop safely.
- Slow down and sound the horn at cross aisles and other places where your vision is obstructed.
- Look toward the travel path and keep a clear view of it.
- Do not allow passengers to ride along unless a seat is provided.
- When dismounting from a forklift, set the parking brake, lower the forks or lifting carriage, and neutralize the controls.
- Do not drive up to anyone standing in front of a bench or a fixed object.
- Do not use a forklift to elevate workers who are standing on the forks.
- Elevate a worker on a platform only when the vehicle is directly below the work area. Secure the elevating platform to the lifting carriage or forks.
- Use a means of restraint for the worker(s) on the platform (rails, chains, body belt and lanyard, etc.).
- Do not drive to another location with the work platform elevated.



Notes...



**Case Report**—A 47-year-old assistant warehouse manager was fatally injured while working with a forklift operator to pull tires from a storage rack. The two workers had placed a wooden pallet on the forks of the forklift, and the victim then stood on the pallet. The operator raised the forks and victim 16 feet above a concrete floor to the top of the storage rack. The victim had placed a few tires on the pallet when the operator noticed that the pallet was becoming unstable. The victim lost his balance and fell, striking his head on the floor.

**Source:** *National Institute for Occupational Safety and Health*

## Summary

- Handling materials poses a number of hazards, including the potential for back injury.
- Lifting objects safely alone includes lifting and lowering the load by bending your knees.
- Lifting objects safely alone includes turning with your feet—not twisting at your waist.
- Lifting objects safely as a team includes carrying the object at the same level and on the same side of the body.
- A two-wheeled handtruck poses safety hazards at its handles, wheels, and tongue.
- Using a handtruck safely involves following general guidelines.
- Forklifts kill some 100 workers each year and injure another 95,000. Many of the deaths are due to overturns.
- Using a forklift safely involves following general guidelines.





# Using Tools and Ladders

In this section, you will:

- Identify the sources of hazards with tools.
- Learn guidelines for working safely with tools every day.
- Learn safety rules for using specific hand tools.
- Learn safety rules for using specific power tools.
- Learn safety rules for using portable ladders.



## Tool Hazards

Hand tools are tools that are powered manually—by your own hands. They include anything from axes to wrenches. Using the right tool for the job can make the task easier; using the wrong tool—or using the right tool in the wrong way—can result in a poor job or even personal injury. Power tools can make projects go more quickly and easily. However, they can also lead to injury and even death if you do not handle them correctly. Common causes of accidents with power tools include:

- Human failure—using the wrong tool for the job, using the right tool in the wrong way, or using a defective tool
- Hazardous equipment
- Pure accident

According to OSHA, the greatest hazards posed by hand tools result from misuse and improper maintenance.

## Safety Every Day

- Wear appropriate clothing that fits properly.
- Use the right kind of personal protective equipment.
- Remove rings and dangling jewelry and tie back long hair.
- Keep work areas clean and organized.
- Return all tools to their proper storage areas after each use.



- Use the right tool for the job.
- Keep tools and equipment properly adjusted and repaired.
- Know the locations and proper use of fire extinguishers.
- Make sure that fire extinguishers are charged.
- Place oily or greasy rags in covered metal containers.
- Turn off electrical equipment after each use.
- Replace frayed electrical cords.
- Use safe lifting techniques.
- Stay alert to possible hazards.
- Report or correct any unsafe conditions.

## Using Hammers

Hammers are driving tools. Driving tools are used to force other objects to move.

- Use the right kind of personal protective equipment.
- Use the right hammer for the job.
- Wear safety goggles when using a hammer with a striking tool, such as a chisel or stake.
- Never strike a mushroomed tool.



**CAUTION:** Splinters could strike you in your eyes.

- Do not strike two hammer faces together.
- Hold the hammer near the end of the handle.

**NOTE:** This will increase your accuracy and decrease your chances of hitting your fingers.

- Check for a tight handle before using a hammer.
- Strike hammer blows squarely with the face of the hammer.

## Using Screwdrivers

Screwdrivers are turning tools. Turning tools are used to turn fasteners such as screws, nuts, and bolts.

- Use the right kind of personal protective equipment.
- Use the right screwdriver for the job.



Notes...

- Use the right size blade or bit for the screw.

**NOTE:** The wrong size blade or bit can cause the screwdriver to slip.

- Do not use a screwdriver to pry objects.
- Do not hold onto the screw while using a screwdriver.

**CAUTION:** The screwdriver could slip and cut your hand.

- Keep the tip of a screwdriver away from power outlets and other sources of electrical current.
- Clean screwdriver handles after every use.

## Using Wrenches

Wrenches are turning tools. Turning tools are used to turn fasteners such as screws, nuts, and bolts.

- Use the right wrench for the job:
  - Crescent/adjustable wrench—use to apply force in one direction
  - Open-end wrench—use where you have room for movement
  - Box-end wrench—use where you have limited room for movement
  - Combination wrench—use when you need an open-end or box-end wrench
  - Pipe wrench—use to work with pipes and rods
  - Socket wrench—use when the fastener is recessed or hard to reach
- Make sure the wrench fits tightly on the nut or bolt.

**NOTE:** Make sure the wrench fits the fastener.

- Do not use an “extender” on the handle of any wrench.

**CAUTION:** You could injure yourself, damage equipment, or break the wrench if the extender slips.

- With crescent/adjustable wrenches, apply force on the fixed jaw—not on the adjustable (weaker) jaw.

## Using Pliers

Pliers are holding tools. Holding tools are used to grip and securely hold materials or objects.



- Use the right kind of pliers for the job.

**EXAMPLE:** You could damage long-nose (needle-nose) pliers by using them to bend thick wire.

- Use the right kind of personal protective equipment.
- Do not use pliers to hammer an object.

## Using Files

- Use the right kind of file for the job.

**NOTE:** The right file can help prevent injuries, increase the life of the file, and make the job easier.

- Do not use a file that does not have a secure handle.

**CAUTION:** The exposed tang could pierce your hand and cause a serious injury.

- Clean files with a file-cleaning card only—not by striking the file against another object.

**NOTE:** Files can chip easily.

- Do not hammer or pry an object using a file.

**NOTE:** Files can chip and break easily. Use a file for filing, not for hammering, prying, punching, chiseling, or other uses.

- Clamp the work to be filed in a vise at about waist-height.

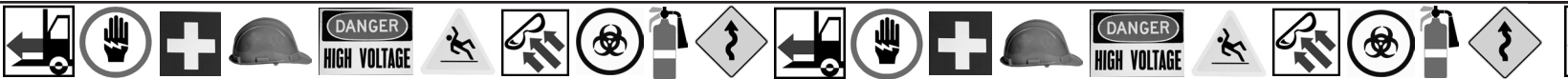
**NOTE:** To file, you must apply pressure. The pressure could cause the object to move or to slip.

- Hold the file handle securely in one hand and guide the point of the file using the thumb and index finger of the other hand.

**NOTE:** This technique will help you to control the file and to complete the job safely.

- Push the file forward as you press down on it, then release your pressure on the file on the return stroke.

**NOTE:** If you do not release your pressure on the return stroke, you will wear out the file teeth quickly.



Notes...

## Using Handsaws

- Use the right kind of personal protective equipment.
- Use the right kind of handsaw for the job:
  - Crosscut saw—use to cut across the grain of wood
  - Ripsaw—use to cut with the grain of wood
  - Compass/keyhole saw—use to cut inside corners, curves, and circles
  - Coping saw—use to cut curves and to shape ends of molding and trim for joints
  - Hacksaw—use to cut metal
- Check the cutting material for nails and other metal before cutting.
- Hold the cutting material securely.
- Keep your hands at a safe distance from the saw blade as you cut.
- Do not force a saw blade into a cut—it could bend or break the saw blade.

**EXAMPLE:** Coping saw blades are thin and can break easily.

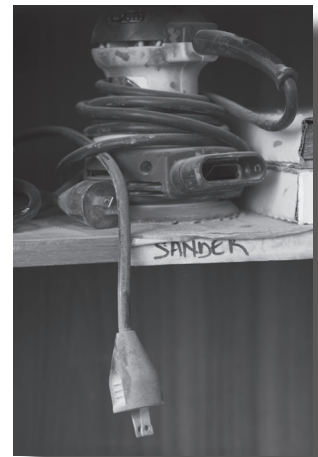
- Ease up on the pressure when reaching the end of the cut.
- Clean saw blades with a lightly oiled cloth after each use and before storing.
- Use the proper guards on saw blades after use.

## Using Power Tools

- Wear the right clothing for the job.

**CAUTION:** Loose clothing or jewelry can become caught in moving parts.

- Never carry a power tool by its cord.
- Never use a damaged power tool.
- To disconnect a power tool, tug on the plug, not on the cord.
- Keep cords away from heat, oil, and sharp edges.
- Disconnect power tools:
  - When you are not using them,
  - Before servicing and cleaning them, and





- o When changing accessories such as blades, bits, and cutters.
- Secure the work with clamps or a vice, as appropriate.
- Avoid accidental starting—keep your fingers off the starting switch/button while carrying a tool that is plugged in.
- Keep power tools clean and sharp for top performance.
- Follow the user’s manual for instructions about maintenance and accessories.
- Maintain a good footing and balance while operating any power tool.

## Using a Portable Circular Saw

A portable circular saw is common for cutting lumber and masonry materials.

- Keep the power cord free of the blade.
- Make sure the automatic guard is free and retractable. Never remove the guard or lock it in the retracted position.
- Check the stock for nails and any other metal before cutting.
- Use a good, solid support for the stock while cutting.
- Allow the saw to reach its maximum speed before starting the cut.
- Set the blade deep enough to cut through the stock only.
- Lay the saw on its side after finishing the cut.

**CAUTION:** Do not put the saw down until the blade stops completely.

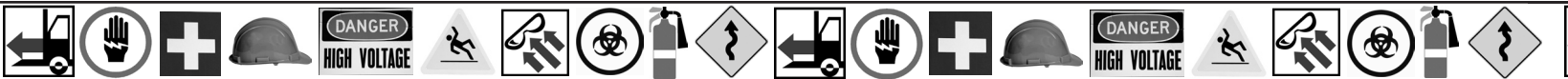
## Using a Portable Drill

A portable drill can be used for both turning and cutting. Fitted with the proper bit, it can turn screws and bolts or drill holes. Cordless drills are powered by rechargeable battery packs. Keyless-chuck models are designed for hand-tightening of the drill bit.

- Wear the proper type of eye protection (such as safety goggles).
- Remove the chuck key before starting the drill.

**NOTE:** The chuck key locks the drill bit into the chuck.

- Do not stop the drill by holding onto the chuck.
- Do not force the drill bit into the stock.



Notes...

**CAUTION:** Secure small items being drilled, to keep them from moving.

- On deep cuts, back out the drill often to clear the hole.
- Never hold the drill against your body.

## Using a Power Nailer/Nail Gun

A power nailer—also called a nail gun—uses compressed air to drive nails quickly and efficiently.

- Never point a nail gun or staple gun at anyone.
- Do not lift the tool by its power cord.
- Use only the nails and staples designed for the tool.
- Keep your hands and body away from the discharge end of the tool.

## Using Powder-Actuated Tools

Powder-actuated tools act like a loaded gun! You must treat them with extreme caution. They are so dangerous, they must be operated only by employees who have completed special training. When using a powder-actuated tool, you must follow these guidelines:

- Do not use the tool in a flammable or explosive atmosphere.
- Inspect the tool before using it. Make sure it is clean, moving parts operate freely, the barrel has no obstructions, and the proper shield, guard, and attachments are in place.
- Do not load the tool unless you will use it immediately.
- Do not leave a loaded tool unattended.
- Keep your hands clear of the barrel end of the tool.
- Never point the tool at anyone.

If you are applying fasteners with a powder-actuated tool:

- Do not fire fasteners into material that would allow the fasteners to pass through to the other side.
- Do not drive fasteners into material that is very hard or very brittle—the material could chip or splatter, or make the fasteners ricochet.
- Always use an alignment guide when shooting fasteners into existing holes.



## Using Fuel-Powered Tools

Fuel vapors from these tools can burn or explode. When using these tools, make sure that you follow these guidelines:

- Handle, transport, and store gas or fuel only in approved flammable liquid containers.
- Before refilling the tool, turn the engine off and allow it to cool. This can prevent accidental ignition of hazardous vapors.
- When using a fuel-powered tool in an enclosed area, use proper ventilation and/or respirators as appropriate. This can prevent you from breathing carbon monoxide. You must also make sure that fire extinguishers are available in the area.

## Using Portable Ladders

Falls from ladders are a common source of falls from elevations. Ladders range from 2-foot stepladders to 72-foot, three-section extension ladders and fixed ladders that can extend hundreds of feet. Many ladders include built-in safety features; others are available as retrofits. These features include slip-resistant rungs/steps, positioning feet that fully articulate, top and bottom stabilizers, and a glide-rail system for use with a full body harness.

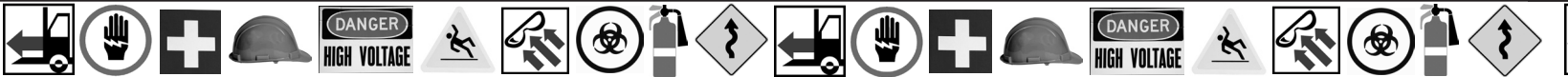
Several factors contribute to falls from ladders. They include ladder slip, overreaching, slipping on rungs/steps, defective equipment, and using the wrong ladder for the job. Stepladders and extension ladders have appropriate uses; using the wrong ladder for the task can increase your risk of falling.

To use a ladder safely:

- Choose the right ladder for the job. When choosing between a self-supporting ladder (stepladder) and a straight or extension ladder, consider the bottom (working) surface and the top support conditions.
- Make sure the ladder is long/tall enough to safely reach the work area; has a load rating that can support the weight of the user, materials, and tools; and has non-conductive side rails when used near energized equipment.

When using a straight or extension ladder:

- Use the ladder only on stable or level surfaces, unless the ladder is secured to prevent accidental movement.
- Extend the ladder side rails at least 3 feet above the upper landing to which the ladder is



Notes...

used to gain access.

- Make sure both rails maintain equal contact with the supporting structure.
- Set up the ladder so that the height-to-base ratio is 4 feet to 1 foot (for every 4 feet of length, extend the ladder from the vertical surface/wall 1 foot). For example, the feet of a 16-foot ladder should be placed 4 feet from the wall.
- Use adjustable feet to level the ladder, if applicable.
- When climbing up or down, have another person hold the ladder, or tie/stake the ladder in place at top and bottom.
- Never lean more than 12 inches beyond either side rail.
- Carry small tools and other work materials in your clothing or attached to a tool belt.
- Stop climbing when you reach the third-highest rung—it is the maximum climbing height.

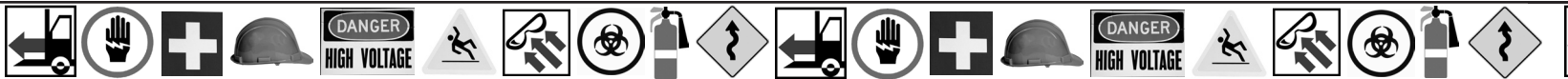
When using a stepladder:

- Use a stepladder only on a solid, level surface.
- Never use a folded stepladder as a straight ladder.
- Fully extend and lock the spreaders.
- Never climb or stand on the leg braces, the top step, or on the service tray.
- Avoid using an unprotected stepladder in a doorway or in high-traffic areas.
- When working in a high-traffic area, lock or barricade doors, mark the area off, or have a co-worker monitor the area while work is underway.
- Carry small tools and other work materials in your clothing or attached to a tool belt.
- Keep all ladders free of oil, grease, and other slipping hazards.
- Use ladders only for their intended purpose.
- Do not use ladders on slippery surfaces unless the ladder is equipped with slip-resistant feet.
- Keep areas clear around the top and bottom of ladders.
- Do not move, shift, or extend ladders while using them.
- Face the ladder when moving up or down.
- Maintain 3-point contact with a ladder—two feet and one hand, or two hands and one foot, must be in contact with the ladder at all times.
- Do not carry objects or loads that could cause you to lose your balance and fall.



# Summary

- The greatest hazards posed by hand tools result from misuse and improper maintenance.
- Working safely with tools every day includes using the right tool for the job, using the right kind of PPE, and staying alert to possible hazards.
- Safety rules exist for using specific hand tools and power tools.
- Powder-actuated tools must be operated only by someone who has completed special training.
- Fuel-powered tools create vapors that can burn or explode.
- Falls from ladders are a common source of falls from elevations. Several factors contribute to falls from ladders. They include ladder slip, overreaching, slipping on rungs/steps, defective equipment, and using the wrong ladder for the job.



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# Using Personal Protective Equipment (PPE)

In this section, you will:

- Make the connection between PPE and safety.
- Identify categories of PPE and types of PPE within each category.
- Learn general guidelines for inspecting and using types of PPE.



## PPE and Safety

Hazards exist in every workplace. The forms of these hazards vary; they may include sharp edges, falling objects, flying sparks, chemicals, noise, and many others. The Occupational Safety and Health Administration (OSHA) requires employers to protect employees from workplace hazards that can cause injury. The best way to control a hazard—and protect workers—is at the source of the hazard. Two common ways of controlling a hazard are engineering controls and work practice controls. Building a barrier between the hazard and the workers is an example of an engineering control. Changing the way that workers do their work is an example of a work practice control. When these controls are not possible or do not provide enough protection, then employers must provide personal protective equipment—or PPE—for their employees and must make sure that workers use this equipment. PPE refers to equipment worn to minimize your exposure to a variety of hazards. Examples of PPE include gloves, foot and eye protection, hard hats, earplugs and muffs, respirators, and full body suits.

Both employers and workers must cooperate to get the greatest possible protection. In general, employers are responsible for: performing a “hazard assessment” of the workplace to identify and control physical and health hazards; identifying and providing appropriate PPE for employees; training employees in using and caring for PPE; maintaining PPE and replacing worn or damaged PPE; and reviewing, updating and evaluating the effectiveness of the PPE program periodically.

In general, employees are responsible for:

- Properly wearing PPE.
- Attending training sessions on PPE.
- Caring for, cleaning and maintaining PPE.
- Informing a supervisor of the need to repair or replace PPE.



Many different OSHA standards include detailed requirements for PPE. You can access complete publications about specific hazards and PPE requirements from OSHA online at [www.osha.gov](http://www.osha.gov).

When using PPE, you should:

- Never consider any type of PPE as your “first line of defense” against safety hazards on the job. Think of PPE as an added safety measure when all others fail.
- Follow proper safety rules on the job.

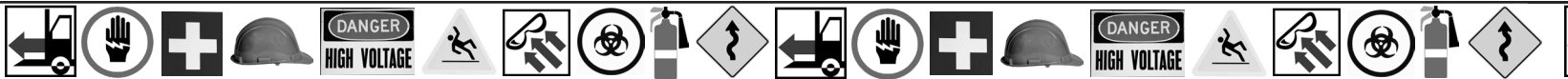
## Eye and Face Protection



You can be exposed to many hazards that pose a danger to your face and eyes. For example, OSHA requires employers to ensure that workers have the appropriate eye or face protection if they are exposed to eye or face hazards from flying particles, molten metal, liquid chemicals, acids or caustic liquids, chemical gases or vapors, potentially infected material, or potentially harmful light radiation. Many eye injuries occur on the job because workers do not wear eye protection. Others happen when workers wear the wrong eye protection or protection that does not fit properly. Everyday prescription lenses do not offer enough protection against most workplace eye and face hazards. Workers with corrective lenses must either wear eye protection that incorporates the prescription into the design, or must wear added eye protection over their prescription lenses.

Each type of protective eyewear is designed to protect against specific hazards. Some of the most common types include the following:

- **Safety glasses**—These protective eyeglasses have safety frames made of metal or plastic with impact-resistant lenses. Some also have side shields.
- **Goggles**—These are tight-fitting and completely cover the eyes, eye sockets and area surrounding the eyes. Goggles protect from impact, dust and splashes. Some will fit over corrective lenses.
- **Welding shields**—These are fitted with a filtered lens and protect eyes from burns caused by infrared or intense radiant light. They also protect the eyes and face from flying sparks, metal splatter and chips produced during welding, brazing, soldering and cutting operations. The intense light associated with welding work can cause serious and sometimes permanent eye damage without the proper eye protection. The intensity of the light or radiant energy varies. The filter lenses have a shade number that protects against the specific hazards of the work.
- **Laser safety goggles**—These are specialty goggles to protect against the intense concentrations of light that lasers produce. The type of goggles depends on the equipment and on operating



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conditions. Laser light radiation can be extremely dangerous to the unprotected eye. Direct or reflected beams can cause permanent eye damage. Laser burns on the retina can be painless, so it is essential that everyone in or around laser operations wear the appropriate eye protection.

- **Face shields**—These are transparent sheets of plastic. Some are polarized for glare protection. They protect against nuisance dusts and against potential splashes or sprays of hazardous liquids. However, face shields do not offer enough protection against impact hazards.

## Head Protection

A head injury could affect you for life—it can even be fatal. Wearing a safety helmet or hard hat is one of the easiest ways to protect your head from injury. Hard hats can protect you from impact and penetration hazards, as well as from electrical shock and burn hazards. In general, protective helmets or hard hats should resist penetration by objects; absorb the shock of a blow; be water-resistant and slow-burning; and have clear instructions for adjusting them properly and for replacing the suspension and headband.



Employers must ensure that their employees wear head protection if:

- Objects might fall from above and strike them on the head;
- They might bump their heads against fixed objects, such as exposed pipes or beams; or
- The possibility exists for accidental contact between workers' heads and electrical hazards.

When there is a danger of falling objects from above, such as working below other workers who are using tools, or working under a conveyor belt, you must wear head protection. To protect you properly, your hard hat must be worn with the bill forward.

Hard hats are available in different types or classes:

- Class A hard hats provide impact and penetration resistance, along with limited voltage protection (up to 2,200 volts).
- Class B hard hats provide the highest level of protection against electrical hazards, with high-voltage shock and burn protection (up to 20,000 volts). They also protect from impact and penetration hazards by flying/falling objects.
- Class C hard hats provide lightweight comfort and impact protection but no protection from electrical hazards.

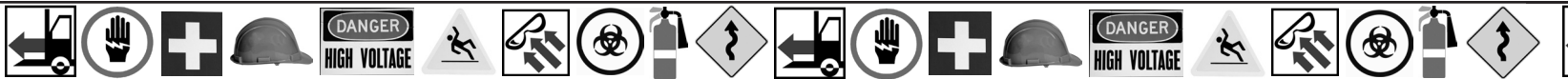




A “bump hat” is also available for use in areas with low head clearance. They are recommended for areas where protection is needed from head bumps and cuts. However, bump hats are not designed to protect against falling or flying objects. You should find a label inside each hat that identifies the manufacturer and the class of the hat.

When using protective headgear, you should follow these guidelines:

- Wear the right type of head protection for the job. Even though your job may only briefly expose you to hazards requiring head protection, the consequences of failing to use the right PPE can be long-lasting.
- Inspect all head protection equipment before using it:
  - Inspect the hard hat shell, suspension system and accessories for holes, cracks, tears or other damage each day.
  - Look for damage that could compromise the protective value of the hat.
  - Remove any hard hat from service and replace it if you find any of the following defects: perforation, cracking, or deformity of the brim or shell; or indication of exposure of the brim or shell to heat, chemicals, or ultraviolet light and other radiation. (Signs can include a loss of the surface gloss, as well as chalking or flaking.)
- Make sure the PPE fits you. Head protection that is too large or too small is not appropriate for use. It must fit on the body and for the head size of each individual. Most protective headgear comes in a variety of sizes with adjustable headbands for proper fit. A proper fit should allow enough clearance between the shell and the suspension system for ventilation and for distribution of an impact. The hat should not bind, slip, fall off, or irritate the skin. Some protective headgear works with various accessories to handle changing conditions, such as having slots for earmuffs, safety glasses, face shields, and mounted lights.
- Do not carry anything inside a hard hat. The space inside the hard hat is needed to absorb the shock of any impact.
- Do not push a hard hat or cap to the back of your head. Doing so could reduce the level of protection offered.
- Never drill holes, paint, or apply labels to protective headgear. This may reduce the integrity of the protection offered. Paints, paint thinners and some cleaning agents can also weaken the shells of hard hats and can eliminate electrical resistance.
- Do not store protective headgear in direct sunlight, such as on a rear window shelf or dashboard of a car. Sunlight and extreme heat can damage them.



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- Replace the suspension system when damaged or if you notice excessive wear. They are available as replacement parts; you do not have to replace the entire hard hat.
- Replace the hard hat if it receives an impact—even if damage is not noticeable.

## Foot and Leg Protection

Foot and leg protection is vital if you face possible foot or leg injuries from falling or rolling objects, from crushing or penetrating materials, or if your work involves exposure to hot substances or to corrosive or poisonous materials. In addition, if your feet may be exposed to electrical hazards, you should wear non-conductive footwear. (You could also be required to wear conductive footwear if you are exposed to static electricity on the job.) For example, you should wear foot and/or leg protection in situations such as:

- When heavy objects, such as barrels or tools, might roll onto or fall onto your feet;
- When working with sharp objects such as nails or spikes that could pierce the soles or uppers of ordinary shoes;
- When exposed to molten metal that could splash onto feet or legs;
- When working on or around hot, wet or slippery surfaces; and
- When working when electrical hazards are present.

Foot and leg protection could include the following:

- **Leggings**—They protect the lower legs and feet from heat hazards such as molten metal or welding sparks.
- **Metatarsal (over-the-foot) guards**—They protect the instep area from impact and compression and are made of aluminum, steel, fiber or plastic. These guards may be strapped to the outside of shoes.
- **Toe guards**—They fit over the toes of regular shoes to protect the toes from impact and compression hazards and may be made of steel, aluminum or plastic.
- **Combination foot and shin guards**—They protect the lower legs and feet, and may be used with toe guards for greater protection.
- **Safety shoes**—They have impact-resistant toes and heat-resistant soles that protect against hot work surfaces common in roofing, paving and hot metal industries. Some may also protect against puncture wounds. They may also be designed to be electrically conductive to prevent the build-up of static electricity.





### Did you Know?

Static electricity can build up on the surface of an object and, under the right conditions, can discharge to a person, causing a shock. The most familiar example of this is when a person reaches for a door knob or other metal object on a cold, relatively dry day and receives a shock. However, static electricity also can cause shocks or can just discharge to an object with much more serious consequences, as when friction causes a high level of static electricity to build up at a specific spot on an object. This can happen simply through handling plastic pipes and materials or during normal operation of rubberized drive or machine belts found in many worksites.



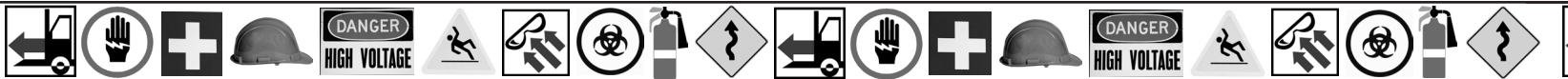
In these cases, for example, static electricity can potentially discharge when sufficient amounts of flammable or combustible substances are located nearby and cause an explosion. Grounding or other measures may be necessary to prevent this static electricity buildup and the results.

Source: *Controlling Electrical Hazards* (OSHA 3075), 2002 (revised)

In addition to the types of foot and leg protection listed above, some types of work require special purpose shoes. Electrically conductive shoes protect against the buildup of static electricity. Workers wear these shoes to reduce the risk of static electricity build-up on the body that could produce a spark and cause an explosion or fire. Electrical hazard, safety-toe shoes are nonconductive and will prevent your feet from completing an electrical circuit to the ground. They can protect against open circuits of up to 600 volts in dry conditions. Besides insulating the feet from the extreme heat of molten metal, foundry shoes keep hot metal from lodging in shoe eyelets, tongues, or other shoe parts. They also have built-in safety toes.

You should inspect safety footwear before each use:

- Check shoes and leggings for wear and tear, including cracks or holes, separation of materials, and broken buckles or laces.
- Check the soles of shoes for pieces of metal or other embedded items that could present electrical or tripping hazards.
- Clean and maintain the footwear according to the manufacturer’s recommendations.



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## Hand and Arm Protection

The workplace can pose hazards to the hands and arms of workers. These hazards include the absorption of harmful substances through the skin, chemical or thermal burns, electrical dangers, bruises, abrasions, cuts, punctures, fractures and amputations. PPE for hands and arms includes gloves, finger guards and arm coverings or elbow-length gloves.

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**Did you Know?** Thermal contact burns are caused when the skin touches hot surfaces of overheated electric conductors, conduits, or other energized equipment. Thermal burns also can be caused when clothing catches on fire, as may occur when an electric arc is produced.

Source: *Controlling Electrical Hazards* (OSHA 3075), 2002 (revised)



Many types of gloves are available to protect against a variety of hazards. For this reason, you must use the right type of gloves for the job and its hazards. Gloves designed for one function may not protect against a different function.

- Leather, Canvas or Metal Mesh Gloves—These gloves protect against cuts and burns. Leather or canvas gloves also protect against sustained heat.
  - Leather gloves protect against sparks, moderate heat, blows, chips and rough objects.
  - Aluminized gloves protect against heat and require an insert to protect against heat and cold.
  - Aramid fiber gloves protect against heat and cold, are cut- and abrasive-resistant, and wear well.
  - Synthetic gloves protect against heat and cold, are cut- and abrasive-resistant, and may withstand some diluted acids. They do not stand up to alkalis and solvents.
- Fabric and Coated Fabric Gloves—These gloves are made of cotton or other fabric and provide varying degrees of protection.
  - Fabric gloves protect against dirt, slivers, chafing and abrasions. They do not provide enough protection for use with rough, sharp or heavy materials.
  - Coated fabric gloves are normally made of cotton flannel with napping on one side. When the unnapped side is coated with plastic, these fabric gloves offer general-purpose hand protection and have slip-resistant qualities. They are used for tasks such as handling bricks and wire, or handling lab containers.



- Chemical- and Liquid-Resistant Gloves—These gloves are made with different kinds of rubber.
- Insulating rubber gloves—These gloves are designed to offer protection when working with electrical equipment.

No matter the type of gloves, they can protect you only if they are maintained properly:

- Inspect gloves before each use. Make sure they are not torn, punctured, or made ineffective in any way.
- Check for pinhole leaks, if appropriate, by filling the gloves with water and rolling the cuffs toward the fingers.
- Pay attention to gloves that are stiff or discolored—they may no longer offer adequate protection due to excessive use or degradation from chemical exposure.
- Replace gloves that fail inspection.

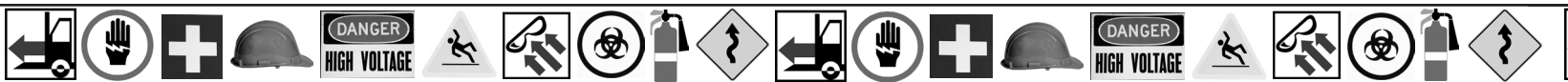
## Body Protection

In some cases, you may have to shield most or all of your body against hazards at work. For example, hazards such as temperature extremes; hot flashes from molten metals and other hot liquids; potential impacts from tools, machinery and materials; body fluids; and hazardous chemicals can cause bodily injury. A variety of whole-body PPE is available to protect against specific hazards.

## Hearing Protection

Exposure to high noise levels can cause irreversible hearing loss or damage, as well as physical and psychological stress. Wearing earplugs or earmuffs can help to prevent damage to your hearing. Long or repeated exposure to sounds at or above 85 decibels (dB) can cause hearing loss. (A decibel is a unit that measures the intensity of sound.) Sounds that humans can hear are measured on a scale from 0 dB to 140 dB. A normal conversation is about 60 dB. Chainsaws, hammer drills, and bulldozers ring in at over 100 dB.

The need for hearing protection depends on factors such as: the loudness of the noise, measured in decibels; the length of your exposure to the noise; whether you move between work areas with different noise levels; and whether noise is generated from one or multiple sources. Generally, the louder the noise, the shorter the exposure time before hearing protection is required. The noise exposures that are permissible (allowed) in the workplace range from 8 hours per day at 90 dB to 15 minutes or less at 115 dB. In other words, you could be exposed to a noise level of 90 dB for 8 hours



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per day before hearing protection is required. On the other hand, if the noise level reached 115 dB for more than 15 minutes, you would be required to wear hearing protection.



**Did you Know?** Noise-induced hearing loss is the second most self-reported work-related illness or injury.

Source: National Institute on Deafness and Other Communication Disorders

Noises are considered continuous if the time between each instance of the noise is one second or less. Noises outside that definition are impact or impulse noises—loud, momentary explosions of sound—that happen when you use a powder-actuated nail gun, a punch press, or other equipment. Exposures to this type of noise cannot exceed 140 dB. It is important to know that loud noise does not have to be a daily event to cause damage. One-time exposure to very loud noises can harm your hearing permanently!

Hearing loss—whether from impulse noise or from continuous exposure—can also result in tinnitus. Tinnitus is a ringing, buzzing, or roaring in the ears or head. Tinnitus may decrease over time, or it may continue constantly or occasionally for a lifetime.

Some types of hearing protection include:

- Single-use earplugs—These are made of waxed cotton, foam, silicone rubber or fiberglass wool. They are self-forming and, when properly inserted, work as well as most molded earplugs.
- Pre-formed or molded earplugs—These must be individually fitted by a professional and can be reusable or disposable.
- Earmuffs—These require a perfect seal around the ear. The protective value of earmuffs can be reduced by glasses, facial hair, long hair, or facial movements such as chewing.

## Workplace Hazards and Female Reproductive Health

Substances or agents that affect the reproductive health of women or men or the ability of couples to have healthy children are called reproductive hazards. Some examples of reproductive hazards include radiation, some chemicals, certain drugs, cigarettes, some viruses, and alcohol. A reproductive hazard could cause one or more health effects, depending on when a woman is exposed. For example, exposure to harmful substances during the first 3 months of pregnancy might cause a birth defect or

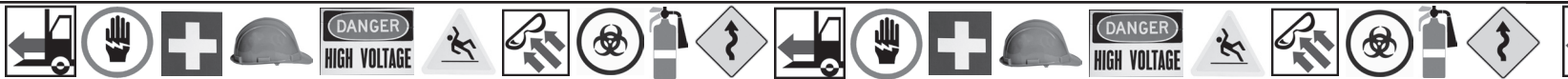


a miscarriage. During the last 6 months of pregnancy, exposure could slow the growth of the fetus, affect the development of its brain, or cause premature labor. Reproductive hazards may not affect every worker or every pregnancy. Whether a woman or her baby is harmed depends on how much of the hazard they are exposed to, when they are exposed, how long they are exposed, and how they are exposed.

Harmful substances can enter a woman's body through breathing in (inhalation), contact with the skin (absorption), or swallowing (ingestion). Pregnant workers—and those planning to become pregnant—should be especially concerned about exposure to reproductive hazards. Some chemicals (such as alcohol) can circulate in the mother's blood, pass through the placenta, and reach the developing fetus. Other hazardous agents can affect the overall health of the woman and reduce the delivery of nutrients to the fetus. Radiation can pass directly through the mother's body to harm her eggs or the fetus. Some drugs and chemicals can also pass through a mother's body into the nursing baby through the breast milk.

To protect yourself, you should:

- Store chemicals in sealed containers when they are not in use.
- Wash your hands after contact with hazardous substances and before eating, drinking, or smoking.
- Avoid skin contact with chemicals.
- Be familiar with the Material Safety Data Sheets (MSDSs) for the hazardous materials that you work with. Your employer is required to have the MSDS for all hazardous materials in their workplaces and to make them available to employees.
- Know and follow your employer's rules and procedures.
- Use the appropriate PPE to reduce exposures to harmful substances.
- Prevent home contamination:
  - Change out of contaminated clothing and wash with soap and water before leaving the workplace.
  - Store street clothes at work in a separate area to prevent contamination.
  - Wash work clothes separately from other laundry.
  - Avoid bringing contaminated clothing or other objects home from work. If work clothes must be brought home, keep them in a sealed plastic bag.



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# Summary

- Hazards exist in every workplace. The best way to control a hazard is at the source of the hazard.
- Different OSHA standards include detailed requirements for PPE
- PPE is not the “first line of defense” against safety hazards on the job.
- Many eye injuries occur on the job because workers do not wear eye protection. Others happen when workers wear the wrong eye protection or protection that does not fit properly.
- Wearing a safety helmet or hard hat is one of the easiest ways to protect your head from injury.
- When there is a danger of falling objects from above, you must wear head protection.
- Different classes of hard hats provide different types and levels of protection.
- Foot and leg PPE includes leggings, metatarsal guards, toe guards, foot and shin guards, and safety shoes. Gloves designed for one function may not protect against a different function. No matter the type of gloves, they can protect you only if they are maintained properly.
- In some cases, you may have to shield most or all of your body against hazards at work.
- Exposure to high noise levels can cause irreversible hearing loss or damage, as well as physical and psychological stress. Wearing earplugs or earmuffs can help to prevent damage to your hearing.
- Hearing loss—whether from impulse noise or from continuous exposure—can also result in tinnitus. Tinnitus may decrease over time, or it may continue constantly or occasionally for a lifetime.
- Pregnant workers—and those planning to become pregnant—should be especially concerned about exposure to reproductive hazards.







# Working with Machines

In this section, you will:

- Identify sources of amputation and other hazards with machines.
- Identify the hazards associated with specific machines.
- Define engineering controls and work practice controls.
- Learn general guidelines for working safely around machines.



## Sources of Amputation and Other Hazards

Amputations are among the most severe and disabling workplace injuries that often result in permanent disability. Machinery accounts for the majority of amputation cases in industry. Specific types of machinery are often involved:

- Mechanical power presses
- Power press brakes
- Powered and non-powered conveyors
- Printing presses
- Roll-forming and roll-bending machines
- Shearing machines
- Food slicers
- Meat grinders
- Meat-cutting band saws
- Drill presses
- Milling machines
- Grinding machines
- Slitters



Amputation hazards exist due to hazardous mechanical components, hazardous mechanical motions, and hazardous activities.

Hazardous mechanical components—Three (3) types of components present amputation hazards:

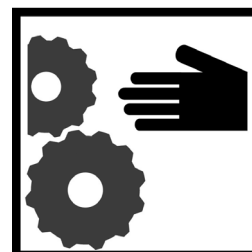
- Point of operation. This is the area of the machine where the machine performs work—cutting, shaping, boring, and forming.



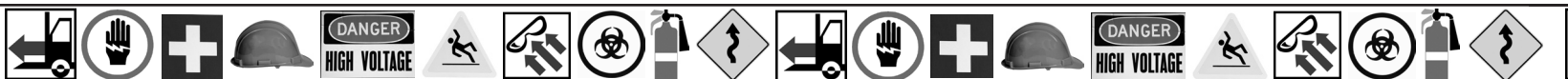
- Power-transmission components. These are the components that transmit energy, such as flywheels, pulleys, belts, chains, couplings, connecting rods, spindles, cams, and gears.
- Other moving parts. These are the parts of the machine that move when the machine is operating. They include reciprocating, rotating, and transverse moving parts, as well as lead mechanisms and auxiliary parts.

Hazardous mechanical motions—Mechanical motion is potentially hazardous. Basic types of hazardous mechanical motions include the following:

- **Rotating motion**—Circular motion such as by rotating collars, couplings, cams, clutches, flywheels, shaft ends, and spindles that could grip clothing or otherwise force a body part into a dangerous location.
- **Reciprocating motion**—A back-and-forth or up-and-down motion that can strike or entrap a worker between a moving part and a fixed object.
- **Transversing motion**—Motion in a straight, continuous line that can strike or catch a worker in a pinch or shear point created by the moving part and a fixed object.
- **Cutting action**—Action that cuts material; the machine motion may be rotating, reciprocating, or transverse.
- **Punching action**—When power causes the machine to hit a slide (ram) to stamp metal or other material, creating a hazard at the point of operation where the worker inserts, holds, or withdraws the stock by hand.
- **Shearing action**—Applying power to a slide or knife to trim or shear metal or other materials, creating a hazard at the point of operation where the worker inserts, holds, or withdraws the stock by hand.
- **Bending action**—Applying power to a slide to draw or stamp metal or other materials in a bending motion, creating a hazard at the point of operation where the worker inserts, holds, or withdraws the stock by hand.
- **In-running nip points**—When machine parts move toward each other or when one part moves past a stationary object, creating pinch points. Common in-running nip points include gears, rollers, belt drives, and pulleys. Parts of the body may be caught between or drawn into the nip point and crushed, mangled, or severed.



Hazardous activities—Using and maintaining machinery poses amputation hazards for those workers. Hazardous activities include normal production operations, as well as service or maintenance activities



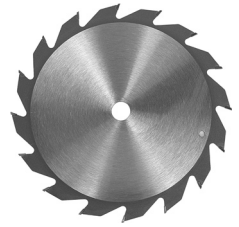
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such as:

- Setting-up/threading/preparing the machine
- Inspecting the machine
- Clearing jams
- Adjusting the machine
- Cleaning the machine
- Lubricating the machine parts
- Making scheduled and unscheduled maintenance

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**Did you Know?** The Fair Labor Standards Act, or FLSA, is the primary law that governs the employment of youth under age 18. The FLSA includes work declared hazardous for youth by the Secretary of Labor. Workers under age 18 are generally prohibited from operating band saws, circular saws, guillotine shears, punching and shearing machines, meatpacking or meat-processing machines, paper products machines, woodworking machines, metal forming machines, and meat slicers.



Source: *OSHA Fact Sheet: Amputations*. Occupational Safety and Health Administration, 2002.

Besides amputation hazards, other safety hazards could affect the machine operator—and nearby workers. Kickbacks can happen when a saw seizes the stock and hurls it back at the operator. This can happen when the stock twists and binds against the side of the blades or is caught in the teeth. Poor quality lumber can also result in kickbacks, such as lumber with knots or foreign objects like nails. The machine could also expose workers to chips and splinters that are flung by the cutting action of a machine. Parts of a machine, such as a cutter head, could also be flung at workers if they break, are poorly mounted, or become unbalanced. A number of these hazards are present at the point of operation. For example:

- You could be injured if your hands get too close to a blade, especially when working on small pieces of stock. The stock could move unexpectedly or your hand could slip.
- Stock can get stuck in a blade and pull your hands into the machine.
- If the machine or its guard is not properly adjusted or maintained, you could be injured when a saw blade, for example, does not return to its starting position after a cut.
- Someone could accidentally start the machine and catch your hands at the point of operation.

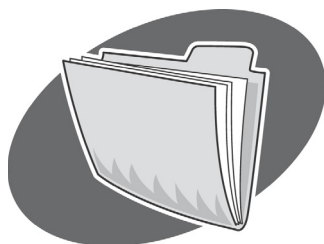


- If the employer’s lockout/tagout procedures are not followed, you could be injured while repairing or cleaning the machine.
- Fast-moving parts such as saw blades may not appear to be moving.

## Specific Machine Hazards

**Mechanical Power Presses** — In mechanical power presses, tools or dies are mounted on a slide, or ram, which operates in a controlled, reciprocating motion toward and away from the stationary bed or anvil containing the lower die. When the upper and lower dies press together—to punch, shear or form—the workpiece, the desired piece is produced. Once the downstroke is completed, the re-formed workpiece is removed automatically or manually, a new workpiece is fed into the die, and the process is repeated.

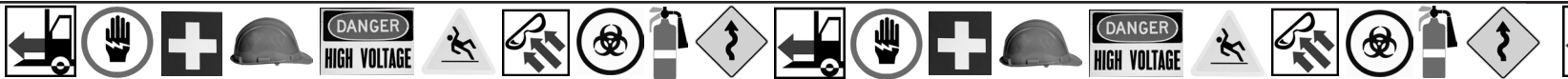
The most common types of injuries that occur with mechanical power presses are amputations from hazards at the point of operation. Safeguarding methods that are not applied properly could allow operators unsafe access to the hazard area. This unsafe condition could lead to an amputation when a worker, for example, instinctively reaches into the point of operation to adjust a part or fix a jam. Amputations could also result when the operator’s normal feeding rhythm is interrupted, or when a component of the machine fails.



**Case Report**—While using an unguarded, foot-pedal-operated, full-revolution mechanical power press that made trip collars for wood stoves, an employee used his hands to feed and remove finished parts and scrap metal. He placed the completed part to the left side of the press, and then turned to place the scrap in the bin behind him. As he turned back to face the press, he inadvertently stepped on the foot pedal and activated the press while his hand was in the die area. His left hand was amputated at the wrist.

Source: *Safeguarding Equipment and Protecting Employees from Amputations* (OSHA 3170-02R)

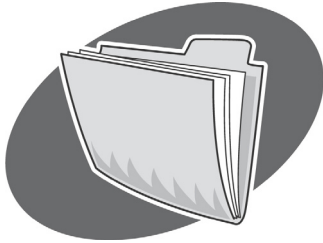
**Conveyors** — Conveyors transport materials horizontally, vertically, at an angle, or around curves. Many conveyors have different and unique features and uses, so the hazards vary with the material being moved, the location of the conveyor, and the nearness of the conveyor to workers. Conveyors present



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amputation hazards associated with mechanical motion. Injuries typically involve a worker's hands or fingers getting caught in nip points or shear points, such as when:

- Cleaning and maintaining the conveyor, especially when it is still operating
- Reaching into an in-running nip point to remove debris or to remove jammed material
- Allowing a cleaning cloth or item of clothing to get caught in the conveyor and pull the worker's fingers or hands into the conveyor



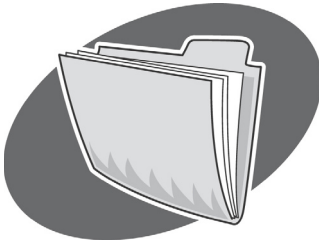
**Case Report**—While removing a cleaning rag from the ingoing nip point between the conveyor belt and its tail pulley (the unpowered end of the conveyor), an employee's arm became caught in the pulley, which amputated his arm below the elbow.

Source: *Safeguarding Equipment and Protecting Employees from Amputations* (OSHA 3170-02R)

**Roll-Forming and Roll-Bending Machines** — These machines primarily perform metal bending, rolling, or shaping functions. Roll-forming is the process of bending a continuous strip of metal to gradually form a pre-determined shape using a self-contained machine. Roll-bending machines usually have three rolls arranged like a pyramid and they perform essentially the same process as roll-forming. Point of operation hazards associated with in-running nip points are the most common type of amputation hazard. Amputations happen when the operator's hands feeding material through the rolls get caught and are pulled into the point of operation. Amputations can result from:

- Having an unguarded or inadequately guarded point of operation
- Locating the operator control station too close to the process
- Activating the machine by accident
- Performing cleaning, clearing, changing, or inspecting tasks while the machine is operating or when it is not properly locked or tagged out



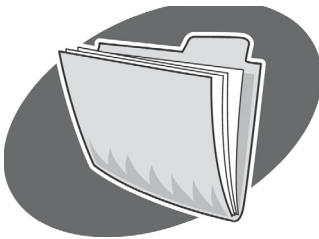


**Case Report**— While feeding a metal sheet into a roller, an employee caught his right hand in the roller and amputated one finger.

Source: *Safeguarding Equipment and Protecting Employees from Amputations* (OSHA 3170-02R)

**Shearing Machines.** In the basic shear operation, stock is fed into the point of operation between two blades. A hold-down may then be activated that applies pressure to the stock to prevent movement. One complete cycle consists of a downward stroke of the top blade until it passes the lower fixed blade, followed by an upward stroke to the starting position. The shear blade and the material hold-downs are the main point of operation hazards. Amputations can happen when:

- The foot control accidentally activates while the operator’s hands are in the point of operation
- A tripping device on the back side of the shear’s mouth operates the shear but does not prevent the operator from reaching into the hazard area
- When there is no hold-down and stock being fed into a stand-alone manual shear kicks out and strikes the operator’s hands or fingers

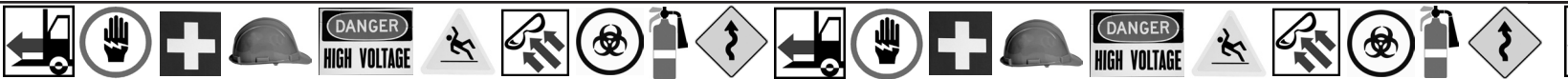


**Case Report**— After breaking metal with a mechanical alligator shear, an employee turned the shear off and was picking up debris on the ground when he placed his left hand on the shear and amputated his fingers. The shear’s flywheel was not equipped with a clutch or similar device. So, when the shear was shut off, the jaw continued to operate on stored energy.

Source: *Safeguarding Equipment and Protecting Employees from Amputations* (OSHA 3170-02R)

**Food Slicers** — Food slicers are electrically powered machines typically equipped with a rotary blade, an on/off switch, thickness adjustment, and a food holder or chute. A pushing/guarding device or plunger may be used to apply pressure to the food against the slicer blade, or pressure may be applied by gravity and/or by an attachment connected to the food holder. Amputations can result:

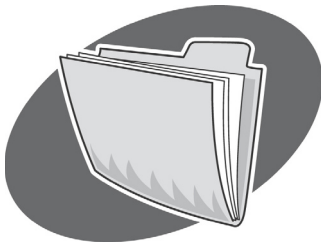
- When the operator adjusts or services the slicer while it is still operating or while it is switched off



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but still plugged in, or energized (resulting in amputation when the operator accidentally switches the slicer on)

- When the operator fails to use the sliding attachment on the food-holding device, especially when slicing small pieces of meat
- When the operator hand-feeds food into a chute-fed slicer without using the proper pushing/guarding device or plunger



**Case Report**— An employee was cleaning a meat slicer that was turned off but was still plugged in. He inadvertently turned the machine on by bumping the on/off switch, resulting in an amputation of his right ring finger.

Source: *Safeguarding Equipment and Protecting Employees from Amputations* (OSHA 3170-02R)

**Drill Presses** — Electric drill presses use a rotating bit to drill or cut holes in wood or metal. The holes may be cut to a desired preset depth or completely through the stock. A basic drill press operation consists of selecting an appropriate drill bit, tightening the bit in the chuck, setting the drill depth, placing the material on the drill press bed, securing the work to the bed so that it will not rotate during drilling, turning the drill press on, and pulling the drill press lever down so that the drill bit will lower into the stock. Amputations typically occur when the operator’s gloves, loose-fitting clothing, or jewelry become entangled in the rotating drill bit. Other causes include:

- Inadequately guarding points of operation or power-transmission devices (such as belt and pulleys)
- Removing a part from a drill press while wearing gloves
- Adjusting the drill press, such as setting the depth, securing the material, and repositioning the material, while the drill bit is still rotating
- Changing the drill bit with the operating control unprotected
- Performing servicing and maintenance activities without deenergizing and locking/tagging out the drill press

**Milling Machines** — Electric milling machines cut metal using a rotating cutting device called a milling cutter. These machines cut flat surfaces, angles, slots, grooves, shoulders, inclined surfaces, dovetails, and recessed cuts. Cutters of different sizes and shapes are available for a variety of milling operations. Frequent causes of amputation include:

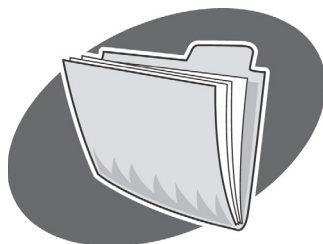




- Loading or unloading parts and callipering or measuring the milled part while the cutter is still rotating
- Operating milling machines with the safety door selector switch on bypass
- Inspecting the milling machine gearbox with the machine still operating
- Manually checking the machine for loose gears while a cutting software program is operating
- Performing servicing and maintenance activities while the milling machine is stopped but still energized, or while the cutter is still rotating
- Getting jewelry or loose-fitting clothing entangled in the rotating cutter

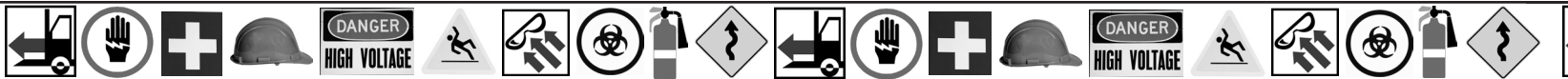
**Grinding Machines** — Grinding machines primarily change the size, shape, and surface finish of metal by placing a workpiece against a rotating abrasive surface or wheel. They may also be used for grinding glass, ceramics, plastics, and rubber. Amputation can happen when the operator’s hands enter the point of operation during the following activities:

- Bypassing the grinding machine safety switch to clean the machine while it is running
- Wearing gloves while grinding, where the glove could get caught between the revolving disc and the table
- Fixing a jammed machine by turning it off, removing the blade guard, and reaching into the danger area before the blades stop turning
- Operating a grinding machine with non-functional interlocks and without the guard in place
- Using an incorrectly adjusted or missing work rest or a poorly maintained or unbalanced abrasive wheel
- Adjusting the work rest, balancing the wheel, cleaning the area around the abrasive wheel and loading and unloading parts or measuring parts while the abrasive wheel is still rotating
- Trying to stop a rotating abrasive wheel by hand



**Case Report**— After grinding a piece of steel on an off-hand grinder, an employee turned off the machine and tried to stop the wheel with a piece of scrap steel. His hand slipped and hit the rotating abrasive wheel, amputating the tip of his left middle finger.

Source: *Safeguarding Equipment and Protecting Employees from Amputations* (OSHA 3170-02R)



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# Controlling Hazards

A number of methods exist for preventing injury to workers from machines. Engineering controls and work practice controls are the first choices to eliminate or reduce hazards. When those controls are not enough, then PPE must also be used.

**Engineering controls**—These controls involve physically changing the machine or the work environment to prevent workers from being exposed to the hazard. Machine guards and safeguarding devices are examples of engineering controls. Guards provide physical barriers that prevent access to danger areas. They include fixed guards, adjustable guards, self-adjusting guards, and interlocking barrier guards. Safeguarding devices prevent or detect operator contact with the point of operation or stop potentially hazardous motion if any part of a worker’s body is within the hazardous portion of the machine. They include pullback and restraint devices, presence-sensing devices, required two-hand controls or trips, and gates.

**Work practice controls**—These controls involve removing workers from exposure to the potential hazard by changing the way workers do their jobs. Work practice controls include using push sticks to guide pieces of stock through saws or requiring minimum safe distances between the operator and the hazard.

In addition to controls and PPE, employers often use equipment such as hand-feeding tools, emergency stop devices, foot controls, and work-holding equipment. This equipment supplements the controls that are in place.

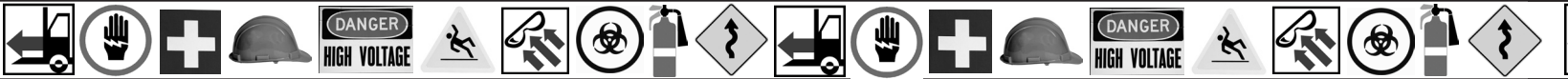
To work safely around machines, you should follow these guidelines:

- Know and follow your employer’s policies and rules.
- Wear the appropriate PPE for the job.
- Remove slip, trip, and fall hazards from the area around machines.
- Remove waste stock as it is generated.
- Do not wear loose-fitting clothing, jewelry, or other items that could become entangled in a machine.
- Protect long hair from entanglement in moving machinery.
- Never remove a machine guard or work around a safeguarding device.



# Summary

- Machinery accounts for the majority of amputation cases in industry.
- Amputation hazards exist due to hazardous mechanical components, hazardous mechanical motions, and hazardous activities.
- Different machines pose specific amputation and other hazards.
- Engineering controls and work practice controls are the first choices to eliminate or reduce hazards.
- Engineering controls involve physically changing the machine or the work environment to prevent workers from being exposed to the hazard. Machine guards and safeguarding devices are examples of engineering controls.
- Work practice controls involve removing workers from exposure to the potential hazard by changing the way workers do their jobs.

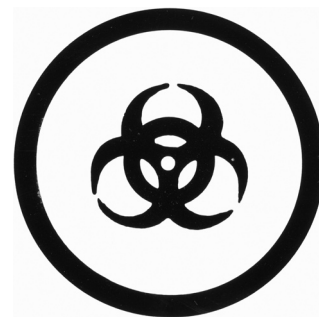


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# Working with Hazardous Substances

In this section, you will:

- Identify the link between hazardous substances and safety.
- Identify routes of entry for hazardous substances.
- Describe labeling requirements for hazardous chemicals.
- Learn the purpose of a material safety data sheet for a hazardous chemical.
- Identify general safety guidelines for working with hazardous substances.



## Hazardous Substances and Safety

Working with hazardous substances may be a part of your job. Your job-related activities may involve hazardous materials in different forms and amounts. These substances introduce risks to you in the form of health hazards and physical hazards. Physical hazards are present with combustible liquids, explosives, reactive (unstable) substances, water-reactive materials, and other substances. Health hazards are present with substances such as corrosives, irritants, carcinogens (cancer-causing materials), toxic agents, and others. Hazardous substances can affect you through three possible routes of entry:

- Inhalation—Such as by breathing mists, dust, vapors, or particles
- Absorption—Being exposed to a hazardous material through your skin
- Ingestion—Swallowing something that has become contaminated by a hazardous substance, or touching your mouth with your hand after contacting a hazardous substance

Dealing with hazardous materials may be a part of your job every day—whether you actively use the materials or supervise other people who must handle them. Identifying hazardous substances can be hard, since many products may not seem hazardous. For example, oxygen may not appear to be hazardous, but it is highly flammable in its pure form. Communicating information about the possible health and physical hazards in the workplace is important for your safety and the safety of your co-workers. Job-related injuries and illnesses related to hazardous substances have personal, material and financial costs. Chemical exposure may cause or contribute to many serious health effects such as heart ailments, central nervous system, kidney and lung damage, sterility, cancer, burns, and rashes. Some chemicals may also be safety hazards and pose a risk of fire and explosion.



## Labels and Material Safety Data Sheets

The Occupational Safety and Health Administration (OSHA) issued the Hazard Communication Standard to make sure that employers and employees know about the hazards of hazardous substances in the workplace, and how to protect themselves. The Hazard Communication Standard establishes uniform requirements to make sure that the hazards of all chemicals imported into, produced, or used in workplaces in the United States are evaluated. The standard also requires that this hazard information be communicated to the affected employers and employees.



Chemical manufacturers and importers must determine the hazards of the products they produce or import. They must also communicate this hazard information—as well as protective measures—to their customers “downstream” through labels and material safety data sheets (MSDS). 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, as well as with the name and address of the producer or other responsible party. Employers who purchase the chemicals can rely on the label provided by their suppliers. If they transfer the material from a labeled container to another container, the employer must label that container, too (unless the chemical being transferred is intended for immediate use by the employee who is transferring the chemical).

The MSDS provides information about the characteristics of the hazardous chemical, the physical and health hazards related to using the chemical, routes of exposure, precautions for safe handling and use, emergency and first aid procedures, and other information. Employers must have a material safety data sheet for each hazardous chemical that they use. They must also provide training to their employees about the list of hazardous chemicals in the workplace, the location and use of MSDSs, and label information. Copies of the MSDSs for the hazardous chemicals in a specific workplace must be readily accessible to employees in that area during each workshift. Employers can do this in different ways, depending on what is appropriate for the particular workplace. The MSDSs may be kept in binders in a certain location, or they may be stored on a computer. There is no required format for an MSDS. However, OSHA has an optional MSDS form (OSHA 174) that can serve as a guide. The form is available at the OSHA website.

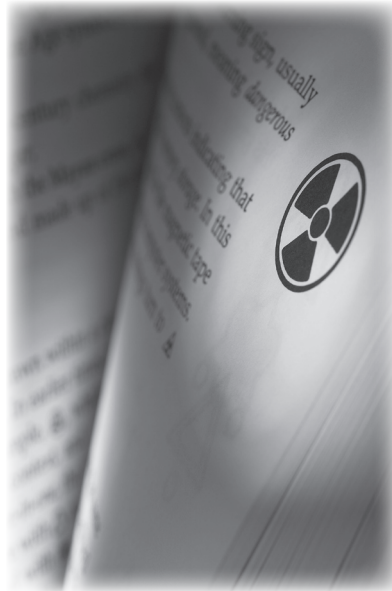


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# General Safety Guidelines

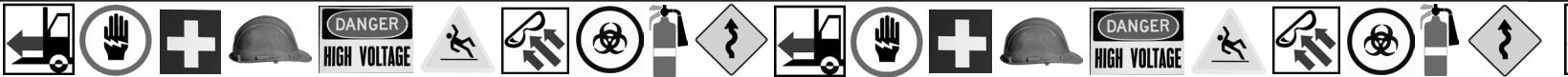
To work safely with hazardous substances, follow these guidelines:

- Know your employer’s policy for access to MSDSs. Know where they are kept and how to access them.
- Check the MSDS before you use a hazardous chemical.
- Identify the health and physical hazards of working with or handling a hazardous substance.
- Follow the guidelines, precautions, and warnings stated on each MSDS.
- Use the MSDS to plan for any emergency procedures in advance for the hazardous chemicals that you will use.
- Refer to the MSDSs as often as needed.



# Summary

- Hazardous substances introduce risks to you in the form of health hazards and physical hazards.
- Hazardous substances can affect you through three possible routes of entry: inhalation, absorption, and ingestion.
- Chemical exposure may cause or contribute to many serious health effects and may pose a risk of fire and explosion.
- The Occupational Safety and Health Administration (OSHA) issued the Hazard Communication Standard to make sure that employers and employees know about the hazards of hazardous substances in the workplace, and how to protect themselves.
- Chemical manufacturers and importers must determine the hazards of the products they produce or import. They must also communicate this hazard information—as well as protective measures—to their customers “downstream” through labels and material safety data sheets (MSDS).
- Employers must have a material safety data sheet for each hazardous chemical that they use. They must also provide training to their employees about the list of hazardous chemicals in the workplace, the location and use of MSDSs, and label information. Copies of the MSDSs for the hazardous chemicals in a specific workplace must be readily accessible to employees in that area during each workshift.



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# Working around Electricity

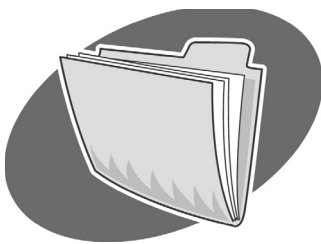
In this section, you will:

- Learn basic information about electricity.
- Learn facts about overhead power lines.
- Describe some protective measures to prevent accidents with electricity.



## Electricity Basics

Many people believe that everyday household current is not lethal. Others believe that overhead powerlines are insulated and pose no threat. The truth should be frightening: Electrocutation is quick and deadly. The current drawn by a tiny 7.5 watt, 120-volt lamp, passed from hand to hand or hand to foot across the chest, is enough to cause electrocution. Electrocutation can result from contact with a broken lightbulb as well as with an overhead powerline.



**Case Report**— The employee was attempting to correct an electrical problem involving two non-operational lamps. He proceeded to the area where he thought the problem was. He had not shut off the power at the circuit breaker panel nor had he tested the wires to see if they were live. He was electrocuted when he grabbed the two live wires with his left hand and then fell from the ladder.

Source: Occupational Safety and Health Administration

Electricity is dangerous. Coming in contact with an electrical voltage can cause current to flow through the body. Electrical shock, burns, and death can result. Electrical hazards include inadequate wiring; exposed electrical parts; overhead power lines; defective insulation; improper grounding; overload hazards; wet conditions; and others. Electrical hazards are present at work and at home. Because electricity is a familiar part of our everyday lives, many people may not treat electricity with the caution it deserves.





An electrical shock is received when electrical current passes through the body. Current will pass through the body in a variety of situations. Whenever two wires are at different voltages, current will pass between them if they are connected. Your body can connect the wires if you touch both of them at the same time. Your risk of receiving a shock is greater if you stand in a puddle of water. But, you don't even have to be standing in water to be at risk. Wet clothing, high humidity, and perspiration also increase your chances of being electrocuted. Even contact with another person who is receiving an electrical shock may cause you to be shocked.



Pure water is a poor conductor. But small amounts of impurities in water like salt, acid, solvents, or other materials can turn water itself and substances that generally act as insulators into conductors or better conductors. Dry wood, for example, generally slows or stops the flow of electricity. But when saturated with water, wood turns into a conductor. The same is true of human skin. Dry skin has a fairly high resistance to electric current. But when skin is moist or wet, it acts as a conductor.

The danger from electrical shock depends on ADP—the Amount, Duration, and Path of the shocking current:

- The severity of injury from electrical shock depends on the amount of electrical current and the length of time the current passes through the body. For example, 1/10 of an ampere (amp) of electricity going through the body for just two seconds is enough to cause death. You will be hurt more if you can't let go of a tool that is giving a shock. The amount of internal current that a person can withstand and still be able to control the muscles of the arm and hand can be less than 10 milliamperes (milliamps or mA; 1 mA = 1/1,000 of an ampere). Currents above 10 mA can paralyze or "freeze" muscles. When this happens, a person is no longer able to release a tool, wire, or other object. The electrified object may be held even more tightly, resulting in longer exposure to the shocking current.
- High voltages can cause additional injuries. High voltages can cause violent muscular contractions. You could lose your balance and fall. High voltages can also cause severe burns.
- The path of the electrical current through the body affects the severity of the shock. Currents through the heart or nervous system are most dangerous.

Some injuries from electrical shock are not visible. A person may suffer internal bleeding and destruction of tissues, nerves, and muscles. These hidden injuries can result in a delayed death. Shock is often only the beginning of a chain of events. Even if the current is too small to cause injury, your reaction to the shock may cause you to fall. The most common shock-related, nonfatal injury is a burn. Electrical burns can result when you touch electrical wiring or equipment that is used or maintained improperly. These burns typically occur on the hands. Electrical burns are one of the most serious



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injuries you can receive. They require immediate attention. Clothing may also catch fire and cause a thermal burn from the heat of the fire.

Static electricity can also cause a shock. Static electricity can build up on the surface of an object and, under the right conditions, can discharge to a person, causing a shock. For example, this happens when you reach for a doorknob or other metal object on a cold, dry day, and receive a shock.

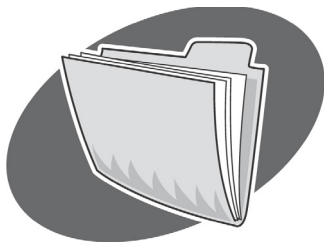
Static electricity can also have more serious results. Friction causes a high level of static electricity to build up at a specific spot on an object. This can happen when you handle plastic pipes and materials or when you operate rubberized drive or machine belts. Static electricity can potentially discharge when flammable or combustible substances are present nearby, resulting in an explosion. Grounding or other measures may be needed to prevent the build-up and the result.

## Overhead Power Lines

Power lines are not insulated against contact. Power lines may be covered to protect against weather. However, they have no insulation to guard against contact by a person or an object (such as a ladder). Birds and squirrels can remain unhurt on power lines because they do not represent a path to ground.



To be in danger from a power line, you do not have to be in contact with it. Electricity can jump, or arc, from a power line to a person who is too close to the power line. According to the Electrical Safety Foundation International, the best insulator is a lot of space—at least 10 feet. Personal protective equipment will not protect you if you contact a power line. Gloves and rubber boots provide no protection. Space is the best insulator.



**Case Report**— Five employees were constructing a chain link fence in front of a house and directly below a 7200-volt energized power line. They were installing 21-foot sections of metal top rail on the fence. One employee picked up a 21-foot section of top rail and held it up vertically. The top rail contacted the 7200-volt line, and the employee was electrocuted.

Source: Occupational Safety and Health Administration



# Protective Measures

Most electrical accidents result from unsafe equipment or installation, unsafe environment, or unsafe work practices. Grounding and safe work practices can help to prevent these accidents.

Grounding a tool or electrical system means intentionally creating a low-resistance path that connects to the earth. This prevents the build-up of voltages that could lead to an electrical accident. Grounding is normally a secondary protective measure—it does not guarantee that you will not receive a shock or be injured or killed by electric current. Grounding will substantially reduce the risk.

A service or system ground is designed mainly to protect machines, tools, and insulation against damage. One wire, called the “neutral” or “grounded” conductor, is grounded. In an ordinary low-voltage circuit, the white or gray wire is grounded at the generator or transformer and at the building’s service entrance.

An equipment ground helps protect the equipment operator. It provides a second path for the current to pass through from the tool or machine to the ground. This additional ground protects the operator if a malfunction causes the tool’s metal frame to become energized. The flow of current that results may activate the circuit protection devices.

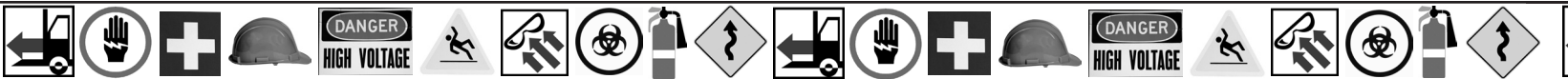
Circuit protection devices automatically limit or stop the flow of current in the event of a ground fault, overload, or short circuit in the wiring system. Examples of circuit protection devices include fuses, circuit breakers, and ground-fault circuit interrupters (GFCIs).

Fuses and circuit breakers open or break the circuit automatically when too much current flows through them. When that happens, fuses melt and circuit breakers trip the circuit open. Fuses and circuit breakers are designed to protect conductors and equipment. They prevent wires and other components from overheating and open the circuit when there is a risk of a ground fault.

GFCIs are used in wet locations, construction sites, and other high-risk areas. They interrupt the flow of electricity within as little as 1/40 of a second to prevent electrocution. GFCIs compare the amount of current going into electric equipment with the amount of current returning from it along the circuit conductors. If the difference is greater than 5 milliamperes, the device automatically shuts off the electric power.

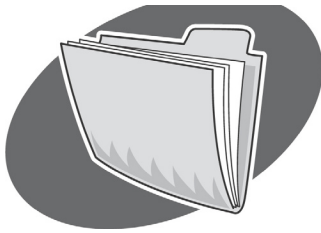
You can prevent electrical accidents by following safe work practices. Such practices include deenergizing electric equipment before inspecting or repairing it; maintaining power tools properly; working cautiously around power lines; and using the right personal protective equipment for the job.

Hand-held power tools pose a potential danger because they make continuous good contact with



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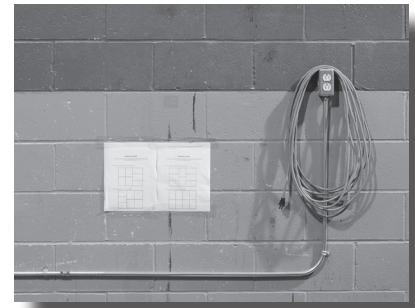
your hand. A break in a tool's or machine's insulation can cause its metal parts to become "hot" or energized. This means that they conduct electricity. Touching these energized parts can result in an electrical shock, burn, or electrocution. The best way to protect yourself is to establish a low-resistance path from the device's metallic case to the ground. Cord and plug equipment with a three-prong plug is a common example of equipment that incorporates this ground conductor. Another way to protect yourself is to use listed or labeled portable tools protected by an approved system of double insulation or its equivalent.



**Case Report**— One employee was climbing a metal ladder to hand an electric drill to the journeyman installer on a scaffold about five feet above him. When the victim reached the third rung from the bottom of the ladder he received an electric shock that killed him. The investigation revealed that the extension cord had a missing grounding prong and that a conductor on the green grounding wire was making intermittent contact with the energizing black wire, thereby energizing the entire length of the grounding wire and the drill's frame. The drill was not double insulated.

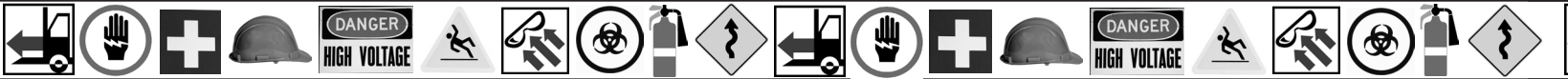
Source: Occupational Safety and Health Administration

Another electrical hazard involves the use of flexible power cords. These cords can be more vulnerable than fixed wiring. Flexible cords are subject to damage through aging, door/window edges, staples/fastenings, abrasion, and activities near the cord. The improper use of flexible cords can lead to shocks, burns, or fire. Improper uses include using flexible cords in place of fixed wiring; running the cord through walls, ceilings, floors, doors, or windows; or concealing the cord behind building surfaces or attaching it to building surfaces.



# Summary

- Electricity is dangerous. Even small amounts of current can kill.
- The danger from electrical shock depends on ADP—the Amount, Duration, and Path of the shocking current.
- Some injuries from electrical shock are not visible.
- Static electricity can also cause a shock.
- Power lines are not insulated against contact.
- To be in danger from a power line, you do not have to be in contact with it.
- Most electrical accidents result from unsafe equipment or installation, unsafe environment, or unsafe work practices.
- Safe work practices can prevent many accidents with electricity.



Notes...

# Working in Heat and Cold

In this section, you will:

- Identify outdoor hazards and ways to prevent heat stress and cold stress.
- Identify risk factors for melanoma.
- List the ABCDs of melanoma.
- Learn guidelines for protecting your skin.
- Identify poisonous plants and ways to protect yourself.



## Outdoor Hazards

Work outdoors involves heat and cold hazards. Unprotected exposure to the sun can lead to sunburn, skin cancer, and eye problems (such as cataracts and other damage). Prolonged exposure to heat can cause:

- **Heat cramps**—muscle spasms due to overheating and dehydration
- **Heat exhaustion**—headache, nausea, dizziness, flushing or paleness
- **Heat stroke**—a medical emergency that is potentially fatal and is the most severe type of heat-related illness

To avoid heat stress, you should:

- Dress appropriately for the weather—lightweight, light-colored, loose-fitting clothes.
- Block out direct sun or other heat sources.
- Use cooling fans/air conditioning.
- Drink plenty of fluids—such as one cup of water every 15 minutes. Don't wait until you are thirsty. Avoid alcoholic and caffeinated beverages or drinks with large amounts of sugar. (They tend to cause dehydration.)
- Avoid heavy meals.
- Perform the heaviest work during the coolest part of the day.
- Rest regularly.



Cold weather hazards are affected by temperature, wind, and moisture. A relatively mild temperature can still lead to a cold-related illness if it is accompanied by wind or wetness. Exposure to cold can cause:

- Trenchfoot—damage to the foot caused by long-term exposure to both cold and wetness
- Frostbite—parts of the body, such as fingers, toes, and nose, freeze and the tissue dies
- Hypothermia—severe loss of body heat that can result in death

To avoid cold stress, you should:

- Dress appropriately for the weather—warm, layered clothing:
  - Wear an inner layer that moves sweat away from the skin, a middle layer that insulates, and a breathable outer layer that blocks wind and water.
  - Wear warm socks and insulated, waterproof boots.
  - Wear headgear that prevents heat loss from the head and protects the ears. Add face protection in very cold or windy conditions.
  - Wear gloves heavy enough to protect the hands from cold, wind, and wetness.

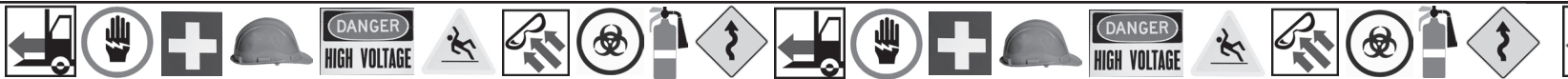


### Did you Know?

You can lose up to 40% of body heat when your head is exposed.



- Perform work during the warmest part of the day. Use the buddy system (work in pairs).
- Take frequent, short breaks indoors to warm up. Get out of the cold if you experience uncontrollable shivering or feel uncomfortably cold.
- Drink warm, sweet beverages (sugar water, sports-type drinks). Avoid drinks with caffeine (coffee, tea, hot chocolate) or alcohol. Eat warm, high-calorie foods. If you are following a low-salt diet, check with your doctor before using sports-type drinks.



Notes...

# Skin Cancer and Melanoma

There are more than 100 types of cancer. Cancer begins inside a cell, the basic building block of all living things. Normally, when the body needs more cells, older ones die off and younger cells divide to form new cells that take their place. When cancer develops, however, the orderly process of producing new cells breaks down. Cells continue to divide when new cells are not needed, and a growth or extra mass of cells called a tumor is formed. Over time, changes may take place in tumor cells that cause them to invade and interfere with the function of normal tissues. It takes many years for the development of a tumor and even more years until detection of a tumor and its spread to other parts of the body. Growths or tumors can be benign or malignant:

Benign growths are not cancer:

- Benign growths are rarely life-threatening.
- Generally, benign growths can be removed. They usually do not grow back.
- Cells from benign growths do not invade the tissues around them.
- Cells from benign growths do not spread to other parts of the body.

Malignant growths are cancer:

- Malignant growths are generally more serious than benign growths. They may be life-threatening. However, the two most common types of skin cancer cause only about one out of every thousand deaths from cancer.
- Malignant growths often can be removed. But sometimes they grow back.
- Cells from malignant growths can invade and damage nearby tissues and organs.
- Cells from some malignant growths can spread to other parts of the body. The spread of cancer is called metastasis.

Most cancers are named for the organ or type of cell in which they begin to grow. The two most common types of skin cancer are basal cell cancer and squamous cell cancer. These cancers usually form on the head, face, neck, hands, and arms. These areas are exposed to the sun. But skin cancer can occur anywhere. Basal cell skin cancer grows slowly. It usually occurs on areas of the skin that have been in the sun. It is most common on the face. Basal cell cancer rarely spreads to other parts of the body. Squamous cell skin cancer also occurs on parts of the skin that have been in the sun. But it also may be in places that are not in the sun. Squamous cell cancer sometimes spreads to lymph nodes and organs inside the body.







**Did you Know?** One American dies of skin cancer every hour. One in five Americans develops skin cancer. People get 80 percent of their lifetime sun exposure by the age of 18.

Melanoma is the most serious type of cancer of the skin. Each year in the United States, more than 53,600 people learn they have melanoma. Melanoma occurs when melanocytes (pigment cells) become malignant. Melanoma is one of the most common cancers. The chance of developing it increases with age, but this disease affects people of all ages. It can occur on any skin surface. In men, melanoma is often found on the trunk (the area between the shoulders and the hips) or the head and neck. In women, it often develops on the lower legs. Melanoma is rare in African-Americans and others with dark skin. When it does develop in dark-skinned people, it tends to occur under the fingernails or toenails, or on the palms or soles.

No one knows the exact causes of melanoma. Doctors can seldom explain why one person gets melanoma and another does not. However, research has shown that people with certain risk factors are more likely than others to develop melanoma. A risk factor is anything that increases a person's chance of developing a disease. Still, many who do get this disease have no known risk factors. Risk factors for melanoma include:

- Many (more than 50) ordinary moles—Having many moles increases the risk of developing melanoma.
- Fair skin—Melanoma occurs more frequently in people who have fair skin that burns or freckles easily (these people also usually have red or blond hair and blue eyes) than in people with dark skin.
- Personal history—People who have been treated for melanoma have a high risk of a second melanoma.
- Family history—Melanoma sometimes runs in families. Having two or more close relatives who have had this disease is a risk factor. About 10 percent of all patients with melanoma have a family member with this disease. When melanoma runs in a family, all family members should be checked regularly by a doctor.
- Severe, blistering sunburns—People who have had at least one severe, blistering sunburn as a child or teenager are at increased risk of melanoma. Because of this, doctors advise that parents



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protect children’s skin from the sun. Such protection may reduce the risk of melanoma later in life. Sunburns in adulthood are also a risk factor for melanoma.

- Ultraviolet (UV) radiation—Experts believe that much of the worldwide increase in melanoma is related to an increase in the amount of time people spend in the sun. This disease is also more common in people who live in areas that get large amounts of UV radiation from the sun. In the United States, for example, melanoma is more common in Texas than in Minnesota, where the sun is not as strong. UV radiation from the sun causes premature aging of the skin and skin damage that can lead to melanoma.
- Artificial sources of UV radiation—such as sunlamps and tanning booths—also can cause skin damage and increase the risk of melanoma. Doctors encourage people to limit their exposure to natural UV radiation and to avoid artificial sources.

Skin cancer can be curable if you detect it early. To help recognize potential problems, conduct periodic self-examinations and watch for growths that meet one of the ‘ABCDs’ of melanoma:

<b>ABCDs of Melanoma:</b>	
<b>A</b> symmetry: One half of the growth doesn’t match the other half.	<b>B</b> order irregularity: The edges of the growth are ragged, notched, or blurred.
<b>C</b> olor: The pigmentation of the growth is not uniform. Shades of tan, brown, and black are present. Dashes of red, white, and blue also may appear.	<b>D</b> iameter: Any growth greater than 6 millimeters (about the size of a pencil eraser) is cause for concern.

If you notice any changes in the appearance of moles or freckles, contact a dermatologist.

## Protecting Your Skin

Doctors recommend that people take steps to help prevent and reduce the risk of melanoma caused by UV radiation:

- Avoid exposure to the midday sun (from 10 a.m. to 4 p.m.) whenever possible. When your shadow



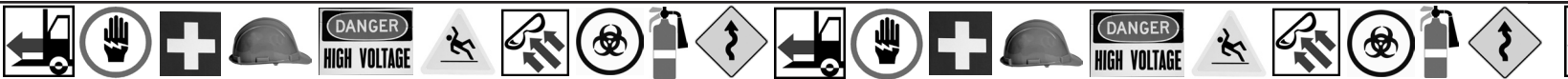
is shorter than you are, remember to protect yourself from the sun.

- If you must be outside, wear long sleeves, long pants, and a hat with a wide brim.
- Protect yourself from UV radiation that can penetrate light clothing, windshields, and windows.
- Protect yourself from UV radiation reflected by sand, water, snow, and ice.
- Help protect your skin by using a lotion, cream, or gel that contains sunscreen. Many doctors believe sunscreens may help prevent melanoma, especially sunscreens that reflect, absorb, and/or scatter both types of ultraviolet radiation. These sunscreen products will be labeled with “broad-spectrum coverage.” Sunscreens are rated in strength according to a sun protection factor (SPF). The higher the SPF, the more sunburn protection is provided.
  - Sunscreens with an SPF value of 2 to 11 provide minimal protection against sunburns.
  - Sunscreens with an SPF of 12 to 29 provide moderate protection.
  - Those with an SPF of 30 or higher provide the most protection against sunburn.



**Did you Know?** The sunscreen lotion that you apply to your skin contains chemicals that absorb the harmful UV radiation from the sun before it reaches your skin. A sunscreen’s sun protection factor (SPF) indicates how long your skin will be protected. For example, if you could normally stay in the sun for 10 minutes before getting burned, a sunscreen with SPF 15 will protect you for 15 times longer, or about 150 minutes. (This only works if you apply the sunscreen properly and reapply it after it washes or wears off.)

- Put sunscreen on before you go outside, even on slightly cloudy or cool days. The sun’s UV rays can damage your skin in as little as 15 minutes. Put it on again if you stay out in the sun for more than two hours, and after you swim or do things that make you sweat.
- Wear sunglasses that have UV-absorbing lenses. The label should specify that the lenses block at least 99 percent of UVA and UVB radiation. Sunglasses can protect both the eyes and the skin around the eyes.



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## Poisonous Plants

Poison ivy, poison oak, and poison sumac have poisonous sap (urushiol) in their roots, stems, leaves, and fruits. The urushiol may be deposited on the skin by direct contact with the plant or by contact with contaminated objects, such as clothing, shoes, tools, and animals. Approximately 85 percent of the general population will develop an allergy if exposed to poison ivy, poison oak, or poison sumac.



Poison Ivy



Poison Oak



Poison Sumac

Reactions, treatments and preventive measures are the same for all three poisonous plants. Avoiding direct contact with the plants reduces the risk but doesn't guarantee against a reaction. Urushiol can stick to pets, garden tools, balls, or anything it comes in contact with. If the urushiol isn't washed off those objects or animals, just touching them—for example, picking up a ball or petting a dog—could cause a reaction in a susceptible person. Urushiol that has rubbed off the plants onto other things can remain potent for years, depending on the environment. If the contaminated object is in a dry environment, the potency of the urushiol can last for decades. Even if the environment is warm and moist, the urushiol could still cause a reaction a year later.

To protect yourself, you should:

- Wear long-sleeved shirts and long pants, tucked into boots.
- Wear cloth or leather gloves.
- Keep rubbing alcohol available—it removes the oily resin up to 30 minutes after exposure.

If you've been exposed to poison ivy, oak or sumac, stay outdoors—if possible—until you complete the first two steps:

- First, cleanse exposed skin with generous amounts of isopropyl (rubbing) alcohol. Do not return to the woods or yard the same day. Alcohol removes your skin's protection along with the urushiol and any new contact will cause the urushiol to penetrate twice as fast.
- Second, wash skin with water. Water temperature does not matter; if you're outside, it's likely only cold water will be available.



- Third, take a regular shower with soap and warm water. Do not use soap before this point—soap will tend to pick up some of the urushiol from the surface of the skin and move it around.
- Finally, wipe off any clothes, shoes, tools, and anything else that may have been in contact with the urushiol with alcohol and water. Be sure to wear gloves or otherwise cover your hands while doing this and then discard the hand covering.

If you don't cleanse quickly enough, or your skin is so sensitive that cleansing didn't help, redness and swelling will appear in about 12 to 48 hours. Blisters and itching will follow. For those rare people who react after their very first exposure, the rash appears after seven to 10 days. The rash will only occur where urushiol has touched the skin; it doesn't spread throughout the body. However, the rash may seem to spread if it appears over time instead of all at once. This is either because the urushiol is absorbed at different rates in different parts of the body or because of repeated exposure to contaminated objects or urushiol trapped under the fingernails.

Because they don't contain urushiol, the oozing blisters are not contagious nor can the fluid cause further spread on the affected person's body. However, scratching the blisters could transfer germs from your fingernails and cause an infection.

The rash, blisters and itch normally disappear in 14 to 20 days without any treatment. However, few people can handle the itch without some relief. For mild cases, wet compresses or soaking in cool water may be effective. Oral antihistamines can also relieve itching. Over-the-counter topical corticosteroids (commonly called hydrocortisones under brand names such as Cortaid and Lanacort) are safe and effective for temporary relief of itching associated with poison ivy. For severe cases, prescription topical corticosteroid drugs can halt the reaction, but only if treatment begins within a few hours of exposure.



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# Summary

- Work outdoors involves heat and cold hazards. Heat cramps, heat exhaustion, and heat stroke can result from prolonged exposure to heat. Exposure to cold can lead to trenchfoot, frostbite, and hypothermia.
- There are more than 100 types of cancer. Benign growths are not cancer; malignant growths are cancer.
- The two most common types of skin cancer are basal cell cancer and squamous cell cancer. These cancers usually form on the head, face, neck, hands, and arms. These areas are exposed to the sun. But skin cancer can occur anywhere.
- Melanoma is the most serious type of cancer of the skin. Research has shown that people with certain risk factors are more likely than others to develop melanoma. You can take a number of steps to help prevent and reduce the risk of melanoma caused by UV radiation.
- Poison ivy, poison oak, and poison sumac have poisonous sap (urushiol) in their roots, stems, leaves, and fruits. Urushiol that has rubbed off the plants onto other things can remain potent for years, depending on the environment.





# Coping with Shiftwork

In this section, you will:

- Make the connection between shiftwork and safety.
- Identify strategies for coping with shiftwork.



## Shiftwork and Safety

Many work schedules are known as shiftwork—working outside the normal daylight hours. (These normal hours are often between 7 a.m. and 6 p.m., the period during which many people work a 7- to 8-hour shift.) Shiftworkers might work during the evening, in the middle of the night, overtime or extra-long workdays. They also might work regular days at one time or another. Many shiftworkers “rotate” around the clock, which involves changing work times from day to evening, or day to night. This might happen at different times of the week or at different times of the month.

Why is the time of shift important? Because people who work in the late night or early morning hours often feel sleepy and fatigued during their shift. This happens because their body rhythm (also called a circadian rhythm) tells them to be asleep at those times. Night workers also must sleep during the day, when their circadian rhythm tells them to be awake. Because of this, day sleep is short and feels “light” or unsatisfying. Often, night workers don’t get enough sleep during the day to combat nighttime fatigue and sleepiness. Also, day workers must sometimes wake up very early to go to work. This might cause them to cut off their sleep, which makes them feel tired during the day.

Shiftwork also involves health and safety concerns. Sleep loss makes it much easier to fall asleep at inappropriate times. This affects your ability to perform safely and efficiently. Sleepiness can affect performance both on and off the job. Driving to and from work is a major concern. Sleepiness affects the ability to concentrate or pay attention, and driving requires you to pay attention at all times. So, if you are sleepy, it is easier to have an accident. Several jobs, such as those involving operation of dangerous machinery, also require you to pay attention at all times. So, sleepiness can be risky in many different occupations. This risk is not simply a matter of falling completely asleep. After sleep loss, it is possible to have very brief periods of sleep that last only a few seconds. Most people may not even realize these short sleeps are happening. During those few seconds of sleep, they are not paying attention at all. If something dangerous happens at those times, you or someone else could get seriously hurt.

The circadian rhythm is a major body rhythm with regular ups and downs in the 24-hour day. Many





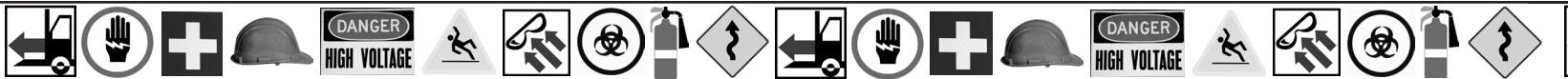
systems in the body are very active at certain times of day, and not active at all at other times of day. Usually the most activity happens in late afternoon or early evening. For example, the body's ability to produce energy from food (metabolism) is highest in the afternoon to evening. The least activity usually happens in the middle of the night when most people are asleep. This is one reason people feel most active and alert around 4 to 6 o'clock in the afternoon, and sleepest at 4 to 6 o'clock in the morning.

The internal circadian rhythm affects how alert people feel. This affects their ability to perform. People perform best when alertness and internal body activity are high, and worst when alertness and activity are low. In the normal day-work, night-sleep situation, people work when the circadian rhythm is high and sleep when it is low. On average, this schedule is best for performance, which means it also is best for safety. When workers perform poorly, they are more likely to make errors that could lead to accidents or injuries. When working the night shift, a person is at work when his or her circadian rhythm is low and asleep when it is high. Such a schedule means that a person is trying to stay alert when the circadian rhythm is low. On average, this is not the best time of day for performance. This low-point affects physical activity and the ability to concentrate. If you have lost sleep, fatigue could combine with the circadian low-point to double the effect on your ability to perform. Poor performance could affect both productivity and safety.

## Coping with Shiftwork

Get good sleep. If you are a shiftworker, you need to take responsibility for getting enough sleep to feel rested and restored. Answers to some common questions can help you to get satisfying sleep at the right times:

- **When should you sleep after working the night shift?** This depends on the person. Try different times and see what works best for you. Some workers like to sleep in one longer period, but many workers need two shorter sleep periods to get enough sleep after the night shift. To maximize sleep, you should go to bed as early as possible after the night shift. You could also sleep again in the afternoon, to get ready for the night shift. Try taking advantage of the natural tendency to be sleepy in mid-afternoon; you might get your most satisfying sleep at that time.
- **Is resting the same as sleep?** Resting without sleep is not enough. Your brain has to have sleep, or you will be sleepy later in the day or during the night shift. Rest without sleep does help with body and muscle recovery, though. Schedule at least seven (7) hours in bed, even if you don't sleep the whole time. Shiftworkers often take naps, especially when working the night shift. Added to your regular sleep, a short afternoon or evening nap will help fight sleepiness during the night. However, napping is not long enough to replace regular sleep. Naps work best when they are extra sleep time. They don't work as well when you are trying to make up for lost sleep.



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- **How much sleep is enough?** Most people need at least six (6) hours of sleep, but some need more than that. Many people do not feel refreshed and at their best with just six hours of sleep. Staying with your own preferred amount of sleep is best in the long run. You might discover that you need less as you become more experienced with shiftwork.
- **What about when switching back to a daytime shift?** When switching back to days after the night shift, you should get most of your sleep the following night. Sleep just a couple of hours after the night shift, to shake off sleepiness. Then, stay awake all day and go to sleep at your regular time at night.

Protect your sleep. To cope safely with shiftwork, it is important to protect your sleep. You can do this by (1) blocking out noise, (2) keeping a regular sleep routine, and (3) avoiding heavy foods and alcohol before sleep.

To block out noise:

- Switch off the phone and disconnect the doorbell.
- Wear ear plugs.
- Ask family members to be considerate when watching TV.
- Specify time periods for noisy activity, such as vacuuming, doing laundry, or kids playing indoors. Don't allow these activities during your sleep times.
- Locate your bedroom in the quietest place. If possible, get away from outside noise and away from the kitchen or bathroom.
- Soundproof the bedroom with insulation and heavy curtains.
- Post a sign that says you are sleeping.
- Tell friends and neighbors when not to call.



To keep a regular sleep routine:

- Make the bedroom as dark as possible.
- Always sleep in the bedroom.
- Follow your regular bedtime routine every time you go to sleep. For example, wash up and brush your teeth. This can “signal” your body that it is time for sleep.
- Use the bed for sleep—not for reading, eating, watching TV, etc. Make sure you have a comfortable bed that won't disturb your sleep.



To avoid heavy foods and alcohol before sleep, eat a light snack if you must eat; it won't disturb your



sleep. (Heavy, greasy foods can affect your sleep due to stomach upsets.) Alcohol might make you feel sleepy, but it will wake you up too quickly. Don't drink alcohol in the hour or two before sleep.



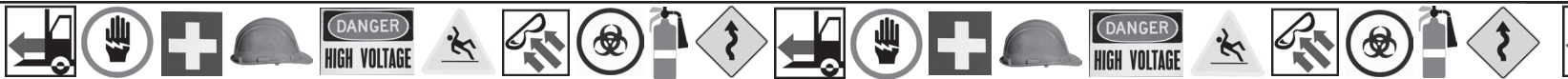
**Exercise.** In general, keeping physically fit helps resist stress and illness. Regular exercise also keeps you from becoming tired too quickly. The timing of your exercise is important, so it doesn't make you too tired to work. Exercise also should not interfere with sleep. If you do physical labor, too much exercise before work might make work too tiring. Twenty (20) minutes of aerobic exercise before work—such as walking, riding a bike, jogging, or swimming—is enough to help any worker wake up and get going. It also keeps your heart in shape. Try to avoid exercise during the three hours before sleep. Exercise tends to activate the body or wake it up. This might make it harder to fall asleep. The timing of exercise might also help you rotate from one shift to another. Because it activates the body to produce energy, exercise might also help the body rhythm to adjust to the new work time. Try exercise before starting work. Early morning exercise is good for day shift, afternoon exercise is good for evening shift, and early evening exercise is good for night shift. Remember not to overdo it and be too tired to work!

**Relax.** Being able to wind down and take it easy is as important as being able to wake up and get going. Give yourself time to relax and get rid of work-time stresses. This will make home life and sleep easier. Find out what is best for you personally to help you relax best.

**Eat well.** You should stick to a diet that, along with exercise, helps you to stay physically fit. This means avoiding fatty and sugary foods—they cause you to gain weight. You should avoid heavy or fatty meals especially in the middle of the night—they are the most difficult to digest at that time.

**Be careful with caffeine, alcohol, and drugs.** Caffeine is a mild stimulant that helps people feel more alert. It is the most widely used drug in the world and is a natural ingredient in coffee and tea. It is also added to many soft drinks. In small doses—1-3 cups of coffee or tea, or soft drinks, per day—can be helpful to shiftworkers. If you drink caffeinated beverages, drink them before the shift or early in the shift. Avoid caffeine late in the shift, especially late in the night shift. Too much caffeine, or caffeine late in the shift, makes it harder to fall asleep after the shift. If you do fall asleep, the caffeine makes your sleep lighter and less satisfying. If you drink a lot of caffeine, cutting back may help you to relax and might improve your sleep. You should reduce your use of caffeine gradually over a number of days. Cutting back too fast could produce headaches, nervousness, and bad moods or irritability.

**You should avoid alcohol to help sleep.** Alcohol can make you sleepy, so falling asleep is easy. But, alcohol actually disturbs sleep. After drinking alcohol, you wake up more often and sleep more lightly. Alcohol can also keep you from sleeping as long as you want or need to sleep. You should avoid alcohol for 1-2 hours before sleep, especially if you have to go to work after sleeping.



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Nonprescription sleep medications can make you drowsy and help you to fall asleep, but they may also be long acting. You may still feel drowsy after waking up. If you use them often, they may also stop working for you. Prescription sleep medications may be appropriate for limited use. However, you should avoid using them every time you need to sleep during the day. Before considering prescription medications, you should try the other techniques for improving your sleep. If you still have problems with sleep, check with your doctor.

## Summary

- Shiftwork refers to working outside the normal daylight hours.
- Late night or early morning workers often feel sleepy or tired during their shift. Their body rhythm—or circadian rhythm—is telling them to be asleep at those times.
- Shiftwork involves safety and health concerns by making it easier to fall asleep at inappropriate times and by affecting your ability to concentrate or pay attention.
- Strategies exist to help you to cope with shiftwork. They include getting good sleep, protecting your sleep, exercising, relaxing, eating well, and being careful with caffeine, alcohol, and drugs.

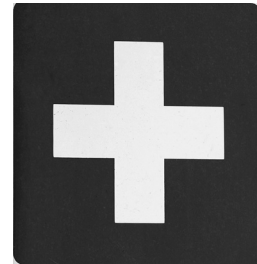




# Responding to Injury or Illness

In this section, you will:

- Identify the importance of first aid training to the workplace.
- Learn how to respond to cuts.
- Learn how to respond to sprains and strains.
- Learn how to respond to back pain.
- Learn how to respond to burns (and scalds).
- Learn how to respond to emergencies in hot weather and in cold weather.
- Learn how to respond to a heart attack or sudden cardiac arrest.



## First Aid and Safety

First aid is emergency care provided for injury or sudden illness before emergency medical treatment is available. Knowing basic first aid procedures is important in the workplace. According to OSHA (the Occupational Safety and Health Administration), private industry reported some 4.3 million workplace injuries and illnesses in 2004.

Prompt and proper first aid treatment can make the difference in the time needed for recovery and in the severity of the injury. First aid can even mean the difference between life and death. You can obtain training in first aid procedures from the American Heart Association, the American Red Cross, the National Safety Council, and other organizations. In addition to basic procedures, training is also available for responding to life-threatening emergencies, including:

- performing CPR (cardiopulmonary resuscitation);
- using automated external defibrillators;
- controlling bleeding through direct pressure;
- responding to medical emergencies—stroke, seizures, impaled objects, and other emergencies;
- and other life-threatening emergencies.



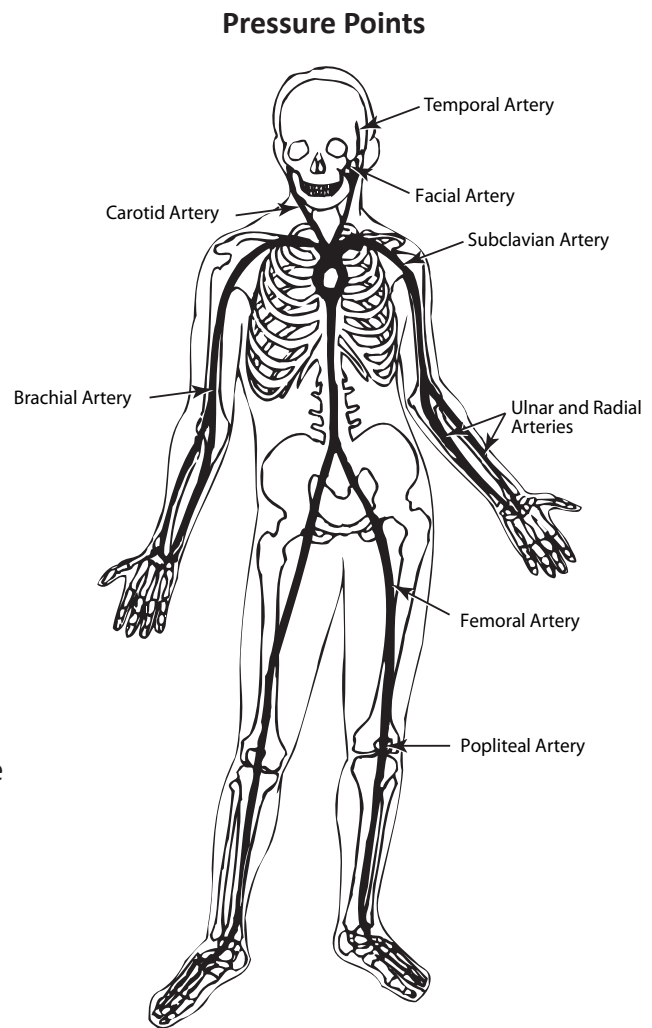
## Cuts—Minor and Severe

If the cut is minor:

- Wash the cut.
- Apply dressing and bandage.

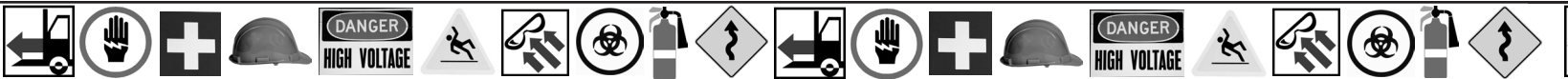
If the cut is severe:

- Obtain medical attention.
- Put a dressing over the cut and apply pressure.
- Elevate the wound. If you suspect a broken bone, do NOT elevate the wound.
- Put a bandage over the dressing.
- If bleeding continues after applying a dressing and bandage, place an additional dressing and bandage over the first one.
- If bleeding still does not stop, put pressure on a pressure point (nearby artery).
- Do not remove an object impaled in a wound. Wrap dressings around the object to keep it in place.
- If a body part is severed, wrap it in sterile gauze, place it in a plastic bag, and put the bag on ice. The severed part should be taken to the hospital with the victim.
- Wash your hands and any areas that may have contacted a bodily fluid.



## Sprains and Strains

A sprain is an injury to a ligament (tissue that connects two or more bones at a joint). In a sprain, one or more ligaments is stretched or torn. A sprain can result from a fall, a sudden twist, or a blow to the body that forces a joint out of its normal position and stretches or tears the ligament supporting that joint. Sprains usually occur when people fall and land on an outstretched arm, land on the side of their foot, or twist a knee with the foot planted firmly on the ground. The usual signs and symptoms of a sprain include pain, swelling, bruising, instability, and loss of the ability to move and use the joint. However, these signs and symptoms can vary in intensity, depending on the severity of the sprain.



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Sometimes, people feel a “pop” or tear when the injury happens.

A strain is caused by twisting or pulling a muscle or tendon. An acute strain is associated with a recent trauma or injury; it can also occur after improperly lifting heavy objects or overstressing the muscles. Chronic strains usually result from overuse: prolonged, repetitive movement of the muscles and tendons. Two common sites for a strain are the back and the hamstring muscle (in the back of the thigh). Typically, people with a strain experience pain, limited motion, muscle spasms, and possibly muscle weakness. They can also have localized swelling, cramping, or inflammation and—with a minor or moderate strain—usually some loss of muscle function. People with a strain typically experience pain in the injured area and general weakness of the muscle when they try to move it. Severe strains—strains that partially or completely tear the muscle or tendon—are often very painful and disabling.

Treatments for sprains and strains are similar. To reduce swelling and pain during the first day or two, health care providers usually advise you to:

- Rest the injured area. If your ankle or knee is hurt, you might be advised to use crutches or a cane.
- Apply ice on the injury for 20 minutes at a time, 4 to 8 times a day. You can use a cold pack, ice bag, or plastic bag filled with crushed ice and wrapped in a towel.
- Compress (squeeze) the injury using special bandages, casts, boots, or splints. This may help reduce swelling. Your health care provider will advise which is best for you.
- Elevate the injured area on a pillow—above the level of the heart—to help decrease swelling.
- Take medicines, such as aspirin or ibuprofen, as advised.

If you have any concerns about the seriousness of a sprain or strain, you should contact your health care provider. You may need physical therapy. You should see a health care provider for a sprain when:

- You have severe pain and cannot put any weight on the injured joint.
- The injured area looks crooked or has lumps and bumps (other than swelling) that you do not see on the uninjured joint.
- You cannot move the injured joint.
- You cannot walk more than four steps without significant pain.
- Your limb buckles or gives way when you try to use the joint.
- You have numbness, coolness, or discoloration in any part of the injured area.
- You see redness or red streaks spreading out from the injury.
- You injure an area that has been injured several times before.
- You have pain, swelling, or redness over a bony part of your foot.
- You are in doubt about the seriousness of the injury or how to care for it.





## Back Pain

Back pain affects an estimated 8 out of 10 people. The first attack of low back pain typically occurs between the ages of 30 and 40. Back pain becomes more common with age and can range from a dull, constant ache to a sudden, sharp pain. It can come on suddenly—from an accident, a fall, or lifting something that is too heavy—or it can develop slowly. You can prevent back pain by exercising regularly, eating a healthy diet, and practicing good posture.

In most cases, it is not necessary to see a doctor for back pain; the pain usually goes away with or without treatment. However, you should see a doctor if you experience numbness or tingling, if your pain is severe and does not improve with medications and rest, or if you have pain after a fall or an injury. It is also important to see your doctor if you have pain along with any of the following problems: trouble urinating; weakness, pain, or numbness in your legs; fever; or unintentional weight loss. Such symptoms could signal a serious problem that requires treatment soon.



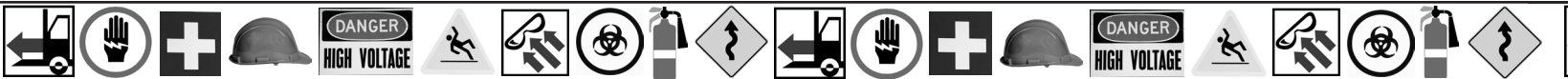
Hot or cold packs—or sometimes a combination—can be soothing to chronically sore, stiff backs. Heat dilates the blood vessels, improving the supply of oxygen that the blood takes to the back and reducing muscle spasms. Heat also alters the sensation of pain. Cold may reduce inflammation by decreasing the size of blood vessels and the flow of blood to the area. Although cold may feel painful against the skin, it numbs deep pain. Applying heat or cold may relieve pain, but it does not cure the cause of chronic back pain—pain that comes on quickly or slowly, and lasts a long time (3 months or longer).

Although exercise is usually not advisable for acute back pain, proper exercise can help ease chronic pain and may reduce its risk of returning. Acute back pain—pain that hits you suddenly—usually gets better on its own and without treatment, although you may want to try acetaminophen, aspirin, or ibuprofen to help ease the pain. A wide range of medications are used to treat chronic back pain. Some you can try on your own; others require a doctor's prescription.

## Burns (and Scalds)

A burn is defined as tissue damage caused by a variety of agents, such as heat, chemicals, electricity, sunlight, or nuclear radiation. Most common are burns caused by scalds, building fires, and flammable liquids and gases.

- First-degree burns affect only the outer layer (called the epidermis) of the skin.
- Second-degree burns damage the epidermis and the layer beneath it (called the dermis).
- Third-degree burns involve damage or complete destruction of the skin to its full depth and damage



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to underlying tissues. People who experience such burns often require skin grafting.

The swelling and blistering characteristic of burns is caused by the loss of fluid from damaged blood vessels. In severe cases, such fluid loss can cause shock, requiring immediate transfusion of the patient with blood or a physiological salt solution to restore adequate fluid levels to maintain blood pressure. Shock is defined as “circulatory collapse,” when the blood pressure in the arteries is too low to maintain an adequate supply of blood to the body’s tissues. Shock is characterized by cold and sweaty skin, weak and rapid pulse, irregular breathing, dry mouth, dilated pupils, and reduced flow of urine. Shock can be caused by internal or external bleeding, dehydration, burns, or severe vomiting and/or diarrhea—all of which involve the loss of large amounts of bodily fluids. Other causes of shock include: the presence of microorganisms in the bloodstream, a severe allergic reaction, drug overdose, alterations in the ability of the heart to pump blood effectively, and extreme emotional upset due to personal tragedy or disaster.

Burns often lead to infection, due to damage to the skin’s protective barrier. In many cases, topical antibiotics (creams or ointments applied to the skin) can prevent or treat such infection. According to the American Burn Association, each year in the United States, 1.1 million burn injuries require medical attention. Approximately 45,000 of these require hospitalization, and roughly half of those burn patients are admitted to a specialized burn unit. Each year, approximately 4,500 of these people die. Up to 10,000 people in the United States die every year of burn-related infections; pneumonia is the most common infectious complication among hospitalized burn patients.

To treat a burn:

- Remove any clothing and jewelry from near the burned area. If the clothing is stuck to the skin, do not remove it. Do not pop any blisters.
- For a first- or second-degree burn, run cool water over the burned area.
- Apply a gauze bandage to a small first-degree burn.
- Get immediate medical attention if:
  - for a second- or third-degree burn
  - for infected burns
  - for large burns or burns on your face, head, hands, or genitals
  - for burns caused by electricity or fire

## Hot Weather Emergencies

Prolonged exposure to heat can cause heat cramps, heat exhaustion, and heat stroke. Heat stroke is a



medical emergency that is potentially fatal and is the most severe type of heat-related illness. Responding to heat cramps—Heat cramps usually occur in the abdomen, arms, or legs. If medical attention is not necessary, you should:

- Stop your activity and sit in a cool place.
- Drink clear juice or a sports drink.
- Wait a few hours after the cramps stop, before returning to any strenuous activity. If you return to work too soon, heat exhaustion or heat stroke could result!
- Get medical attention if the cramps do not subside in one (1) hour.

Responding to heat exhaustion—Warning signs of heat exhaustion include:

- Heavy sweating
- Paleness
- Muscle cramps
- Tiredness
- Weakness
- Dizziness
- Headache
- Nausea or vomiting
- Fainting



The skin may be cool and moist. The pulse rate will be fast and weak, and breathing will be fast and shallow. If heat exhaustion is untreated, it may progress to heat stroke. Seek medical attention immediately if symptoms are severe or if you or the victim has heart problems or high blood pressure. Otherwise, cool off (or help the victim to cool off), and seek medical attention if symptoms worsen or last longer than 1 hour. Cooling measures that may be effective include the following:

- Cool, nonalcoholic beverages
- Rest
- Cool shower, bath, or sponge bath
- An air-conditioned environment
- Lightweight clothing

Responding to heat stroke—Warning signs of heat stroke may include:

- An extremely high body temperature (above 103°F, orally)
- Red, hot, and dry skin (no sweating)



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- Rapid, strong pulse
- Throbbing headache
- Dizziness
- Nausea
- Confusion
- Unconsciousness

Heat stroke is a medical emergency—It can cause death or permanent disability if emergency treatment is not provided. If you see any of the above signs, you may be dealing with a life-threatening emergency. Have someone call for immediate medical assistance while you begin cooling the victim. Do the following:

- Get the victim to a shady area.
- Cool the victim rapidly using whatever methods you can. For example, immerse the victim in a tub of cool water; place the person in a cool shower; spray the victim with cool water from a garden hose; sponge the person with cool water; or if the humidity is low, wrap the victim in a cool, wet sheet and fan him or her vigorously.
- Monitor body temperature, and continue cooling efforts until the body temperature drops to 101-102°F.
- Do not give the victim fluids to drink.
- Get medical assistance as soon as possible. If emergency medical personnel are delayed, call the hospital emergency room for further instructions.

Sometimes a victim’s muscles will begin to twitch uncontrollably as a result of heat stroke. If this happens, protect the victim from injury, but do not place any object in the mouth and do not give fluids. If there is vomiting, make sure the airway remains open by turning the victim on his or her side.

## Cold Weather Emergencies

Cold weather can result in frostbite and hypothermia. With frostbite, parts of the body, such as fingers, toes, and nose, freeze and the tissue dies. Hypothermia involves a severe loss of body heat that can result in death.

Responding to frostbite—Frostbite involves freezing in the deep layers of skin and tissue. The skin appears pale and waxy-white in color, the skin becomes hard and numb, and the areas that are usually affected are the fingers, hands, toes, feet,



ears, and nose. You should:

- Move to a warm, dry place (or move the other person, if you are not the victim). Do not leave another person alone.
- Remove wet or tight clothing—it could cut off the blood flow to the affected areas.
- Do not rub the affected areas—rubbing damages the skin and tissue.
- Gently place the affected areas in a warm water bath (105°F) and monitor the water temperature to slowly warm the tissue (over a period of 25-40 minutes).

**CAUTION:** Do not pour warm water directly on the affected areas. It will warm the tissue too quickly, causing tissue damage.

- After warming the affected areas, dry the areas and wrap them to keep them warm.

**CAUTION:** If the affected areas could become cold again, do not warm the skin. If the skin is warmed and then becomes cold again, severe tissue damage will result.

- Get medical attention as soon as possible.



**Did you Know?** A wind chill of  $-20$  degrees Fahrenheit will cause frostbite in just 30 minutes.

Source: National Weather Service



Responding to hypothermia—Hypothermia is a medical emergency! With hypothermia, a person's normal body temperature drops to or below 95°F, the person experiences fatigue or drowsiness, uncontrolled shivering, slurred speech, clumsy movements, and irritable, irrational, or confused behavior, and the skin is cool and bluish. You should:

- Call for emergency assistance (ambulance or 9-1-1).
- Move the person to a warm, dry place. Do not leave the person alone.
- Remove any wet clothing and replace them with warm, dry clothing or wrap the person in blankets.
- Give the person warm, sweet drinks (sugar water or sports drinks) if the person is alert.

**NOTE:** Avoid drinks that contain caffeine (coffee, tea, hot chocolate) or alcohol.



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- Have the person move his/her arms to create muscle heat. If the person cannot do this, place warm bottles or hot packs in the armpits, groin, neck, and head areas.

**CAUTION:** DO NOT rub the person’s body or place the person in a warm water bath. This may stop the person’s heart!

If in water:

- Call for emergency assistance (ambulance or 9-1-1).
- DO NOT remove any clothing. Button, buckle, zip, and tighten any collars, cuffs, shoes, and hoods—the layer of trapped water that is closest to the body provides a layer of insulation that slows the loss of heat. Keep the head out of the water and cover the head with a hat or hood.
- Get out of the water as quickly as possible or climb onto anything floating. DO NOT try to swim unless a floating object or another person can be reached. Swimming or other physical activity uses the body’s heat and reduces survival time by about 50 percent.
- If getting out of the water is not possible, wait quietly and conserve body heat by folding your arms across your chest, keeping thighs together, bending the knees, and crossing ankles. If another person is in the water, huddle together with chests held closely.

## Heart Attacks and Sudden Cardiac Arrest

During a heart attack, a clot blocks the flow of blood to the heart. Heart muscle begins to die. The more time that passes without treatment, the greater the damage. Unfortunately, many people take a “wait and see” approach to the warning signs of a heart attack:

- Chest discomfort—Most heart attacks involve discomfort in the center of the chest that lasts for more than a few minutes, or that goes away and returns. This discomfort can feel like uncomfortable pressure, squeezing, fullness, or pain.
- Discomfort in other areas of the upper body—This can include pain or discomfort in one or both arms, the back, neck, jaw, or stomach.
- Shortness of breath—This often comes along with chest discomfort. It can also happen before the discomfort.
- Other signs—Other signs can include breaking out in a cold sweat, nausea, or light-headedness.



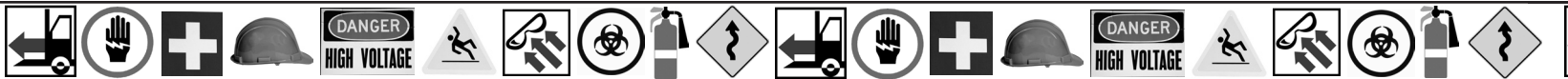
Most heart attack victims wait two hours or more after their symptoms start before they seek medical attention. This delay can result in death or permanent heart damage—damage that can greatly reduce your ability to do everyday activities.

Sudden cardiac arrest is caused by abnormal, uncoordinated beating of the heart or loss of the heartbeat altogether—usually as a result of a heart attack. Some 250,000 sudden cardiac arrests happen each year outside of a hospital. Workplace events such as electrocution or exposure to low-oxygen environments can lead to sudden cardiac arrest. Overexertion at work can also trigger it in people who have underlying heart disease.

A heart attack is not necessarily a sudden and intense event, as it appears in the movies. Many heart attacks start slowly as mild pain or discomfort. You may not be sure what is wrong. Your symptoms may come and go. Fortunately, clot-busting drugs and other artery-opening treatments can stop a heart attack. If they are given immediately after symptoms begin, these treatments can prevent or limit damage to the heart. To be most effective, these treatments need to be given within one hour of the start of heart attack symptoms.


Heart disease is the number one killer of both men and women in the United States. In men, the risk for heart attack increases after age 45. In women, they are more likely to occur after about age 50. Besides age, other factors increase the risk for a heart attack:

- **A previous heart attack or angina (chest pain)**—Angina is chest pain or discomfort that occurs when your heart muscle does not get enough blood. Angina may feel like pressure or a squeezing pain in your chest. The pain may also occur in your shoulders, arms, neck, jaw, or back. It may also feel like indigestion. Angina is a symptom of coronary artery disease (CAD), the most common type of heart disease. CAD occurs when plaque builds up in the coronary arteries. As plaque builds up, the coronary arteries become narrow and stiff. Blood flow to the heart is reduced. This decreases the oxygen supply to the heart muscle.
- **A family history of heart disease**—If one or more members of your family had a heart attack at an early age (before age 55 for men or 65 for women), you may be at increased risk.
- **Diabetes**—If you have diabetes, you are at least twice as likely as someone who does not have diabetes to have heart disease or a stroke. People with diabetes also tend to develop heart disease or have strokes at an earlier age than other people. Women who have not gone through menopause usually have less risk of heart disease than men of the same age. But, women of all ages with diabetes have an increased risk of heart disease because diabetes cancels out the protective effects of being a woman in her child-bearing years. People with diabetes who have already had one heart attack run an even greater risk of having a second one. In addition, heart



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attacks in people with diabetes are more serious and more likely to result in death. High blood glucose levels over time can lead to increased deposits of fatty materials on the insides of the blood vessel walls. These deposits may affect blood flow, increasing the chance of clogging and hardening of blood vessels.

- **High cholesterol**—The body needs cholesterol to function normally. However, the body makes all of the cholesterol that it needs. Over a period of years, extra cholesterol and fat circulating in the blood are deposited in the walls of the arteries that supply blood to the heart. These deposits make the arteries narrower and narrower. As a result, less blood gets to the heart and the risk of coronary heart disease increases.
- **High blood pressure**—Blood pressure is the amount of force exerted by the blood against the walls of the arteries. Everyone has to have some blood pressure, so that blood can get to the body's organs and muscles. Usually, blood pressure is expressed as two numbers, such as 120/80, and is measured in millimeters of mercury (mmHg). The first number is the systolic blood pressure, the force used when the heart beats. The second number, or diastolic blood pressure, is the pressure that exists in the arteries between heartbeats. Depending on your activities, blood pressure may move up or down in the course of a day. Blood pressure is considered high when it stays above normal levels over a period of time. If you have high blood pressure—also called hypertension—your heart must work harder to pump blood. High blood pressure can strain the heart, damage blood vessels, and increase your risk of heart attack, stroke, eye problems, and kidney problems.
- **Cigarette smoking**—There is simply no safe way to smoke. Although low-tar and low-nicotine cigarettes may reduce the lung cancer risk to some extent, they do not lessen the risks of heart disease or other smoking-related diseases. The only safe and healthful course is not to smoke. 
- **Being overweight**—Central obesity means carrying extra weight around the waist, as opposed to the hips. A waist measurement of more than 40 inches for men and more than 35 inches for women means you have central obesity. Your risk of heart disease is higher because abdominal fat can increase the production of LDL (bad) cholesterol, the type of blood fat that can be deposited on the inside of blood vessel walls.
- **Physical inactivity**—Heart disease is almost twice as likely to develop in inactive people. Being physically inactive is a risk factor for heart disease. The more risk factors you have, the greater your chance for heart disease. Regular physical activity—even mild to moderate exercise—can reduce this risk.







Minutes matter! Anyone with heart attack warning signs needs immediate medical attention. **DO NOT WAIT MORE THAN A FEW MINUTES—5 MINUTES AT MOST.** Call 9-1-1. By calling 9-1-1, you can get to the hospital sooner. In addition:

- Emergency personnel can begin treatment immediately—even before you arrive at the hospital.
- Your heart may stop beating during a heart attack. Emergency personnel have the equipment and training to get your heart beating again.
- Heart attack patients who arrive by ambulance tend to receive faster treatment when they arrive.

If you cannot call 9-1-1, ask someone else to drive you to the hospital at once. Never drive yourself, unless you have absolutely no other choice.

Choosing foods wisely, being physically active, losing weight, quitting smoking, and taking medications (if needed) can all help lower your risk of heart disease and stroke. If you have any warning signs of a heart attack or a stroke, get medical care immediately—don't delay. Early treatment of heart attack and stroke in a hospital emergency room can reduce damage to the heart and the brain.

Not all chest pain or discomfort is angina. Chest pain or discomfort can be caused by a heart attack, lung problems (such as an infection or a blood clot), heartburn, or a panic attack. However, all chest pain should be checked by a doctor.



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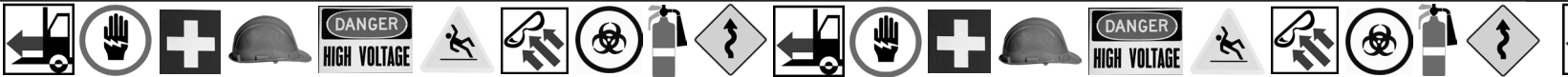
# Summary

- Prompt and proper first aid treatment can make the difference in the time needed for recovery and in the severity of the injury. First aid can even mean the difference between life and death.
- Sprains usually occur when people fall and land on an outstretched arm, land on the side of their foot, or twist a knee with the foot planted firmly on the ground.
- A strain is caused by twisting or pulling a muscle or tendon. An acute strain is associated with a recent trauma or injury; it can also occur after improperly lifting heavy objects or overstressing the muscles.
- The first attack of low back pain typically occurs between the ages of 30 and 40. Back pain becomes more common with age.
- In most cases, it is not necessary to see a doctor for back pain; the pain usually goes away with or without treatment.
- Burns often lead to infection, due to damage to the skin's protective barrier.
- Prolonged exposure to heat can cause heat cramps, heat exhaustion, and heat stroke. Heat stroke is a medical emergency that is potentially fatal and is the most severe type of heat-related illness.
- Cold weather can result in frostbite and hypothermia. With frostbite, parts of the body, such as fingers, toes, and nose, freeze and the tissue dies. Hypothermia involves a severe loss of body heat that can result in death.
- Most heart attack victims wait two hours or more after their symptoms start before they seek medical attention. This delay can result in death or permanent heart damage—damage that can greatly reduce your ability to do everyday activities.
- Workplace events such as electrocution or exposure to low-oxygen environments can lead to



sudden cardiac arrest. Overexertion at work can also trigger it in people who have underlying heart disease.

- All chest pain should be checked by a doctor.

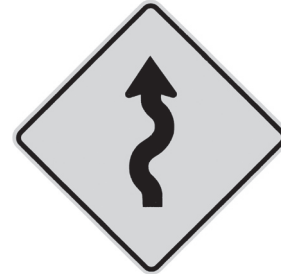


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# Preventing Transportation Incidents

In this section, you will:

- Identify the potential safety hazards of driving on the job.
- State guidelines for driving safely.



## Driving and Safety Hazards

Work-related roadway crashes are the leading cause of death from traumatic injuries in the American workplace. This hazard affects people who occasionally drive their personal vehicles on the job, people who drive fleet vehicles, and people who routinely drive commercial vehicles over long distances. The risk of fatality is highest among workers in transportation and “material moving” occupations—especially truck drivers. Workers aged 65 and older have a higher risk of fatality than workers of all ages. Collisions between vehicles represent the largest number of fatal incidents. Other causes of fatalities are noncollision events—such as loss of control and rollover—and collisions with stationary objects after the worker’s vehicle left the roadway.



**Did you Know?** Every 12 minutes someone dies in a motor vehicle crash, every 10 seconds an injury occurs and every 5 seconds a crash occurs. Many of these incidents occur during the workday or during the commute to and from work.

Source: *Guidelines for Employers to Reduce Motor Vehicle Crashes*, OSHA website, accessed May 2008.

Preventing driving incidents is a challenge; the roadway is a unique work environment. The employer has only a limited ability to control the working conditions and to exert supervisory control. Traffic volume and road construction are increasing. Workers may feel pressured to drive faster and for longer periods (especially truck drivers).

A number of factors are possible contributors to roadway crashes. Driver fatigue is a key factor. Time of day, the length of wakefulness, inadequate sleep and sleep disorders, and extended working hours can all contribute to fatigue-related crashes. Distracted driving is another contributor to driving



incidents. Using a cell phone while driving can increase the risk of an accident. A hands-free device is not necessarily a safer alternative—it is the conversation itself that also distracts the driver. Simply stated, the driver’s attention is on the conversation instead of on the road. Other technologies compete to steal the driver’s attention away from the driving task, including on-board navigation systems and in-vehicle Internet systems.



**Did you Know?** Distracted driving is estimated to be a factor in between 25 to 30% of all traffic crashes—that’s 4,000 or more crashes a day. At 55 mph, a vehicle travels the length of a football field in 3.7 seconds.

Source: *Guidelines for Employers to Reduce Motor Vehicle Crashes*, OSHA website, accessed May 2008.

Aggressive driving contributes to roadway crashes. Employees commuting to and from work and traveling for work purposes often find themselves caught up in bottlenecks and traffic delays. These situations can create a high level of frustration that can spark aggressive driving behavior.

According to OSHA, alcohol plays a role in a significant number of all fatal motor vehicle crashes. These incidents represent an average of one alcohol-related fatality every 30 minutes. Alcohol, certain prescription drugs, over-the-counter medications, and illegal drugs can all affect your ability to drive safely due to decreased alertness, concentration, coordination and reaction time. Alcohol is also a contributing factor in 39 percent of all work-related traffic crashes.

Age is also a factor in driving incidents on the job. Young drivers may be at greater risk for crashes. They have less experience in recognizing, assessing, and responding to hazards. They may also be more willing to accept higher levels of risk. Even though the federal Fair Labor Standards Act (FLSA) prohibits all on-the-job driving for 16-year-olds and limits the amount and nature of driving for 17-year-olds, the FLSA does not cover workers age 18 and older. These workers are still developing their driving skills and are still gaining experience. Older drivers also pose risks. With aging comes a decline in reaction time, in vision (reduced night vision and less tolerance of glare), in the ability to divide attention between tasks, in the ability to handle complex and unfamiliar situations, and in muscle strength and range of motion. As more Americans work beyond the traditional retirement age, the needs of these older drivers create a workplace safety issue.



Notes...



**Did you Know?** One of the most important variables related to crash risk is driver age. Young drivers are over-involved in head-on crashes and crashes related to speeding and rollover. Drivers of middle age were found to have a higher percentage of crashes while under the influence of alcohol. Whether at intersections or at other locations, older drivers were found to be over-involved in right- and left-turn crashes.



Source: *Characteristics of Crash Injuries Among Young, Middle-Aged, and Older Drivers*, U.S. Department of Transportation, National Highway Traffic Safety Administration, November 2007

## Safe Driving Guidelines

### Before Your Trip

- Make sure you are well-rested.
- Adjust steering wheel, seat, controls, and mirrors.
- Clean lights and windows, and inspect your tires.
- Plan your route, especially if you will be traveling in an unfamiliar area, and allow plenty of time to reach your destination safely.
- Determine if there are construction zones or detours along your route.
- Avoid driving at night and in poor weather.

### During Your Trip

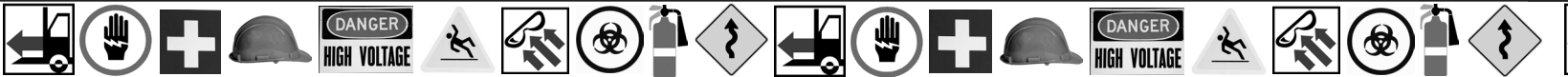
- Wear seat belts.
- Use caution at intersections and interchanges, especially when making left hand turns, and avoid cutting between approaching vehicles when doing so.
- Do not place or receive a cell phone call while operating a vehicle.
- Avoid other activities such as eating, drinking, or adjusting noncritical vehicle controls while driving.
- Avoid aggressive driving:
  - Tailgating
  - Making rude gestures
  - Passing on the shoulder



- o Pulling into a parking space that someone else is waiting for
- o Failing to yield to merging traffic
- o Flashing your high beams
- o Changing lanes without signaling
- o Driving through a yellow light turning red
- o Honking the horn
- Make every attempt to safely move out of an aggressive driver’s way. If a hostile motorist tries to pick a fight, do not make eye contact and do not respond. Ignore gestures and refuse to return them.
- Stop for regular rest breaks, and do not continue to drive if you are tired.

## Summary

- Work-related roadway crashes are the leading cause of death from traumatic injuries in the American workplace. This hazard affects people who occasionally drive their personal vehicles on the job, people who drive fleet vehicles, and people who routinely drive commercial vehicles over long distances.
- The roadway is a unique work environment.
- Possible factors in roadway crashes include driver fatigue, distracted driving, aggressive driving, alcohol, and age.
- Following safe driving guidelines starts before your trip, and include avoiding aggressive driving during your trip.



Notes...

# Managing Anger and Preventing Violence

In this section, you will:

- Identify potential causes of violence on the job.
- List employer and employee responsibilities for preventing workplace violence.
- Identify ways to manage anger and resolve conflict.
- State guidelines for parking your vehicle safely.
- State guidelines for handling difficult people.
- State guidelines for answering the telephone.
- State guidelines for preventing and responding to a robbery.
- State guidelines for working alone.



## Violence and the Workplace

Workplace violence can be any violent act against persons or property, threats, intimidation, harassment, or other inappropriate and disruptive behavior on the job that causes fear for personal safety. Workers in any workplace must be ready to deal with the potential hazard of violence on the job. Dangerous situations may develop that involve strangers, customers, visitors, and even co-workers and former co-workers. Workplace violence can result from actions at work:

- You may have to respond to an angry, difficult, or abusive customer or client.
- You may have to work alone or at night.
- You may be on the job during a robbery.
- You could face a disgruntled former co-worker.

Violence on the job can also result from situations that are unrelated to work. For example, incidents of domestic violence and “road rage” can spill over into the workplace. Some occupations pose a greater risk of violence to workers. For example, late-night retail businesses are more frequently a target for robbery. Healthcare workers often must handle abusive patients or clients and their family members when enforcing regulations or denying a request. Because no reliable method exists for predicting human behavior—and no universal profile exists of a potentially dangerous person—any workplace can include the potential for violence.

Both employers and employees have specific responsibilities for preventing violence on the job.



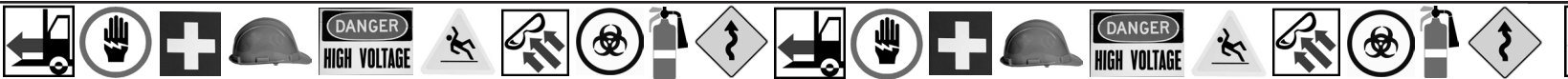


Employers should:

- Adopt a written workplace violence policy and prevention program, and communicate both to employees
- Provide training in preventive measures to all employees
- Practice the plan
- Implement safety measures: security, emergency telephones, etc
- Support victims of workplace and domestic violence
- Check employees' backgrounds before hiring
- Practice fair and consistent disciplinary procedures
- Create and maintain a climate of trust and respect among workers and between employees and managers

As an employee, you should:

- Pay attention to warning signs of potentially violent situations:
  - Direct or indirect threats
  - Inappropriate and aggressive behavior (intimidating, bullying, harassing)
  - Repeated conflicts with supervisors, co-workers, or customers
  - Bringing a weapon to the workplace or making inappropriate remarks about weapons
  - Fascination with weapons and acts of violence
  - Statements indicating suicidal thoughts or desperation
  - Drug or alcohol abuse
  - Noticeable changes in normal behaviors
  - Outbursts of anger
  - Romantic obsession
  - Grudge over a real or imagined grievance
  - Inability to accept responsibility for personal problems, hypersensitivity to criticism
- Take all threats seriously—direct and indirect. Threats may be delivered in person, on the telephone, or in e-mail and letters. Threats can include intimidating or frightening gestures, such as shaking a fist, punching a wall, pounding on a desk, or screaming. Throwing or striking an object, and stalking, can also represent threats.
- Know your employer's policies about workplace violence prevention and response.
- Keep your work area secure, consistent with your employer's policies.



Notes...

- Be alert to strangers in the workplace. Follow your employer’s policies for questioning or reporting them.
- Take notice of any threats or disruptive behavior and report it according to your employer’s policies.
- Avoid confronting individuals who are a threat. Respond according to your employer’s policies.
- Avoid entering areas where you feel unsafe.



**Did you Know?** Many times, a violent act is preceded by a threat. The threat may have been explicit or veiled, spoken or unspoken, specific or vague, but it occurred. In other instances, behavior may be observed by others, which might suggest the potential for some type of violent act to occur. Yet in other cases, it may be the off-handed remark or comments made to people close to the individual, which may suggest problematic behavior. Dealing with threats and/or threatening behavior—detecting them, evaluating them, and finding a way to address them—may be the single most important key to preventing violence.



Source: *Workplace Violence: Issues in Response*. Critical Incident Response Group, National Center for the Analysis of Violent Crime, FBI Academy

It is important for you to know (1) if your employer has a workplace violence prevention plan or policy, and (2) what the plan includes. This can help you to remain alert to potential warning signs, as well as respond appropriately to a potentially violent situation. Your employer’s plan may be included in its employee handbook, or may be covered during an employee orientation session or other training event. Workplace violence prevention plans often include:

- A written policy statement
- Pre-employment screening procedures
- Termination and layoff procedures
- Acceptable workplace behavior—and consequences of unacceptable behavior
- Related training programs for employees
- A crisis-response plan, including how to report an actual or potential incident of violence on the job
- Security measures—ID badges, key cards, surveillance cameras, door-locking procedures, security guards, and other measures
- Details of the employer’s Employee Assistance Program, or EAP (if available), for short-term



## Managing Anger and Resolving Conflict

Anger is a normal human response to threats or problems that can affect the workplace. Anger can range widely from irritation to rage. Anger is not the same as aggression. While anger is a feeling or emotion, aggression is a behavior meant to harm another person or damage property. The things that make you angry can be internal—such as worrying or dwelling on past events—or external—such as words or actions of a co-worker, or the actions of an aggressive driver. Other anger “triggers” or “red flags” can include:

- Waiting a long time—in person or on the telephone
- Having to fix another person’s mistakes
- Dealing with crowds
- Being falsely accused of something
- Being the subject of a joke or rumor
- Waiting in heavy traffic or being delayed by construction



Some myths exist about anger. Common myths include the following:

- **Myth #1:** Anger is inherited. Research indicates that people are not born with a specific way of expressing anger. In fact, studies actually show that the way people express anger is learned behavior. This means that people can also learn better, more appropriate ways of expressing anger.
- **Myth #2:** Anger must lead to aggression. Many people believe that anger builds until it must explode in an act of aggression. However, people have alternatives to aggression that they can learn. These include anger management skills such as by learning how to be assertive, changing negative “self-talk,” and others.
- **Myth #3:** You have to be aggressive to get what you want. Aggression is not the same as assertiveness. People are aggressive when they want to harm, dominate, or intimidate another person. The goal of assertiveness, on the other hand, is to express your anger while being respectful of other people.
- **Myth #4:** Venting anger is always helpful. Recent studies indicate that releasing your anger in an aggressive way may simply reinforce aggressive behavior—it makes you better at being angry.

Source: *Anger Management for Substance Abuse and Mental Health Clients*—Participant Workbook, U.S. Department of Health and Human Services, 2002



Notes...

Anger does not necessarily lead to aggression. However, anger can still cause problems when you express it inappropriately—at home, at work, and in your personal relationships. When you feel anger too intensely or too frequently, you can even put physical strain on your body. For example, your heart rate and blood pressure can increase. Besides health issues, anger can lead to other negative consequences. Anger that is expressed inappropriately, such as through verbal abuse or threatening behavior, can cause other people to fear and distrust you. You could end up alienating yourself from these people. Physical aggression or violence could result, which could also lead to legal consequences such as arrest and jail.

You cannot change the people or issues that make you angry, but you can change how you react to them. These techniques can help you to manage your anger:

- Learn to relax when you begin to feel angry: breathe deeply, repeat a calming word or phrase to yourself, visualize a relaxing experience, and relax your muscles through exercise.
- Change the way you think—replace your irrational thoughts with rational ones. For example, instead of cursing and telling yourself that everything is ruined, tell yourself that the situation isn't the end of the world and that you can work to make it better.
- Face challenges in a planned way—but realize that not all problems have solutions.
- Listen carefully and wait before responding. Avoid jumping to conclusions; listen instead for the meaning beneath the words.
- Try not to take yourself too seriously. Your anger may be in response to a serious situation or event, but your thoughts and emotions in response may appear less reasonable on closer inspection.
- Take a break during stressful times.

One way to face challenges in a planned way is to follow a basic conflict resolution process:

Step 1: Identify the underlying problem that is causing the conflict.

Step 2: Identify how you feel about the conflict.

Step 3: Identify the impact of the underlying problem.

Step 4: Decide whether to resolve the conflict.

Step 5: Work to resolve the conflict with the other person, if needed (based on Step 4).

You might decide at Step 4 that the conflict is not important enough to you to resolve. If you decide that the conflict will not make you angry if you do not resolve it, then Step 5 may not be necessary.



## Parking Your Vehicle

Preventing violence at work includes arriving at work/parking your vehicle safely:

- Lock your doors and roll your windows up before you enter the parking lot.
- Be alert for suspicious people.
- Park in a well-lighted area that is visible to other areas.
- Avoid walking to your vehicle alone; use a buddy system or ask a co-worker to watch from a window or doorway.



## Handling Difficult People

Employees, as representatives of their employers, are often on the receiving end of complaints from customers. A manager might criticize an employee. A co-worker might be rude, emotional, or demanding. Some people make complaints in a calm, professional way. Unfortunately, many others do not. A complaint often becomes emotional. Difficult people can be found in any workplace.

Even without threatening you, difficult people or people expressing strong emotion can make you feel threatened and vulnerable. To “defuse” a situation, you should:

- Focus on emotions first—yours and the other person’s.
- Remain calm and respectful. Do not return the other person’s anger with your own.
- Try to calm the other person.
- Listen to the other person and acknowledge what that person is saying. Try to put yourself in the other person’s place.
- Focus on facts and issues, not opinions or accusations. Ignore insults.
- Do not:
  - argue with the other person.
  - touch the other person.
  - exchange insults or challenges.
  - talk down to the other person.
- If you cannot find a solution to the other person’s concern, offer to forward the person’s information to your supervisor or manager.
- If the person fails to calm down, ask for help from a supervisor or manager.



Notes...

- If a person is being abusive toward another person—such as being rude, making offensive comments, or bullying—you should: (1) Tell the person to stop; (2) explain why the person’s behavior is not acceptable; (3) if the abuse continues, ask the person to leave, consistent with your employer’s policies; and (4) report the incident to your supervisor or other designated authority.

## Answering the Telephone

Most people do not like to be kept waiting for a phone to be answered. They also want to be transferred as few times as possible. When people have a hard time getting through on the phone, it can be a source of anger. Fortunately, it is easy to answer the telephone in a professional way—and avoid creating anger:

- Answer the phone by the second or third ring.
- Use a friendly voice and ask, “How may I help you?” Concentrate on the way you sound to a caller:
  - Put a smile in your voice.
  - Sound patient.
  - Speak slowly and clearly.
  - Keep your voice calm and controlled. Never let personal or work-related problems interfere with answering the phone or assisting people.
  - Maintain a friendly, yet professional tone.
  - Avoid adopting a routine “telephone voice.”
  - Close conversations in a positive, upbeat way.
- Never embarrass the caller.
- If you must put the caller on hold, ask if the caller would mind holding. Check back after 20 seconds. If the caller is still on hold, offer to take a message.
- Know how to transfer a caller correctly.



## Preventing and Responding to a Robbery

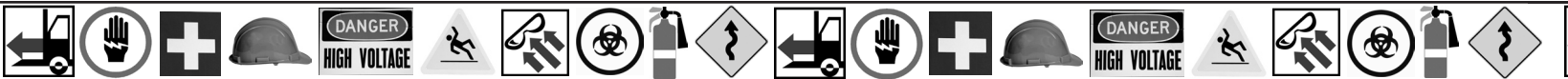
Preventing violence on the job includes taking steps to reduce the potential for robbery, as well as responding appropriately if a robbery occurs:



- Make the workplace an unattractive target:
  - Keep the workplace well-organized and well-lighted. Replace any burned-out lightbulbs immediately.
  - Make sure that nothing blocks the counter or register from view.
  - Keep back doors closed and locked.
  - Stay busy away from the counter or register when you are alone.
- Be alert to the environment: note any parked vehicles or persons watching the workplace from outside, as well as persons loitering inside the workplace.
- Keep emergency numbers nearby.
- Greet every person who enters the workplace.
- Act friendly: make brief, friendly eye contact and ask if you can help.
- If a robbery takes place:
  - Keep the incident as short as possible. The longer it takes, the more nervous the thief may become and the greater your risk.
  - Obey the thief's demands. If you do not understand, ask.
  - Avoid startling the thief: explain that you must make a movement or reach in any way.
  - Assume that the thief has a weapon, even if you do not see one.
- Never try to:
  - stop a thief—it could cost you your life!
  - prevent a thief from leaving; it will likely escalate the situation.
  - chase or fight a thief.
  - approach any vehicle. It could encourage the thief to harm you, and could confuse police or security personnel who respond.
- Be alert and record any personal and vehicle identification.
- After the thief has left, call the police and follow your employer's policies.

## Working Alone

Working alone can bring added risks to your safety. In addition to making the workplace an unattractive target, you should have someone check on you regularly in person or by phone. (Your employer might have a procedure for checking-in.) You should also avoid taking your breaks in isolated or dark areas



Notes...

(such as outside the back door or in an alley). If possible, you should avoid emptying the trash at night; trash dumpsters are often located in isolated areas.

## Summary

Workplace violence can be any violent act against persons or property, threats, intimidation, harassment, or other inappropriate and disruptive behavior on the job that causes fear for personal safety. Any workplace can include the potential for violence.

- Both employers and employees have responsibilities for preventing violence on the job.
- Anger is an emotion; aggression is a behavior. People can learn better, more appropriate ways of expressing anger.
- Anger may not lead to aggression, but anger can still cause problems when you express it inappropriately—including in the workplace.
- Techniques exist that can help you to manage your anger.
- Preventing violence at work includes parking your vehicle safely.
- Employees often have to respond to difficult people. Following specific guidelines can help to “defuse” a situation.
- Answering the telephone in a professional way can help you avoid creating anger in others.
- Preventing violence on the job includes taking steps to reduce the potential for robbery, as well as responding appropriately if a robbery occurs.
- Working alone can bring added risks to your safety.







# Preventing Accidents and Injuries at Work

In this section you will:

- Explain the importance of preventing accidents and injuries at work.
- List common causes of injury and illness in the workplace.
- Identify factors that contribute to injuries at work.
- State responsibilities of employees for working safely.
- Interpret the safety color code.
- List ways to prevent a fall (to same level) and slips, trips, and loss of balance.
- List ways to prevent repetitive motion injuries.
- List ways to prevent accidents while driving to, from, and during work.
- Explain the role of personal protective equipment (PPE).
- Describe the hazards of working with or around electricity.
- State general guidelines for using tools and equipment safely.
- Explain the use of Material Safety Data Sheets.
- List guidelines for responding to potentially violent situations.
- List tips for avoiding heat and cold stress.
- Identify the connection between stress and safety.
- List sources of safety and health information.
- List ways to prevent fires.
- Describe methods of extinguishing a fire.
- Identify ways to match a fire extinguisher with the class(es) of fire on which it can be used.
- Use a fire extinguisher.



## Importance of Preventing Accidents and Injuries at Work

- Working safely helps maintain your quality of life. Workplace injuries can reduce your income and



lead to financial hardship. The financial impact could include:

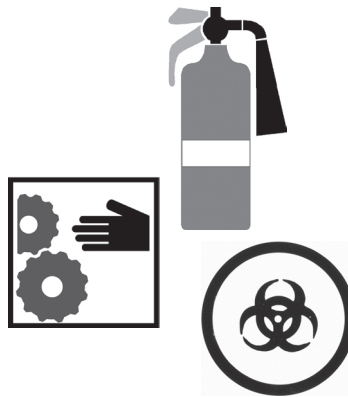
- loss of earnings
  - reduced savings
  - increased borrowing
  - loss of home or car
  - loss of health insurance
- Family members may have to care for an injured or disabled family member. To do this, they may have to leave the labor force or work longer hours (to recover the lost income).
  - Persons injured may have to deal with mental health issues. For example, they may feel more vulnerable, experience more sadness and anger, feel a sense of humiliation, and experience stress. Higher levels of stress can lead to mood and sleep disturbances, strained relationships, and other problems.



## Common Causes of Injury and Illness in the Workplace

### Common Causes—All Workers

- overexertion (including lifting)
- contact with objects and equipment
- fall (to same level and to lower level)
- repetitive motion
- exposure to harmful substances
- transportation accidents
- slips, trips, and loss of balance
- assaults and violent acts
- fires and explosions



Source: OSHA



Notes...

## Special Risks—Young Workers

### Agricultural Work

- Machinery
- Confined spaces
- Work at elevations
- Work around livestock
- Exposure to agricultural chemicals

### Motor Vehicles and Mobile Machinery

- Incidents on and off the highway
- Involving motor vehicles and industrial vehicles (tractors, forklifts)

### Work in Retail Trades

- Assaults and violent acts
- Cuts, burns, bruises, scrapes, and scratches
- Work with unfamiliar machinery
- Exposure to harmful chemicals

### Construction

- Falls
- Electrocuting
- Collapsing structures
- Machinery-related incidents
- Falling objects
- Motor vehicle crashes
- Exposure to hazardous substances

Source: CDC-NIOSH



**Did you Know?** Young people are injured in the workplace at twice the rate of adult workers.

Source: *Working Together for Safety: A State Team Approach to Preventing Occupational Injuries in Young People*, Department of Health and Human Services, National Institute for Occupational Safety and Health, May 2005.



## Factors that Contribute to Injuries at Work

- **obstructions**—stacking materials so high that your vision is limited or is completely obstructed while moving the materials
- **position**—twisting or turning into an awkward position while lifting
- **reach**—using chairs, boxes, or other objects for reaching items (instead of using a ladder)



- **size and shape**—moving an object that may be within your physical ability to move, but that
  - o is too long, too high, or too wide to move safely
  - o has an odd shape that makes safe lifting or moving difficult
- **storage**—storing heavy objects on a floor so that lifting the objects results in strain
 

**HINT:** Store heavy objects at least 12 inches off the floor.
- **tool use**—using the wrong tool for the job, using the right tool in the wrong way, or using a defective tool
 

**NOTE:** Most accidents with hand tools result from human failure, not from hazardous equipment or pure accident!
- **weight**—overestimating your physical abilities and lifting objects that are heavier than you can handle

## Properly Lifting an Object

The number one cause of workplace injuries is overexertion. Overexertion can happen when you are moving things. It may happen most often when you lift things.

- Check the load for rough surfaces, nail, splinters, sharp edges, etc. Choose the appropriate personal protective equipment:
  - o Cotton or canvas gloves for light job tasks
  - o Leather or metal-reinforced gloves for rough or abrasive materials or sharp edges
- Size up the load to be sure you can handle it alone. If you can, then place your feet close to the object and about 12 inches apart.
- Bend your knees, grip the object securely, then lift the load straight up. Push with your legs, keep your back straight, and keep the load close to your body.
- Turn with your feet to turn your body after lifting the load into a carrying position.



Notes...

**CAUTION:** Turn with your feet. Do not twist at the waist.

- Check your path of travel. Make sure it is clear of people and objects.
- Lower the load by bending your knees.

**NOTE:** Store heavy objects at least 12 inches off the floor.

- Keep your fingers out of the way when putting the load down and when moving the load through tight spaces (such as doorways).

## Responsibilities of Employees for Working Safely

- Follow your employer's rules for safety and health protection.
- Use all required personal protective equipment (PPE).
- Ask questions:
  - about situations or equipment that seem dangerous.
  - about how to perform a new task or use a new machine.
  - about how to respond to angry customers.
- Check with your supervisor before doing any task that feels unsafe or makes you uncomfortable.



**HINT:** Trust your instincts!

- Be aware of your environment at all times.

**NOTE:** You might become careless after your work has become predictable.

- Stay sober and drug-free.

**NOTE:** Workers who use alcohol or other drugs are more likely to get hurt or hurt others.



# Safety Color Code

## Safety RED

- Shows danger.
- Labels fire protection equipment and its location.
- Labels emergency stop bars, buttons, and switches on machinery.

## Safety YELLOW

- Shows caution and physical hazards.

**Examples:** low beams, steps

- Labels waste containers for explosive or combustible materials.
- Labels equipment that should not be started, used, or moved.

**Examples:** defective equipment, equipment under repair

- Shows the starting point or power source for machinery.

## Safety ORANGE

- Labels dangerous parts of equipment that could cut, crush, shock or otherwise injure.
- Labels safety starter buttons.

**Safety PURPLE (or MAGENTA or BLACK ON YELLOW)**—Shows radiation hazards.

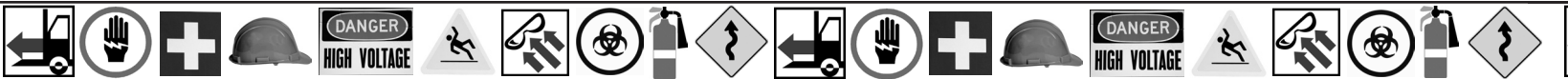
**Safety BLUE**—Marks tags that indicate equipment that should not be started, used, or moved.

## Safety GREEN

- Labels safety equipment (other than firefighting equipment) and its location.
- Labels first-aid equipment and its location.

## Safety BLACK AND WHITE

- Shows traffic flow paths.
- Labels storage areas.
- Labels housekeeping equipment and its location.
- 



Notes...

# Preventing Falls, Slips, Trips, and Loss of Balance

## Work Areas/Offices

- Organize your work area. Keep it clear of trash and other hazards.
- Clear floors of obstacles and spilled substances immediately.
- Keep all aisles, exits, and traffic areas clear.
- Close file drawers immediately after using them. Open only one drawer at a time (to keep the cabinet from tipping).
- Do not use chairs, boxes, or other objects in place of a ladder.



## Floors

- Keep floors as dry as possible at all times.
- Use floor signs or cones to alert other people to wet floor conditions.
- Clean up spills immediately.
- Keep floors clear of tools and equipment that are not in use.
- Secure power cords to prevent tripping hazards.
- Secure carpet and chair mats to prevent tripping or falling.

## Ladders

- Inspect all ladders before use for worn safety shoes, broken or loose rungs, broken extension locks, or other defects.
- Do not use ladders on uneven surfaces.
- Place a ladder away from doors or other openings that are not blocked or guarded.
- Do not over-extend your reach while on a ladder—move the ladder instead.
- Face the ladder when climbing up and down.
- Do not use ladders as scaffolds.

## Handling Materials

- Make sure that an object is not too long, too high, or too wide to move safely.
- Handle objects that have an odd shape appropriately for the shape.
- Do not stack materials so high that your vision is limited or blocked while handling the materials.





## Preventing Repetitive Motion Injuries

- Know the risk factors for repetitive motion injuries. Such injuries often result from a combination and interaction among these factors:
  - Awkward work postures and movements:
    - » Working for a long period in the same body position—working with the torso bent forward, backward, or twisted; reaching above shoulder level or behind the body; rotating the arms; bending the wrist forward, backward or side-to-side
    - » Keeping the neck and shoulders in a fixed position
  - Repetitiveness and pace of work: using the same joints and muscle groups over and over; using the same motion too often, too quickly and for too long
  - Contact stresses: repeated or continuous contact with hard or sharp objects can create pressure over one area of the body
  - Forceful exertions: the effort needed to lift objects, use tools or move
  - Vibration: whole-body vibration (such as from heavy-duty vehicles or large machinery) and local vibration (such as from a power hand tool)
  - Temperature: working in cold weather or touching cold materials, leading to numbness in the hands (and a greater chance of misjudging the force needed to do the job, resulting in too much force being used)
  - Other risk factors: insufficient pauses and rest breaks for recovery; machine-paced work; unfamiliar or unaccustomed work
- Follow the safety and health rules and proper job procedures in your workplace.
- Organize your work area to maintain a comfortable posture:
  - Separate your work area (desk) to reduce how often and how far you reach. In the **primary zone**—within 12 inches of you—keep items that you use often or for long periods. In the **secondary zone**—within 12 to 20 inches of you—keep items that you use only occasionally or for short periods of time. Keep items that you seldom use in the area outside the secondary zone.



**Examples:** telephone, documents, reference materials, writing supplies



Notes...

- o Keep your telephone close to you. Use a headset or speaker phone to avoid awkward neck postures.
- o Use storage areas—shelves, cabinets, drawers—only for items that you do not use regularly.

**NOTE:** This can help you limit how often you reach, twist, and lift.

- o Store heavier materials level with your waist to reduce lifting.
- o Keep the area under your desk clear of clutter.
- o Place documents close to the computer screen and at the same height and distance as the screen while using the keyboard. Document stands and holders can also help.

**NOTE:** Poor placement of documents can cause eyestrain and muscle discomfort.

- Avoid reaching above shoulder height, below waist level, or behind your body.
- Respond to symptoms of potential injury:
  - o Aching and tiredness in affected area (during work in early stages, at night in later stages)
  - o Joint stiffness or muscle tightness
  - o Redness and swelling of affected area
  - o Tingling sensation, numbness
  - o Changes in skin color
  - o Reduced sweating on the hands
  - o Inability to sleep (in later stages)
- Allow muscles and tendons to rest and recover.
- Report early signs and symptoms.



**Did you Know?** The shoulder is the most movable joint in the body. However, it is an unstable joint because of the range of motion allowed. It is easily subject to injury because the ball of the upper arm is larger than the shoulder socket that holds it. To remain stable, the shoulder must be anchored by its muscles, tendons, and ligaments. About 4 million people in the U.S. seek medical care each year for shoulder sprain, strain, dislocation, or other problems.

Source: *Questions & Answers about...Shoulder Problems*, National Institute of Arthritis and Musculoskeletal and Skin Diseases, 2001.



## Preventing Accidents while Driving To, From, and During Work

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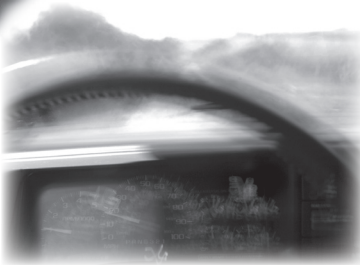
**Did you Know?** A matter of seconds can separate a safe trip from a tragedy. A recent study found that taking your eyes off the road while driving—except for using the rear-view mirror—for longer than 2 seconds significantly increases your risk of a crash or near-crash. Driving while drowsy increases your risk by four to six times.



Source: *The Impact of Driver Inattention On Near-Crash/Crash Risk: An Analysis Using the 100-Car Naturalistic Driving Study Data*, U.S. Department of Transportation, April 2006

- Make sure you are well rested before operating a vehicle.

?



**Did you Know?** On average, drivers make more than 200 decisions during every mile traveled. Fatigued or drowsy driving may be involved in more than 100,000 crashes each year, resulting in 40,000 injuries and 1,550 deaths.

Source: *Guidelines for Employers to Reduce Motor Vehicle Crashes*, OSHA, accessed May 2006

- Do not operate a vehicle that you are not qualified to operate.
- Check each vehicle before operating it.
- Keep the windshield, wipers, side windows, and mirrors clean.
- Clean headlights, taillights, and emergency light covers.
- Wear seat belts while operating any vehicle.



Notes...

**NOTE:** Seat belts are the single most effective way to reduce deaths and serious injuries in traffic crashes. They save nearly 12,000 lives and prevent 325,000 serious injuries in America each year. During a crash, anyone not wearing a seat belt will slam into the steering wheel, windshield, or other parts of the interior, or be ejected from the vehicle.

- Adjust the steering wheel, seat, controls, and mirrors before you drive.
- Drive defensively, follow posted speed limits, and obey all traffic laws.
- Avoid aggressive driving:
  - Tailgating
  - Making rude gestures
  - Passing on the shoulder
  - Pulling into a parking space that someone else is waiting for
  - Failing to yield to merging traffic
  - Flashing your high beams
  - Changing lanes without signalling
  - Driving through a yellow light turning red
  - Honking the horn



**Did you Know?** Of the 6.8 million crashes that occur each year, a large number are estimated to be caused by aggressive driving. Increased traffic congestion is a major reason. Since 1970, the number of drivers increased by 64% while the roadway system increased by only 6%.

Source: *Guidelines for Employers to Reduce Motor Vehicle Crashes*, OSHA, accessed May 2006



- Use caution at intersections.
- Pay attention while operating a vehicle. Avoid these potentially distracting activities while driving:
  - Talking to passengers
  - Adjusting the climate/radio controls
  - Eating
  - Using a cell phone
  - Tending to children
  - Reading a map or other publication
  - Grooming
  - Preparing for work



**Did you Know?** Distracted driving is a factor in 25-30% of all traffic crashes. At 55 mph, a vehicle travels the length of a football field in 3.7 seconds.

Source: *Guidelines for Employers to Reduce Motor Vehicle Crashes*, OSHA, accessed May 2006

- Plan ahead to reduce the need for backing a vehicle.
- Park vehicles in safe locations. Avoid parking in other vehicles' blind spots.
- Do not leave vehicles running while unattended.
- Do not ride on top of any load that can shift, topple, or otherwise become unstable.



Notes...

# Role of Personal Protective Equipment

Hazards exist in every workplace in many different forms. OSHA—the Occupational Safety and Health Administration—requires employers to protect their employees from workplace hazards that can cause injury. The categories of possible hazards include:

- Impact hazards (such as machines or processes where movement could lead to an impact between people and equipment)
- Penetration hazards (sharp objects that could poke, cut, stab, or puncture)
- Compression (roll-over) hazards
- Chemical hazards
- Heat/cold hazards
- Harmful dust hazards
- Light (optical) radiation hazards (welding, high-intensity lights, etc.)
- Biologic hazards (such as blood or other potentially infected material)

Personal protective equipment—or PPE—is equipment worn to minimize exposure to a variety of hazards. Examples of PPE include:

- Hand and arm protection (such as protective gloves)
- Foot protection (such as safety shoes)
- Eye and face protection (such as protective eyeglasses, goggles, welding shields, face shields)
- Hearing protection (such as earplugs and earmuffs)
- Head protection (such as hard hats and bump hats)
- Respirators
- and others



OSHA requires that many categories of PPE meet or be equivalent to standards developed by the American National Standards Institute (ANSI). ANSI has prepared safety standards since the 1920s, when the first safety standard was approved to protect the heads and eyes of industrial workers.

Never consider PPE as your “first line of defense” against safety hazards on the job. PPE is the last line of defense between you and the hazard. Do not substitute PPE in place of following proper safety rules



in the workplace. Use PPE to help protect you from the *unexpected* or the *unusual*.

## Hazards of Working Around Electricity



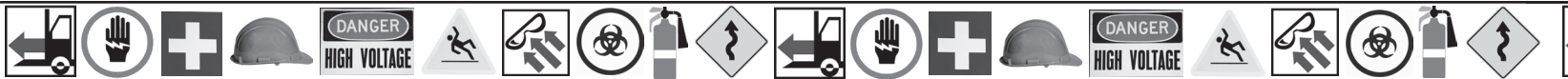
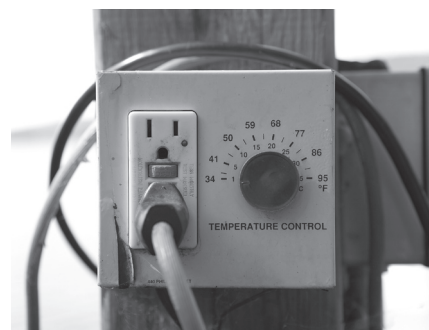
**Did you Know?** An average of one worker is electrocuted on the job every day of every year. Electrocution is the third leading cause of work-related deaths among 16- and 17-year-olds, after motor vehicle deaths and workplace homicide.

Source: *Electrical Safety: Safety and Health for Electrical Trades*, National Institute for Occupational Safety and Health, 2002

- **Electricity is dangerous.** Coming in contact with an electrical voltage can cause current to flow through the body. Electrical shock, burns, and death can occur. Electrical hazards include inadequate wiring; exposed electrical parts; overhead powerlines; defective insulation; improper grounding; overload hazards; wet conditions; and other hazards. Electrical hazards are present at home and at work. Because electricity is a familiar part of people's lives, they may not treat electricity with the caution it deserves. Workers may need to pay special attention to electrical hazards:

- Many jobs involve electric power tools.
- The workplace may be cluttered with tools and materials.
- The workplace can be fast-paced.

- An **electrical shock** is received when electrical current passes through the body. Current will pass through the body in a variety of situations. Whenever two wires are at different voltages, current will pass between them if they are connected. Your body can connect the wires if you touch both of them at the same time. Current will pass through your body. Your risk of receiving a shock is greater if you stand in a puddle of water. But you don't even have to be standing in water to be at risk. Wet clothing, high humidity, and perspiration also increase your chances of being electrocuted. Even contact with another person who is receiving an electrical shock may cause you to be shocked.



Notes...

- **Remember ADP.** The danger from electrical shock depends on A—the *Amount* of the shocking current through the body, D—the *Duration* of the shocking current, and P—the *Path* of the shocking current.
  - The severity of injury from electrical shock depends on the amount of *electrical current* and the *length of time* the current passes through the body. For example, 1/10 of an ampere (amp) of electricity going through the body for just 2 seconds is enough to cause death. You will be hurt more if you can't let go of a tool giving a shock. The amount of internal current a person can withstand and still be able to control the muscles of the arm and hand can be less than 10 milliamperes (milliamps or mA). Currents above 10 mA can paralyze or “freeze” muscles. When this “freezing” happens, a person is no longer able to release a tool, wire, or other object. The electrified object may be held even more tightly, resulting in longer exposure to the shocking current.
  - High voltages can cause additional injuries. High voltages can cause violent muscular contractions. You could lose your balance and fall. High voltages can also cause severe burns.
  - The path of the electrical current through the body affects the severity of the shock. Currents through the heart or nervous system are most dangerous.
- **Some injuries from electrical shock cannot be seen.** A person may suffer internal bleeding and destruction of tissues, nerves, and muscles. These hidden injuries can result in a delayed death. Shock is often only the beginning of a chain of events. Even if the current is too small to cause injury, your reaction to the shock may cause you to fall.
- **The most common shock-related, nonfatal injury is a burn.** *Electrical burns* can result when a person touches electrical wiring or equipment that is used or maintained improperly. These burns typically occur on the hands. Electrical burns are one of the most serious injuries you can receive. They require immediate attention. Clothing may also catch fire and cause a *thermal burn* from the heat of the fire.

**NOTE:** This objective is adapted from the publication *Electrical Safety: Safety and Health for Electrical Trades* from the National Institute for Occupational Safety and Health (2002). This publication is available to download free at the NIOSH website.





## General Guidelines for Using Tools and Equipment Safely

- Use the right tool for the job. Know how to use any tool correctly and safely before using it.
- Inspect tools often.
- Keep all tools and equipment clean and in good working condition.
- Store tools and equipment in their proper storage areas when not in use. Tools that are left unattended or that are not stored can create tripping hazards. Exposed points of tools can also cause injury.
- Do not carry sharp tools in your pockets.
- Remove defective tools and equipment from service. Do not use hand tools and power tool attachments that have mushroomed heads.

**Examples:** chisels, screwdrivers, drill bits, hammer heads, wedges

- Do not use tools or equipment with frayed cords or poor insulation. They can allow the metal parts to conduct electric current and create a shock hazard.



**Did you Know?** Power drills use 30 times as much current as what will kill.

Source: *Electrical Safety: Safety and Health for Electrical Trades*, National Institute for Occupational Safety and Health, 2002

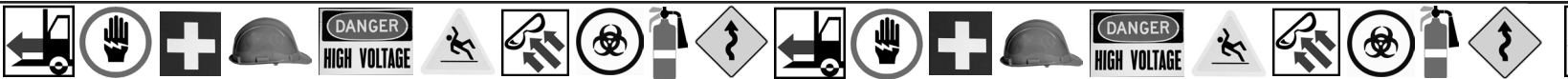


- Do not use extension cords and adapters as substitutes for fixed wiring.

**CAUTION:** This can lead to fire and shock hazards. Adapters can become overloaded easily and cords can become tripping hazards.

- Never use a three-prong grounding plug with the third prong broken-off.

**CAUTION:** Never remove the grounding prong from a plug! You could be shocked or could expose someone else to a hazard. If you see a cord without a grounding prong in the plug, remove the cord from service immediately.



Notes...

- Turn off power equipment when not in use or when attachments or adjustments are needed.
- Do not use a power tool on or near a wet surface.



**Did you Know?** Greater voltages produce greater currents. So, there is greater danger from higher voltages. Resistance hinders current. The lower the resistance, the greater the current will be. Dry skin may have a resistance of 100,000 ohms or more. Wet skin may have a resistance of only 1,000 ohms. Wet working conditions or broken skin will drastically reduce resistance.



Source: *Electrical Safety: Safety and Health for Electrical Trades*, National Institute for Occupational Safety and Health, 2002

- Never carry a power tool by its cord.
- Always disconnect a cord by tugging on the plug (not the cord).
- Coil or hang power cords for storage.

**NOTE:** Coiling or hanging is the best way to avoid kinks, cuts, and scrapes that can damage a cord.



- Pay attention at all times.
- Wear the right kind of PPE, when needed. Follow your employer's requirements.



## Material Safety Data Sheets

The Material Safety Data Sheet—or MSDS—provides information about a hazardous chemical, including the physical and health hazards associated with the chemical, precautions for safe handling and use of the chemical, and other information. Employers must have an MSDS for each hazardous chemical that they use.

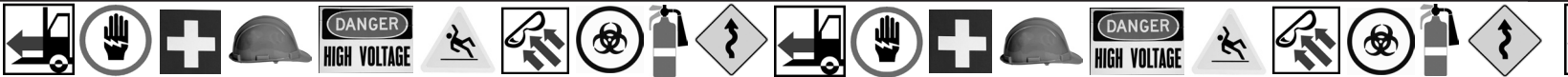
You can use the MSDS to find out about the physical and the health hazards of working with a chemical, before you work with it. The MSDS will tell you how to handle and use the hazardous chemical safely.

Your employer must keep copies of all required MSDSs for each hazardous chemical in the workplace. Employers must make sure that each MSDS is readily accessible to employees in their work areas during each work shift.



**Did you Know?** French hatters of the 17th century discovered that mercuric nitrate aided greatly in the felting of fur. Such use led to chronic mercury poisoning so widespread among members of that trade that the expression “mad as a hatter” entered our folk language.

Source: *The Industrial Environment—its Evaluation & Control*, National Institute for Occupational Safety and Health, 1973



Notes...

# Responding to Potentially Violent Situations



**Did you Know?** Agriculture is the most dangerous industry for young workers, but work in retail trades is the second most dangerous. The second highest number of workplace fatalities among workers younger than age 18 occurred in the retail trades. Most of these deaths resulted from assaults and violent acts.



Source: *NIOSH Alert: Preventing Deaths, Injuries, and Illnesses of Young Workers*, Department of Health and Human Services, National Institute for Occupational Safety and Health, July 2003



Violence at work can result from actions both inside and outside the workplace. For example, it may result when a person experiences a disciplinary action, a demotion, or the loss of a job. Violence can also have causes that are not related to the workplace, such as domestic violence, road rage, or a stressful family situation. The FBI identifies four broad categories of workplace violence:

**Type 1:** Violent acts by criminals who have no other connection with the workplace, but enter to commit robbery or another crime.

**Type 2:** Violence directed at employees by customers, clients, patients, students, inmates, or any others for whom an organization provides services.

**Type 3:** Violence against co-workers, supervisors, or managers by a present or former employee.

**Type 4:** Violence committed in the workplace by someone who doesn't work there, but who has a personal relationship with an employee—an abusive spouse or domestic partner.

- Pay attention to warning signs of potentially violent situations:



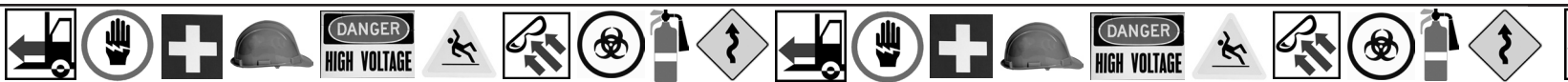
- o Direct or indirect threats
- o Inappropriate and aggressive behavior

**Examples:** intimidating, bullying, harassing

- o Repeated conflicts with supervisors, co-workers, or customers
- o Bringing a weapon to the workplace or making inappropriate remarks about weapons
- o Fascination with weapons and acts of violence
- o Statements indicating suicidal thoughts or desperation over personal problems
- o Drug or alcohol abuse
- o Noticeable changes in normal behaviors
- o Outbursts of anger
- o Romantic obsession
- o Grudge over a real—or imagined—grievance
- o Inability to accept responsibility for one’s own problems
- o Hypersensitivity to criticism
- o Violent reactions by a customer or client

**NOTE:** It is impossible to predict behavior, but it is possible to pay attention to warning signs of potentially violent situations.

- Know your employer’s violence prevention policy.
- Take all threats seriously. Report any threats and warning signs according to your employer’s violence prevention program.
- Always lock your vehicle.
- Be especially careful in elevators, stairwells and unfamiliar places. Use a “buddy” system.
- Call for assistance when you sense that a situation may be getting out of hand. Do not confront individuals who are a threat.
- Ask a co-worker to escort you to your car, if working late.
- Use your employer’s employee assistance program, if available.



Notes...



**Did you Know?** Violence is one example of a workplace emergency. Others include fires, chemical spills, explosions, and dangerous weather conditions. Your employer should have an emergency action plan. An emergency action plan describes the actions that workers must take to be safe during such emergencies. A plan usually includes:

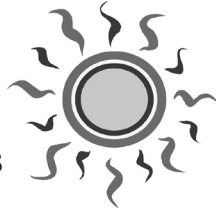
- a preferred method for reporting fires and other emergencies
- an evacuation policy and procedure
- emergency escape procedures and routes, including maps and safe areas
- names, titles, departments, and telephone numbers of people inside and outside the organization to contact
- designated assembly areas to account for employees
- alarms that will be used, and how to recognize them
- procedures for assisting people with disabilities
- and other information



Source: *How to Plan for Workplace Emergencies and Evacuations*, OSHA, 2001



# Avoiding Heat and Cold Stress



## Heat Exhaustion—Symptoms

- ❑ Headaches, dizziness, lightheadedness or fainting
- ❑ Weakness and moist skin
- ❑ Mood changes such as irritability or confusion
- ❑ Upset stomach or vomiting

## Heat Stroke—Symptoms

- ❑ Dry, hot skin with no sweating
- ❑ Mental confusion or losing consciousness
- ❑ Seizures or fits

**NOTE:** Heat stroke can be fatal!



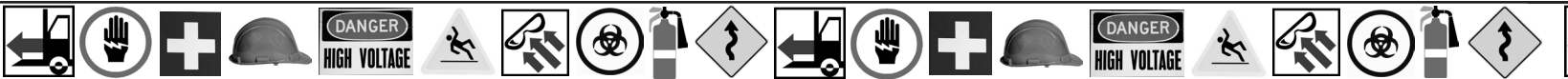
## Frost Bite—Symptoms

- ❑ Freezing in deep layers of skin and tissue
- ❑ Pale, waxy-white skin color; skin becomes hard and numb
- ❑ Usually affects the fingers, hands, toes, feet, ears, and nose

## Hypothermia—Symptoms

- ❑ Normal body temperature drops to or below 95 degrees Fahrenheit
- ❑ Fatigue or drowsiness
- ❑ Uncontrolled shivering
- ❑ Cool bluish skin
- ❑ Slurred speech, clumsy movements
- ❑ Irritable, irrational or confused behavior

**NOTE:** Hypothermia is a medical emergency!



Notes...

## Avoiding Heat Stress

- Dress appropriately for the weather—lightweight, light-colored, loose-fitting clothes.
- Block out direct sun or other heat sources.
- Use cooling fans/air-conditioning.
- Drink plenty of fluids—such as one cup of water every 15 minutes. Don't wait until you are thirsty. Avoid alcoholic and caffeinated beverages or drinks with large amounts of sugar. (They tend to cause dehydration.)
- Avoid heavy meals.
- Perform the heaviest work during the coolest part of the day.
- Rest regularly.
- Learn to recognize and seek medical help for yourself or co-workers who have symptoms.



## Avoiding Cold Stress

- Dress appropriately for the weather—warm, layered clothing (including hat and gloves).
- Pay special attention to protecting your feet, hands, face, and head.  
**NOTE:** You can lose up to 40% of body heat when your head is exposed.
- Perform work during the warmest part of the day. Use the buddy system (work in pairs).
- Take frequent, short breaks indoors to warm up.
- Drink warm, sweet beverages (sugar water, sports-type drinks). Avoid drinks with caffeine (coffee, tea, hot chocolate) or alcohol. Eat warm, high-calorie foods.
- Learn to recognize and seek medical help for yourself or co-workers who have symptoms.



Source: OSHA





## Ways to Prevent Fires

?

**Did you Know?** Most office fire fatalities occur outside of normal working hours. Here, fires can grow unnoticed and persons working alone can be cut off from their normal escape route.

Source: *Emergency Procedures for Employees with Disabilities in Office Occupancies*, Federal Emergency Management Agency, United States Fire Administration



### Preventing Class A Fires (Trash, Wood, Paper)

- Throw away combustible wastes and trash properly.
- Keep work areas clean. Collect waste and trash on a daily schedule.
- Use cleaning materials carefully, especially near sources of ignition. Follow the manufacturer's guidelines for safely using cleaning materials.
- Store combustible waste materials—oily rags, painting rags, etc.—in approved covered containers. Throw these materials away daily.

### Preventing Class B Fires (Liquids, Grease)

- Avoid using highly flammable liquids if possible. Use only the amount of flammable liquids that you need for the job. Do not keep extra amounts in the work area.
- Store flammable liquids in approved fire-resistant containers.
- Use ventilation and exhaust systems.
- Maintain adequate clearances between flammable liquids and sources of heat.
- Clean up spills of flammable liquids immediately.
- Follow all "No Smoking" rules.

### Preventing Class C Fires (Electrical Equipment)

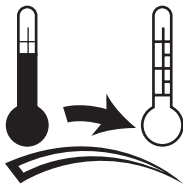
- Maintain all cords, motors, switches, heating elements, and other electrical equipment.
- Keep tools and power cords away from heat, oil and sharp edges.
- Turn off electrical equipment before disconnecting the power cord.
- Make sure electrical equipment is properly grounded.



Notes...

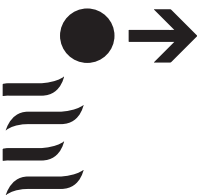
- Do not wrap cloth around a tool that is too hot to handle.
- Do not overload circuits. Avoid using extension cords.

## Methods of Extinguishing a Fire



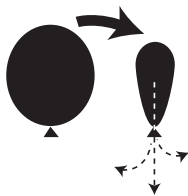
### Reducing the temperature

Cooling the fuel until it does not produce enough vapors to burn. This is often done by absorbing the heat with a cooling agent (such as water).



### Removing the fuel

Stopping the flow of gases or liquids, or removing the solids that are “feeding” the fire.



### Reducing the oxygen

Reducing the amount of oxygen in the fire area, or separating the oxygen from the fuel (such as by “smothering” or “blanketing”).

**CAUTION:** This method does not work on self-oxidizing materials (materials that produce oxygen) or on certain metals as they are oxidized by carbon dioxide or nitrogen — two common extinguishing agents.







### Breaking the chain reaction

Using extinguishing agents that interrupt the flame-producing chemical reaction, putting the fire out. This method is effective only on gas and liquid fuels.

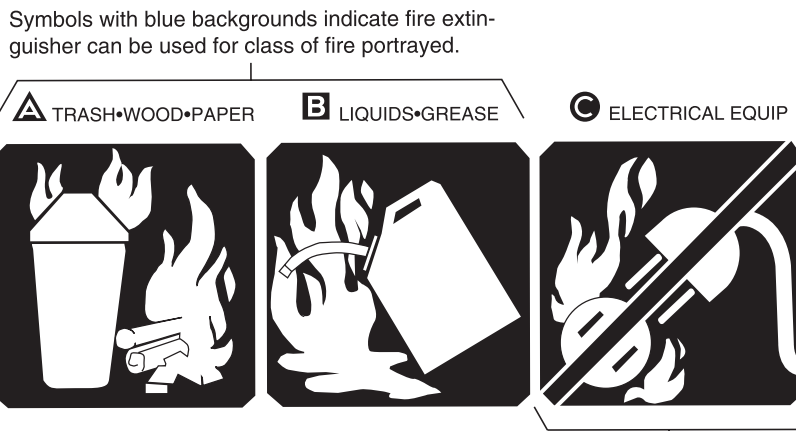


# Types of Fire Extinguishers and Class(es) of Fires

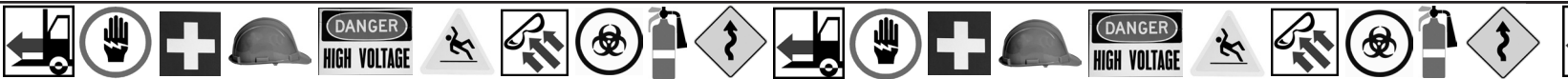
- The type of fire on which a fire extinguisher can be used can be shown by a letter symbol on the extinguisher which matches the class of fire:

GREEN  ORDINARY COMBUSTIBLES	RED  FLAMMABLE LIQUIDS	BLUE  ELECTRICAL EQUIPMENT	YELLOW  COMBUSTIBLE METALS
--	--	--	--

- The type of fire on which a fire extinguisher can be used can also be shown by a pictorial symbol on the extinguisher:



Symbols with red line across a black background indicate fire extinguisher *cannot* be used for class of fire portrayed.



Notes...

## Using a Fire Extinguisher

Portable fire extinguishers offer a “first line” of defense on fires of a limited size. In the workplace, you may have to respond to a fire situation.

The label on the fire extinguisher will tell you if you can use that extinguisher on a certain class of fire. The extinguisher may identify the class(es) of fire by a letter symbol and/or a pictorial symbol.



Steps to using a fire extinguisher:

1. Pull the pin on the fire extinguisher. This unlocks the operating lever. (Some extinguishers have other devices to prevent accidental operation.)
2. Aim low. Point the nozzle or hose at the base of the fire.
3. Squeeze the lever below the handle. This will discharge the extinguishing agent.
4. Sweep from side to side until the flames appear to be out.
5. Release the lever to stop the discharge. (Some extinguishers have a button that you press.)
6. Check to make sure the fire is out.

## Stress and Safety

It should not be surprising that stress is a part of the workplace. Everyone experiences stress that is related to his or her particular job. In addition, some situations at work are stressful for everybody, such as busy holiday periods or downsizing. Stress is also a part of our personal lives. Everyone deals with family and childcare needs, financial issues, health concerns, relationship challenges, and other causes of stress. As the boundary between work and family life becomes blurry, our personal stress can affect *how* we work and *how safely* we work. This is how stress works in the body:



Stress sets off an alarm in the brain. The brain responds by preparing the body for defensive action. The nervous system is aroused and hormones are released to sharpen the senses, quicken the pulse, deepen respiration, and tense the muscles. This response (sometimes called the fight or flight response) is important because it helps us defend against threatening situations. The response is preprogrammed biologically. Everyone responds in much the same way, regardless of whether the stressful situation is at work or home. Short-lived or infrequent episodes of stress pose little risk. But when stressful situations go unresolved, the body is kept in a constant state of activation, which increases the rate of wear and tear to biological systems. Ultimately, fatigue or damage results, and the ability of the body to repair and defend itself can become seriously compromised. As a result, the risk of injury or disease escalates.

Source: U.S. Department of Health and Human Services, National Institute for Occupational Safety and Health, *Stress At Work*

Stress will not disappear completely. However, you can do many things to reduce the amount of stress in your life—and your work. Here is a list of just some of the steps you can take today:

- Recognize what causes stress in your life.
- List your goals and expectations, and how you plan to reach them.
- Prioritize your concerns and deal with them one at a time.
- Talk about your concerns with people you trust.
- Get enough sleep.
- Exercise regularly.
- Improve your eating habits.
- Know when you need to ask for help—and ask.
- Keep a positive attitude.
- Use your work breaks—walk, read, stretch, etc.—whatever relaxes you.
- Make time for hobbies and things you enjoy outside of work.
- Keep a journal.
- Hang out with a new crowd—don't surround yourself with negative people.
- Celebrate your daily accomplishments.



Notes...

- Build your confidence.
- Learn to say “No.”
- Improve your time management.
- Let go of things you cannot change.
- Prepare for life changes and major events—don’t wait for them to happen.
- Spend time with your friends and family.
- Volunteer in your community.
- Inspire yourself with positive messages and quotes.
- Take control—learn from mistakes and move on.
- Put your problems into perspective—think about the concerns of others.
- Listen to your body and manage your health.
- Look for humor—in everyday events, on the comic pages, etc.
- Do not dwell on disappointments—focus on people and things you like.
- Avoid blame.
- Learn from the past and focus on the future.
- Stand your ground during meaningful conflicts—and know which fights are not worthwhile.
- Avoid having to have the last word.
- Break your own habits—use your time differently, take a different route to work, etc.
- Use the employee assistance program where you work, if available.



A variety of resources are available to help you work safely. Once you are on the job, your employer will provide you with safety and health training. You can also find safety and health information for specific kinds of work. Possible sources of information include:

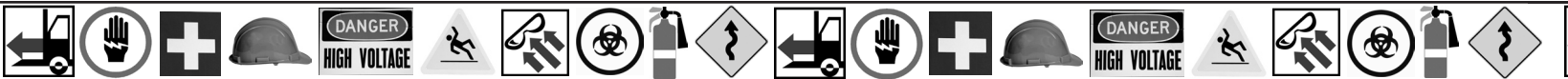
- Your state department of labor and/or department of health
- State and national industry associations



- Federal OSHA—Publications page  
[www.osha.gov/pls/publications/pubindex.list](http://www.osha.gov/pls/publications/pubindex.list)
- Federal OSHA—Teen Workers page  
[www.osha.gov/SLTC/teenworkers/index.html](http://www.osha.gov/SLTC/teenworkers/index.html)
- CDC/NIOSH Occupational Violence topic page  
[www.cdc.gov/niosh/injury/traumaviolence.html](http://www.cdc.gov/niosh/injury/traumaviolence.html)
- WorkSafe BC—The Workers’ Compensation Board of British Columbia (Canada)  
[www.worksafebc.com/publications/default.asp](http://www.worksafebc.com/publications/default.asp)

## Summary

- Working safely helps maintain your quality of life.
- All workers face certain common causes of injury, including using motor vehicles and machines. Unique risks exist for workers in retail workplaces and in construction. Your workers in agricultural work face special risks.
- Injuries at work often result from factors such as obstructions, position, reach, size and shape, storage, tool use, and weight.
- Overexertion is the top cause of workplace injury. One way to prevent it is to follow the steps for safe lifting.
- Employees have specific responsibilities for working safely.
- Knowing the color code in your workplace can help you to work more safely.
- Some basic guidelines can help to prevent falls, slips and trips, and loss of balance. Certain risk factors can contribute to repetitive motion injuries.
- Accidents while driving to, from and during work are common. You can reduce the chances of being involved in a vehicle accident by following some basic guidelines. Distracted driving and



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aggressive driving are particular situations to avoid.

- Personal protective equipment can minimize your exposure to a variety of hazards. However, PPE is only your “last line of defense” between you and a hazard. Your “first line of defense” is following proper safety rules at work.
- Electricity is dangerous and small amounts of it can kill. The most common nonfatal injury is a burn. Some injuries from electrical shock cannot be seen.
- Using tools and equipment safely includes using the right tool for the job and using a tool in the right way.
- Employees must keep copies of material safety data sheets in the workplace. Each MSDS can tell you about the physical and health hazards of working with a chemical.
- Violence can result from actions inside and outside the workplace. Responding to potentially violent situations includes paying attention to warning signs and knowing your employer’s violence prevention policy.
- Heat and cold stress can be avoided.
- Fires can be put out (extinguished) in four ways. Specific labeled fire extinguishers are appropriate for use on specific classes of fire. Using a fire extinguisher appropriately involves six basic steps.
- Stress can contribute to your risk of injury or disease.

