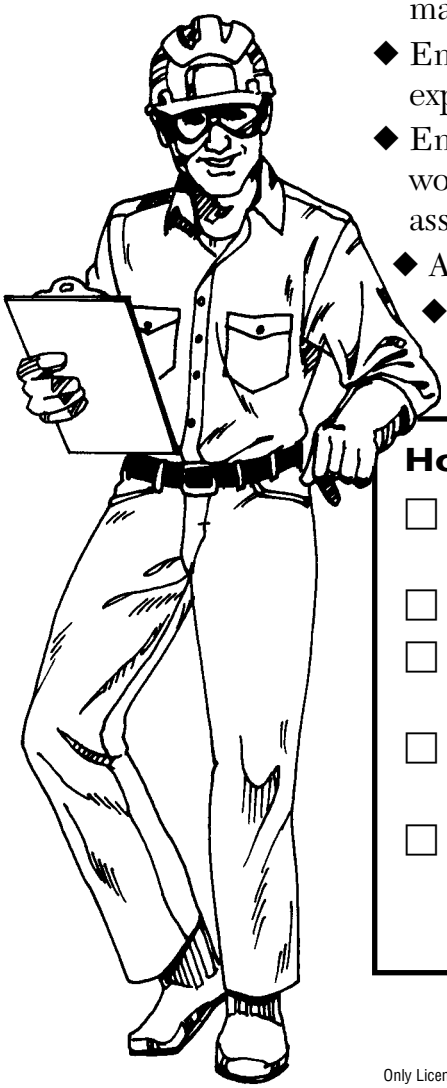
Know the Hazard Communication Standard

For one out of every four workers, contact with hazardous chemicals happens every day. It's important that you know and understand OSHA's Hazard Communication Standard. This standard is also commonly known as "HazCom" or the "Right to Know" law.

What Does the Standard Do?

- The HazCom standard is designed to make your worksite safer.
- The standard says that you have a right to know what chemicals you are, or may be, exposed to.
- The standard requires that all chemicals at your worksite be fully evaluated for possible physical or health hazards.
- It mandates that all information relating to these hazards be made available to you.
- Employers must develop a written HazCom program and explain it to employees.
- Employees must be trained to understand the chemicals they work with and how to protect themselves from dangers associated with each chemical.
- All chemicals must be marked with warning labels.
- A material safety data sheet (MSDS) or Safety Data Sheet (SDS) on each chemical must be made available to you.



How Well Is HazCom Working for You?

- ☐ I know where the MSDSs or SDS are for every chemical I use, and I can consult them at any time.
- ☐ I know how to read chemical warning labels.
- ☐ If I don't understand something on an MSDS/SDS or chemical warning label, I know where to go for help.
- ☐ I have the necessary personal protective equipment available to work with hazardous chemicals.
- ☐ I feel confident that my employer and coworkers and I are taking every precaution to ensure the safety and health of all involved.

HAZARD COMMUNICATION STANDARD UPDATE 2014

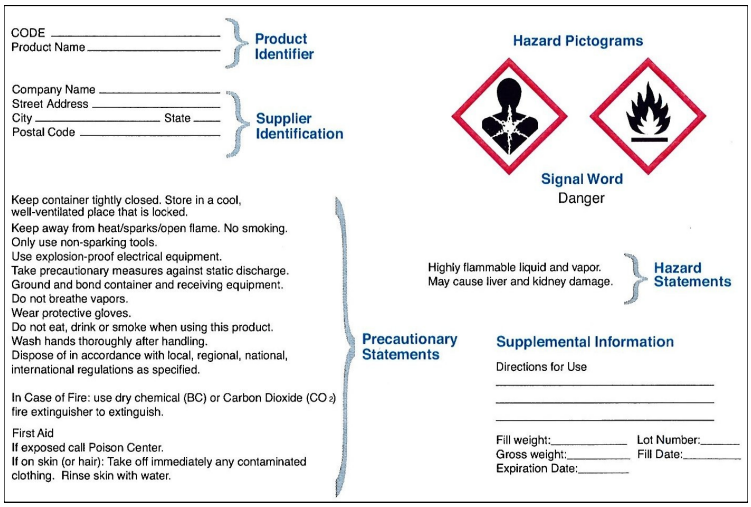
LABELS

OSHA recently revised its Hazard Communication Standard to align with the United Nations' Globally Harmonized System of Classification and Labeling of Chemicals (GHS). Two significant changes contained in the revised standard require the use of new labeling elements and a standardized format for Safety Data Sheets (SDS), formerly known as Material Safety Data Sheets (MSDS).

Labels

The new labels require that hazards be communicated through pictures for immediate recognition and specific text for detailed information.

Product Identifier	This will be the chemical or product name and the code or batch number. This is the chief means of identifying the substance. The same product identifier must be on the label and on that chemical's Safety Data Sheet.
Supplier Identification	This area contains the name, address and phone number of the chemical manufacturer, distributor or importer.
Precautionary Statements	Precautionary statements are phrases that describe the recommended measures that should be taken to minimize or prevent adverse effects of exposure to a hazardous chemical or improper storage or handling. There are four types of precautionary statements: PREVENTION (to minimize exposure), RESPONSE (to a related incident), STORAGE and DISPOSAL. Precautionary statements address work practices, engineering controls and personal protective equipment (PPE) needed to safely work with the chemical or product.
Hazard Pictograms	There are nine pictograms that represent nine specific hazard categories. Pictograms will appear in the shape of a square with a black hazard symbol on a white background with a red frame. Keep in mind there could be more than one pictogram on the label if the chemical poses more than one hazard.
Signal Word	There are only two signal words: "Danger" and "Warning." The usage quickly indicates the severity of the hazard. "Danger" is used for more severe hazards and "Warning" is used for the less severe hazards. Should a material/substance pose multiple hazards, the signal word will default to the higher severity level.
Hazard Statements	The hazard statements describe the nature of the hazards of a chemical, including the degree of the hazard, if appropriate. Hazard statements may be combined when a chemical or product presents multiple hazards. Note that the hazard statements are specific and the same statement will always appear for the same hazards no matter what the chemical is or who makes it.



What's new?

Pictograms and labels visible on all chemical products as part of an updated OSHA standard.

Benefits

The labels are easier to understand and include a signal word, pictogram and hazard statement. All U.S. companies must adhere to the standard.

HAZARD COMMUNICATION STANDARD

Pictograms

Health Hazard

- Carcinogen
- Mutagenicity
- Reproductive Toxicity
- Respiratory Sensitizer
- Target Organ Toxicity
- Aspiration Toxicity

Flame

- Flammables
- Pyrophorics
- Self-Heating
- Emits Flammable Gas
- Self Reactives
- Organic Peroxides

Exclamation Mark

- **Irritant** (skin and eye)
- **Skin Sensitizer**
- **Acute Toxicity** (harmful)
- **Narcotic Effects**
- **Respiratory Tract Irritant**
- **Hazardous to Ozone Layer** (Non-Mandatory)

Gas Cylinder

- Gases Under Pressure

Corrosion

- Skin Corrosion/Burns
- Eye Damage
- Corrosive to Metals

Exploding Bomb

- Explosives
- Self-Reactives
- Organic Peroxides

Flame Over Circle

- Oxidizers

Environment

- Aquatic Toxicity

Skull and Crossbones

- Acute Toxicity (fatal or toxic)

HAZARD COMMUNICATION STANDARD UPDATE 2014

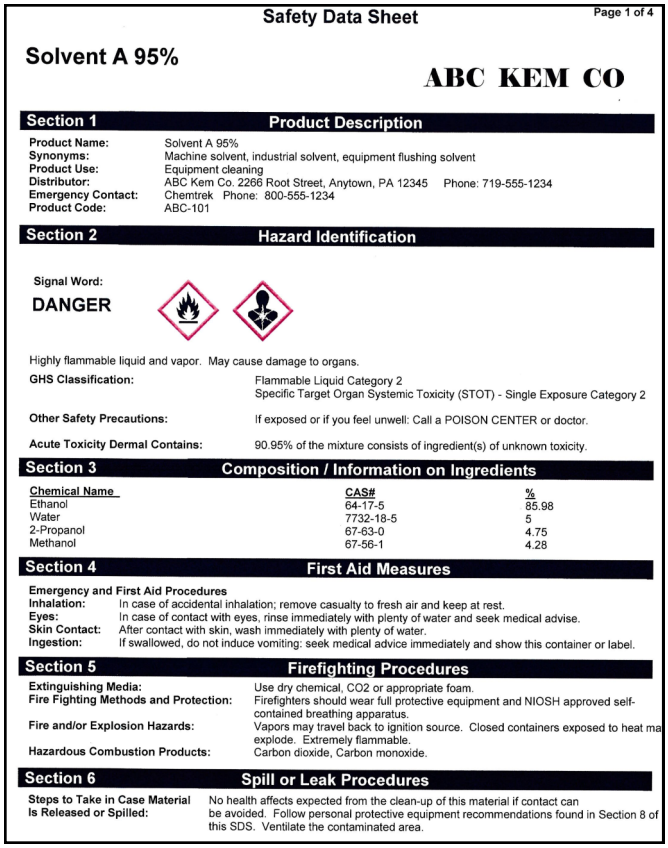
SAFETY DATA SHEETS

OSHA recently revised its Hazard Communication Standard to align with the United Nations' Globally Harmonized System of Classification and Labeling of Chemicals (GHS). Two significant changes contained in the revised standard require the use of new labeling elements and a standardized format for Safety Data Sheets (SDS), formerly known as Material Safety Data Sheets (MSDS).

Safety Data Sheets

Information contained in a Safety Data Sheet (SDS) is the same information currently found in a Material Safety Data Sheet (MSDS). New SDS's will have a uniform format and will include section numbers (a total of 16), headings and associated information under each section.

Section 1	***IDENTIFICATION:*** This section includes a description of the product, who manufactured it, contact information and how to or not to use it.
Section 2	***HAZARD IDENTIFICATION:*** This section identifies the hazards posed by the chemical along with the information that's required to be on the chemical's label including the pictograms, signal word, hazard statements and precautionary statements.
Section 3	***COMPOSITION/INFORMATION OF INGREDIENTS:*** This section identifies the ingredients contained in the product which are known to be hazardous substances.
Section 4	***FIRST-AID MEASURES:*** This section describes the initial care that should be given by untrained responders to an individual who has been exposed to the chemical. Information found here may include: first-aid instructions by relevant routes of exposure and a description of the most important symptoms or effects.



Safety Data Sheet — Page 1 of 4

Solvent A 95%

ABC KEM CO

Section 1 — Product Description

Product Name:	Solvent A 95%
Synonyms:	Machine solvent, industrial solvent, equipment flushing solvent
Product Use:	Equipment cleaning
Distributor:	ABC Kem Co. 2266 Root Street, Anytown, PA 12345 Phone: 719-555-1234
Emergency Contact:	Chemtrek Phone: 800-555-1234
Product Code:	ABC-101

Section 2 — Hazard Identification

Signal Word:
DANGER

Highly flammable liquid and vapor. May cause damage to organs.

GHS Classification:	Flammable Liquid Category 2 Specific Target Organ Systemic Toxicity (STOT) - Single Exposure Category 2
Other Safety Precautions:	If exposed or if you feel unwell: Call a POISON CENTER or doctor.
Acute Toxicity Dermal Contains:	90.95% of the mixture consists of ingredient(s) of unknown toxicity.

Section 3 — Composition / Information on Ingredients

Chemical Name	CAS#	%
Ethanol	64-17-5	85.98
Water	7732-18-5	5
2-Propanol	67-63-0	4.75
Methanol	67-56-1	4.28

Section 4 — First Aid Measures

Emergency and First Aid Procedures

Inhalation:	In case of accidental inhalation; remove casualty to fresh air and keep at rest.
Eyes:	In case of contact with eyes, rinse immediately with plenty of water and seek medical advise.
Skin Contact:	After contact with skin, wash immediately with plenty of water.
Ingestion:	If swallowed, do not induce vomiting: seek medical advice immediately and show this container or label.

Section 5 — Firefighting Procedures

Extinguishing Media:	Use dry chemical, CO2 or appropriate foam.
Fire Fighting Methods and Protection:	Firefighters should wear full protective equipment and NIOSH approved self-contained breathing apparatus.
Fire and/or Explosion Hazards:	Vapors may travel back to ignition source. Closed containers exposed to heat ma explode. Extremely flammable.
Hazardous Combustion Products:	Carbon dioxide, Carbon monoxide.

Section 6 — Spill or Leak Procedures

Steps to Take in Case Material Is Released or Spilled:	No health affects expected from the clean-up of this material if contact can be avoided. Follow personal protective equipment recommendations found in Section 8 of this SDS. Ventilate the contaminated area.

Sample Safety Data Sheet (1st Page)

What's new?

Material Safety Data Sheets (MSDS) are being replaced with new Safety Data Sheets (SDS). SDS's will contain the same information as found in a current MSDS in a new format.

MSDS = SDS

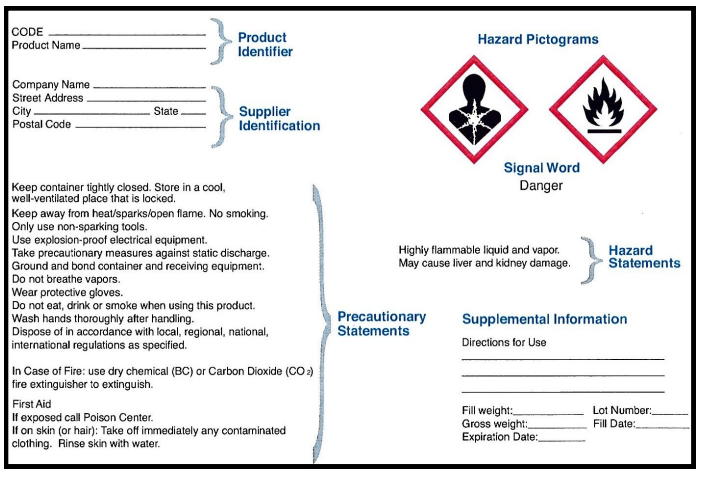
Benefits

New SDS's will be consistent and will match information found on the container label. The change-over to new SDS's has begun and will take several years.

MSDS/SDS are available from your Department Foreman.

Section 5	***FIRE FIGHTING MEASURES:*** This section provides recommendations for fighting a fire caused by the chemical, including suitable extinguishing equipment, provisions for unique circumstances, fire-fighter protective equipment and other relevant information.
Section 6	***ACCIDENTAL RELEASE MEASURES:*** This section provides recommendations on the appropriate response to spills, leaks or releases - including containment and clean-up practices to prevent or minimize exposure to people, properties or the environment.
Section 7	***HANDLING AND STORAGE:*** This section provides guidance on the safe handling practices and conditions for safe storage of chemicals including precautions for safe handling, minimizing the release of the chemical into the environment and providing advice on general hygiene practices.
Section 8	***EXPOSURE CONTROLS/PERSONAL PROTECTION:*** This section indicates the recognized exposure limits, engineering controls/work practices and personal protective measures that can be used to minimize worker exposure.
Section 9	***PHYSICAL AND CHEMICAL PROPERTIES:*** This section describes the chemical's characteristics such as its normal appearance, odor, solubility, boiling, melting and freezing points (to list a few).
Section 10	***STABILITY AND REACTIVITY:*** This section describes the reactivity hazards of the chemical and the chemical's stability information. It's broken into three parts: reactivity, chemical stability and other. Reactive chemical information would indicate if the material could vigorously polymerize, decompose, condense or will become self-reactive under certain conditions; chemical stability information will indicate whether the chemical is stable or unstable, including potential hazardous conditions; other information would include possible hazardous reactions, conditions to avoid, incompatible materials and any hazardous decomposition products.
Section 11	***TOXICOLOGICAL INFORMATION:*** This section identifies toxicological and health effects information or indicates such data is not available. Information includes: potential routes of exposure, known health effects and symptoms, the numerical measures of toxicity and if the chemical has been identified to have any cancer-causing properties.
Section 12	***ECOLOGICAL INFORMATION:*** (non-mandatory)
Section 13	***DISPOSAL CONSIDERATIONS:*** (non-mandatory)
Section 14	***TRANSPORTATION:*** (non-mandatory)
Section 15	***REGULATORY INFORMATION:*** (non-mandatory)
Section 16	***"OTHER" INFORMATION:*** (non-mandatory)

Hazard Communication Program Pictograms

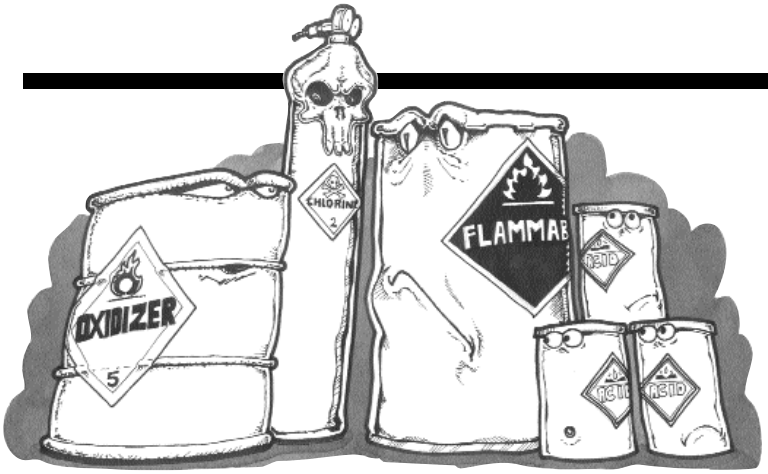


New Container Label

SDS = MSDS

What Makes Hazardous Materials Hazardous?

Nearly every worksite has hazardous materials around. Your health and safety depend on you knowing about possible hazards at work.



BE INFORMED

Where can you find information on the hazards of materials in your workplace?

_____

_____

_____

_____

Materials are hazardous if they...

- **are flammable**—such as solvents and fuels.
- **are reactive**—They may explode, burn or release dangerous vapors when they contact air, water, heat or certain chemicals, or when released from pressure.
- **are an acute health hazard**—They burn skin or are dangerous to inhale or swallow.
- **cause chronic or long-term health hazards**—such as cancer or liver damage.

What hazardous materials do you work with?

_____

_____

_____

_____

_____

In what ways are they hazardous?

_____

_____

_____

_____

_____

How do you protect yourself from the hazards?

_____

_____

_____

_____

_____

Recognizing and Understanding Hazardous Chemical Warning Labels

Understanding warning labels will help you to handle and use hazardous chemicals properly and to avoid health and safety problems at the worksite. The Hazard Communication Standard—or HazCom—requires all hazardous chemical containers to have warning labels on them or on a sign placed near the container.

What You Can Find on a Warning Label

- the name of the chemical
- the name, address and telephone number of the manufacturer or importer
- the chemical code number
- one of three signal words indicating the danger level of the chemical: "Warning," "Caution" or "Danger"
- the word "Poison" if the chemical is highly toxic
- physical hazards (flammable, explosive, corrosive, etc.)
- health hazards (eye, lung and skin irritation, burns, etc.)

Some warning labels may also show:

- how to store the chemical.
- how to dispose of the chemical.
- what personal protective equipment to use with the chemical.
- how to clean up the chemical.
- how to handle leaks or spills.
- first aid instructions for exposure.

Always Read the Label

When you take responsibility for knowing the contents of chemical containers, you protect yourself and every other worker at your worksite.

- Always read the warning label whenever you use any hazardous chemical. Even if you've used the same chemical many times, the manufacturer may have changed the formula or provided a different concentration.
- Avoid identifying chemicals by the label's color or design alone.
- If the information on the label leads you to question the appropriateness of your environment or your protective equipment, check your company's policy or consult your supervisor before using the chemical.

Warning Labels Are Everyone's Responsibility

Making certain that hazardous materials are properly labeled is a responsibility that all workers must share.

- If you find a container without a label or with a torn or illegible label, report it to your supervisor immediately.
- Don't attempt to handle a chemical without a label until you know what it is.
- If you're carrying hazardous chemicals in a portable container that someone else might use, label the container to ensure the safety of other workers.

Safety Checklist

- ☐ I always read the warning label every time I work with the chemical.
- ☐ I make sure each chemical in my area has a label.
- ☐ I report missing or illegible labels.
- ☐ If I don't understand the information on the label, I ask for help.
- ☐ I always follow the instructions on the label.
- ☐ I make sure labels aren't covered up or removed.
- ☐ If I need to know more information about a chemical, I read the MSDS.

The NFPA Diamond and HMIS Labels

The Hazardous Material Identification System—or HMIS—and the National Fire Protection Association—or NFPA—labeling systems use color, number and letter codes to give information about the hazards of chemicals or materials.

HMIS Label

The color codes tell you at a glance the hazards posed by a chemical. Each colored section contains a number that tells how severe the hazard is. The higher the number, the greater the hazard, from 0 (minimal) to 4 (severe). Letter codes from A to K tell which combination of protective equipment is needed.

BLUE: health hazards—how the chemical can harm you

RED: flammability—how easily the chemical burns

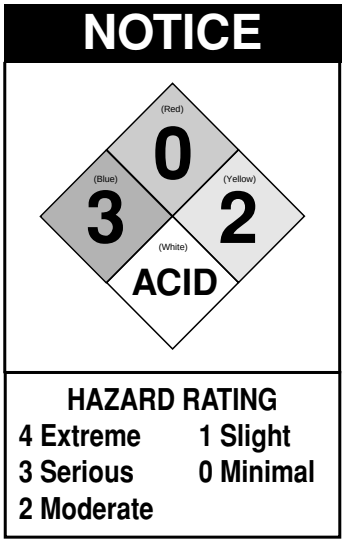
YELLOW: reactivity—how likely the chemical is to explode or react violently with other substances

WHITE: the need for protective equipment

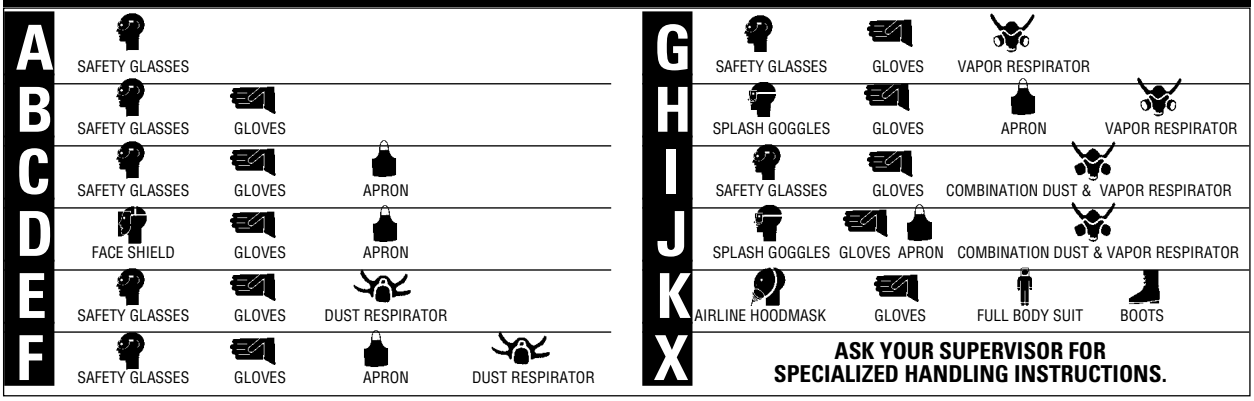
NFPA Diamond

The numbers on the diamond tell you about the fire, health, reactivity and special hazards of the material it labels. You can use the label to tell:

- what kind of substance it describes.
- whether to have a fire extinguisher handy.
- how likely it is the substance will react with something else.
- whether you should protect yourself from contact with the substance.

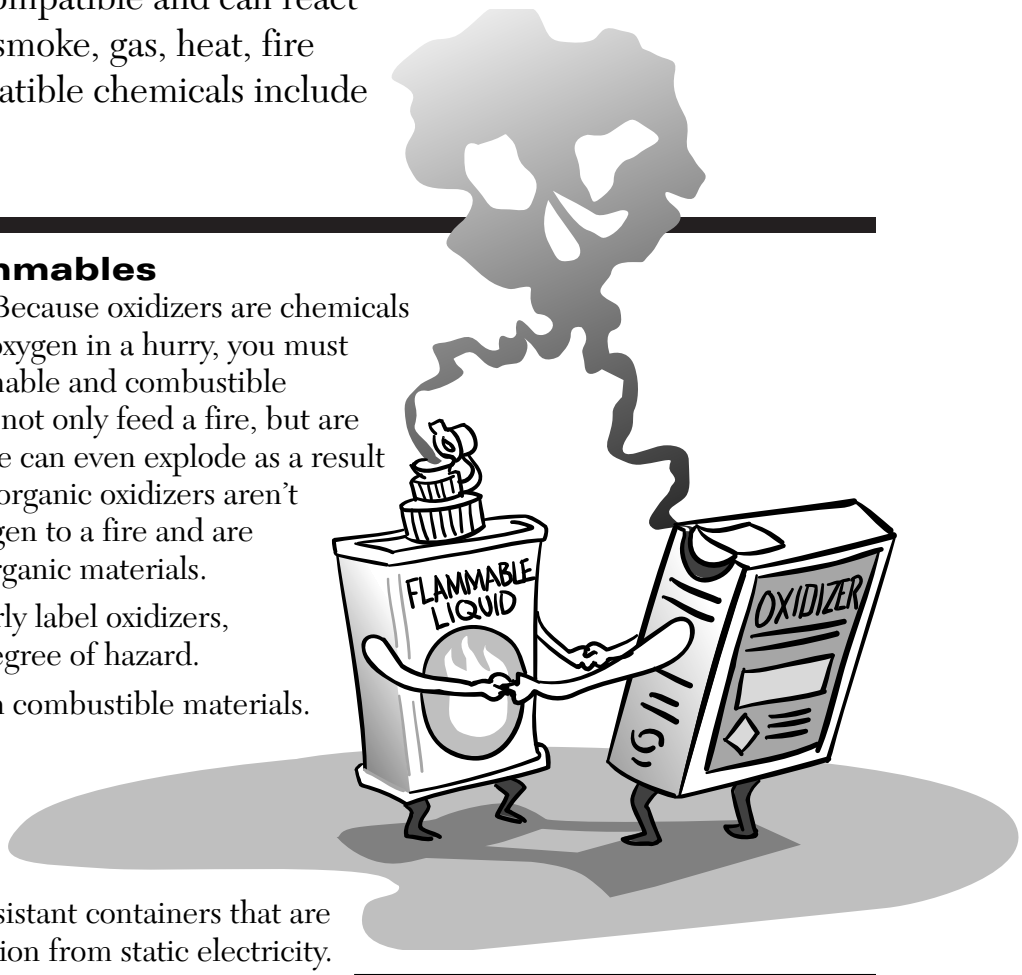


PERSONAL PROTECTION EQUIPMENT INDEX



Incompatible Chemicals

Some chemicals are incompatible and can react together to create toxic smoke, gas, heat, fire or an explosion. Incompatible chemicals include the following:



Oxidizers and Flammables

Fires need oxygen to burn. Because oxidizers are chemicals that give off a great deal of oxygen in a hurry, you must keep them away from flammable and combustible materials. Organic oxidizers not only feed a fire, but are flammable themselves. Some can even explode as a result of heat, shock or friction. Inorganic oxidizers aren't flammable, but can add oxygen to a fire and are especially dangerous near organic materials.

- Storage areas should clearly label oxidizers, indicating the type and degree of hazard.
- Never store oxidizers with combustible materials.
- Store oxidizers in a fire-protected room away from flammables.
- Store flammables in a ventilated room in fire-resistant containers that are grounded to prevent ignition from static electricity.

Acids and Bases

These materials are chemical opposites that react violently with each other, often producing heat, explosions or toxic gases. Because they are powerful corrosives, they can react with many other substances. Many acids are also oxidizers and can create fires if they react with combustible materials. Bases, such as lye, produce intense heat when in contact with water. Chemicals with names that include "hydroxide" are usually bases.

- Store acids and bases in separate areas in clearly labeled containers.
- Consult the material safety data sheets to find out which chemicals must be kept separate.

Be Safe

- Follow your employer's chemical storage plan.
- Refer to labels and the material safety data sheets.
- Never assume that a chemical is safe because it doesn't appear to be an oxidizer, a flammable, an acid or a base.
- Store chemicals in their appropriate containers, under proper conditions.

Working Safely With Flammable Liquids

They're called flammable liquids, but it's not the liquid that you need to worry about—it's the vapor that begins to form as soon as the container is opened. This vapor can explode at the first spark from a tool, a match, simple friction, static electricity or even high temperatures. Most flammable liquids are volatile, that is, they evaporate quickly and reach a concentration in the air that could lead to an explosion.

Flammable vapors are especially dangerous because you can't see them, and often you can't smell them. Solvents, cleaning fluids, acetone, alcohol and fuels are some of the flammable liquids you may use on the job.

Working Safely With Flammable Liquids

- Control the three potential hazards: temperature, concentration of vapor and ignition sources.
- Read the material safety data sheet (MSDS) for each liquid you use so you'll know its flash point as well as its upper and lower explosive limits—the range in which vapors are at the right concentration to explode if they're ignited.
- Follow your employer's flammable liquids safety policy.
- Always wear the correct, properly fitted personal protective equipment.
- Ventilate the area to keep vapor concentration down.
- Know which chemicals, such as oxidizers, increase the fire dangers of flammables.
- Know the location of the correct fire extinguisher to use in a flammables fire.
- Never smoke in areas with flammable liquids.
- Avoid mixing flammables; even small amounts of highly volatile liquids can lower the flash point of the mixture to dangerous levels.
- Check with your supervisor for instruction on how to dispose of flammable liquids.
- Store flammable-soaked rags and other waste materials in tightly covered, specially designated containers.
- Never pour flammable liquids down drains.
- Keep flammables away from welding, cutting and grinding operations.
- Be cautious with empty drums that have contained flammable liquids.
- Never do repair work or welding on an empty flammables drum without getting clearance first.
- Make sure that areas below where you're working are ventilated or sealed off to prevent the vapors from flowing down into them.
- Special spark-proof switches and fixtures should be installed in areas where flammable liquids are used.

Storing Flammable Liquids

- Keep flammable-liquid containers tightly covered, and store away from other chemicals and ignition sources in well-ventilated, temperature-controlled areas.
- Storage areas for flammables should be equipped with nonsparking electrical systems and heat sources.
- Store flammables separately from other chemicals, especially reactives such as oxidizers, in well-ventilated, temperature-controlled areas.
- Make sure flammables are stored in authorized containers and are correctly and clearly labeled for flammability. Liquids with a flash point of 80° F or less must be marked with a red label.
- Make certain containers are fireproof and have vapor screens and vapor-tight caps.
- Attach grounding wires to flammable storage containers to prevent static electricity buildup.
- Before transferring flammable liquids from a drum to a container, be sure to connect the container to the drum with a bonding wire before pouring the liquid, since the friction of pouring can ignite the vapors.

IN CASE OF AN EMERGENCY

Chances are, you'll never have to deal with a fire or explosion caused by flammables, but you should still be prepared. Know your employer's emergency plan, and if a fire breaks out, sound the alarm and evacuate the area immediately.

Responding to Emergencies Involving Flammables

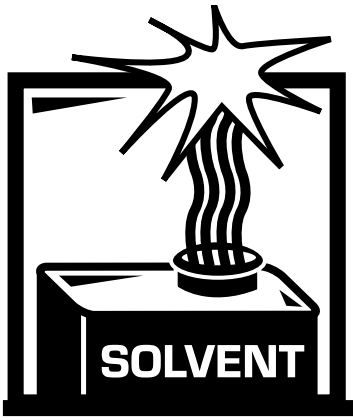
APPROPRIATE ACTION

- If it's a small emergency and you've been trained, you may be able to handle it yourself. If not, get help.
- Turn off any flames and equipment that could spark.
- Ventilate the area thoroughly.
- Clean up any spills, using safe procedures and proper materials.
- Remove contaminated clothing immediately.
- If a fire erupts, use the right type of fire extinguisher.
- If there is any chance of explosion, evacuate the area immediately, closing doors as you leave.
- Only go back into the danger area if you've been properly trained, and you're wearing the right personal protective equipment.

PREPARE IN ADVANCE

Don't wait for an emergency to happen before you get the information you need to handle it. Know the:

- location of the material safety data sheet and training materials for flammables.
- type and location of fire extinguisher to be used.
- emergency plan (including escape route).
- location of the nearest fire alarm.
- location of the nearest eyewash station.
- location of the nearest showers.
- location of the nearest fresh-air source.
- medical emergency phone number.



Working Safely With Solvents

Solvents are used to dissolve other substances. They can be used for jobs such as cleaning, degreasing and thinning paint. Most solvents are safe to use if you handle them correctly. But exposure to solvents can have long-term health consequences when they're used incorrectly. Some solvents you may use are:

- gasoline
- turpentine
- acetone
- benzene
- carbon tetrachloride

Physical Hazards

To know the dangers of solvents, you need to know their physical characteristics. Most solvents evaporate quickly, creating a breathing and explosion hazard. The vapors of solvents can ignite under certain conditions: flammable solvents ignite at a temperature under 100° F (37.8° C) when they're exposed to a spark, flame or static electricity. Because solvent vapors are heavier than air, they tend to concentrate near the floor. Read a solvent's material safety data sheet (MSDS) to determine:

- **Is it flammable?**
- **What are its upper and lower explosive limits?**
- **What is the solvent's permissible exposure limit (PEL)—the amount of solvent in the air you can safely be exposed to?**

FIRST AID

- **If a solvent splashes on unprotected skin, wash it off immediately under running water.**
- **Splashes in the eyes should be flushed at an eyewash station for 15 to 20 minutes.**
- **If dizziness occurs from breathing solvent fumes, get to fresh air immediately and get medical attention.**

Health Hazards

Solvents tend to be easily absorbed through the lungs, skin and eyes.

- They penetrate the protective oils of your skin, causing extreme irritation, dryness, infection or contact dermatitis.
- Splashes in the eyes result in burning, watery eyes, redness and irritation.
- Chronic exposure to solvent vapors may cause blurred vision, a gritty feeling in the eyes and permanent eye damage.
- If you breathe in too much solvent vapor, you may feel nose and throat irritation, dizziness, headache or nausea or even stop breathing.
- Prolonged breathing of solvent vapors can cause serious lung, liver, kidney and nervous-system damage.

How to Protect Yourself From Solvents

- Always wear the recommended personal protective equipment when using solvents. This includes chemical splash goggles, a face shield or safety glasses with side shields.
- Be sure to use the right type of neoprene or rubber gloves for the solvent you're using; otherwise, the solvent may dissolve your gloves.
- Use a respirator specially designed for use with the solvent.
- Use fans, hoods and other available ventilation systems.
- Avoid putting your hands into solvent, even with gloves on. Use a tool instead.
- Store solvents in grounded containers in a well-ventilated area away from direct sunlight, other heat sources and oxidizers.
- Dispose of solvents and solvent-soaked rags and clothing according to your company's policy.

Responding to Emergencies Involving Solvents

Do you know what to do in an emergency involving solvents?

- Get help. Only clean up a solvent spill yourself if it's small and you know proper cleanup procedures.
- If a solvent spill is large, evacuate the area immediately and notify your supervisor.
- Only enter an emergency area if you're wearing proper protective clothing.
- Remove contaminated clothing immediately.
- If there are injuries, send someone for medical help immediately.
- If you've been exposed to a solvent, get medical help even if you don't have symptoms, such as dizziness, vomiting, nausea, skin irritation and difficulty breathing. Symptoms don't always appear immediately.
- If solvent splashes on your skin, rinse it off immediately under running water for 15 to 20 minutes and seek medical attention.

- If solvent splashes in your eyes, remove contact lenses and flush your eyes for 15 to 20 minutes.
- If you swallow solvent, don't drink or swallow anything or try to vomit unless directed by a medical professional, and seek medical attention immediately.
- If you inhale solvent vapors, ask a coworker to summon medical aid and get to fresh air immediately.

IN AN EMERGENCY...

Do you know where to get help? Where is:

- the eyewash station?
- a water source?
- the medical emergency number?
- the nearest shower?
- the evacuation route?
- the poison control center phone number?

Working Safely With Corrosives

Corrosives are substances that can burn or destroy on contact. There are two types of corrosives: acids and bases (or alkalies). Corrosives react with other substances to eat away or chemically burn whatever they touch. They can burn skin, irritating or even blistering it, and can severely damage eyesight.

Handle Corrosives With Care

- Some corrosives produce toxic or explosive gases.
- Acids and bases react violently with water and with each other.
- Make sure all containers housing corrosives are clearly labeled and in good condition, with no cracks, dents or leaks.
- Store acids and bases away from each other.
- When mixing a corrosive with water, always add the corrosive to the water, since adding water to concentrated acid may produce a violent reaction.
- Make sure there is adequate ventilation when working with corrosives.
- When acids react with metal, they produce explosive hydrogen gas.
- Some corrosives release oxygen, which poses a fire hazard.
- Many corrosives are flammable.

Protect Yourself

- Appropriate personal protective equipment should always be worn when working with corrosives.
- A face shield and safety goggles or glasses with side shields will protect your eyes and face.
- Clothing and gloves of neoprene or other corrosive-resistant material will protect you.
- Work with some corrosives requires you to wear a fully encapsulated suit and chemical resistant boots.
- Wear an approved respirator equipped with the right cartridge or canister for the corrosive you're using. Inhaled corrosive gases can cause irritation of the mouth and respiratory passages, coughing, difficulty breathing or respiratory failure.

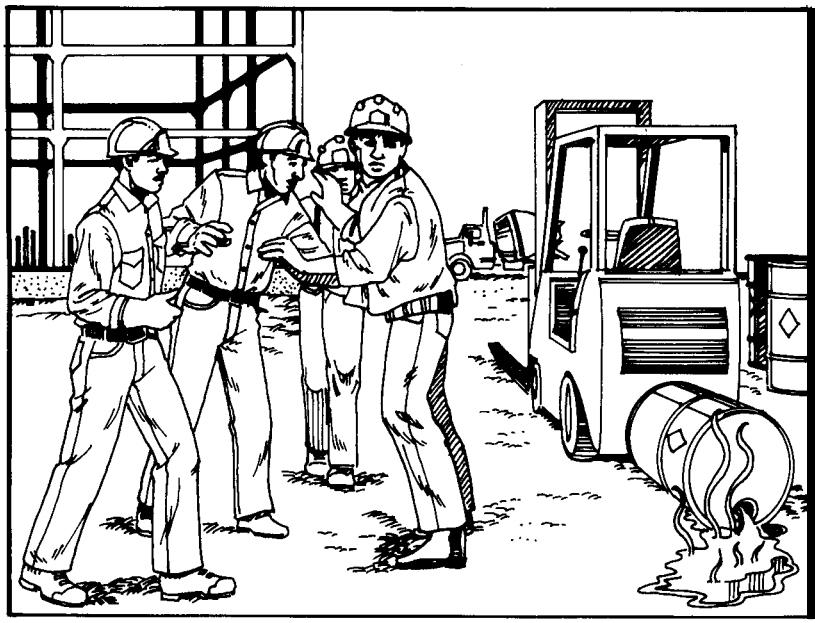
KNOW YOUR SAFETY MEASURES

- **Remove contaminated clothing.**
- **Always thoroughly wash your gloves.**
- **Keep your street clothes separate from your work clothes.**
- **Read the material safety data sheet (MSDS) for each corrosive before you start work and know the dangers.**
- **Treat contact with a corrosive as a chemical burn.**
- **Immediately flush burns with water for 15 to 20 minutes and get medical attention.**
- **Keep your work area and equipment clean.**

Responding to Emergencies Involving Corrosives

Do you know what to do if there's a corrosive spill or if corrosives come in contact with your body? Use the following guidelines when responding to corrosive emergencies.

- Clean up small corrosive spills immediately if you've been trained to do so.
- If a large corrosive spill occurs, evacuate the area immediately and report the spill to your supervisor.
- When a corrosive touches skin, rinse (don't scrub) the affected area for 15 to 20 minutes, even if you don't feel pain from the corrosive. Cover the burn with a sterile dressing and get medical attention immediately.
- Don't apply burn ointments or neutralizing solutions to a corrosive burn.
- If a corrosive is swallowed, don't drink or swallow anything or try to vomit unless the label or a medical professional instructs you to. Call the local poison control center and get medical attention immediately.
- When corrosive vapors are inhaled, get to fresh air immediately and get medical attention right away.
- Using gloves, immediately remove clothing that has a corrosive spill on it.



IN AN EMERGENCY…

Do you know where to get help? Where is:

- **the eyewash station?**
- **the safety shower?**
- **a fresh-air source?**
- **poison control center phone number?**
- **medical emergency number?**
- **the location of the material safety data sheet (MSDS) for each corrosive?**
- **the company policy and procedures for emergencies?**

Working Safely With Reactives

Highly reactive materials are among the most dangerous substances around. Special caution must be taken when working with them. Reactives are chemicals that can, under certain conditions, release very large and potentially dangerous amounts of energy. Some reactives explode at the slightest movement and others explode on contact with air. The kinds of reactions that can be expected under various conditions include:

AIR REACTIVITY—how likely a substance is to ignite or release energy when exposed to air. The higher the reactivity, the greater the danger.

WATER REACTIVITY—how readily a substance reacts with water. Some materials, such as sulfuric acid, react explosively with water.

CATALYSTS AND INHIBITORS—substances that increase the rate of a reaction are catalysts. Inhibitors are substances that slow down a reaction. Inhibitors may be added to highly reactive substances to make them more stable.

OXIDATION ABILITY—the ability to give off oxygen. Oxidizers give off large amounts of oxygen, increasing the rate at which nearby combustible materials burn.

POLYMERIZATION—an often violent chemical reaction in which large molecules are formed from many small molecules.

SAFETY RULES FOR REACTIVES

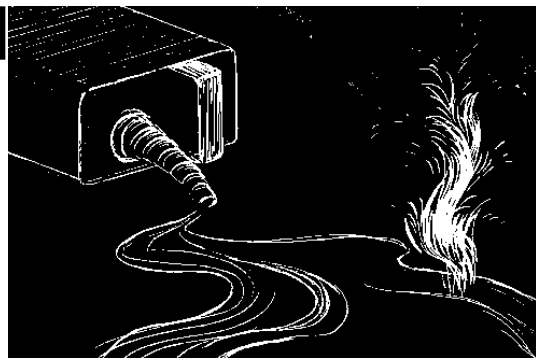
- **Keep all oxidizers far away from all flammable and combustible materials in a room that's fire-resistant and free from vibrations and shocks.**
- **Avoid bumping or jostling containers.**
- **Make sure containers of oxidizers are tightly sealed and clearly labeled.**
- **Read the hazard label and the material safety data sheet (MSDS) before using any reactive chemical.**
- **Make certain all containers housing reactive chemicals are in good condition, free of cracks and leaks.**
- **Clean up any spills immediately if you're trained to do so. If you're not sure, ask your supervisor.**

Responding to Emergencies Involving Reactives

Reactives are highly dangerous chemicals that can easily cause fires and explosions if handled or stored improperly. It's important that you know what to do in case of an emergency involving a reactive. Use the following safety guidelines when responding to such an emergency:

- If you spill a small amount of an oxidizer or flammable, immediately clean it up and remove it according to your training.
- If a large spill occurs, evacuate the area and report the spill immediately.
- A large spill should only be cleaned up by a trained emergency response team that has the equipment and tools designed to protect them and prevent accidental fires and explosions.
- Know your employer's emergency plan and evacuation route.
- Know when to use a fire extinguisher and which one to use in a reactive emergency.
- Read the MSDS for each substance before you work with it or clean it up.
- Get medical help if needed.

REACTIVES AND YOU



- What reactives do you work with?

  _____
  _____
  _____

- What precautions do you take in handling each one?

  _____
  _____
  _____

- How do you clean up a small spill? _____
  _____

- Where are the nearest eyewash stations? _____
  safety showers? _____
  fresh-air sources? _____

Working Safely With Poisons

Simply put, poisons are chemicals that can be fatal even in small doses. But they can be safe to work with if you follow basic safety guidelines and become familiar with the hazards of the poisons you work with.

Poison Hazards and Protecting Yourself

Examples of poisons used in the construction industry are cleaning compounds and corrosive chemicals and gases. Poisons may be dangerous if swallowed, inhaled or absorbed through the skin. They can cause illness, burns to the skin and eyes, dizziness or suffocation, confusion, coma or death. They may also produce toxic gases when they're burned.

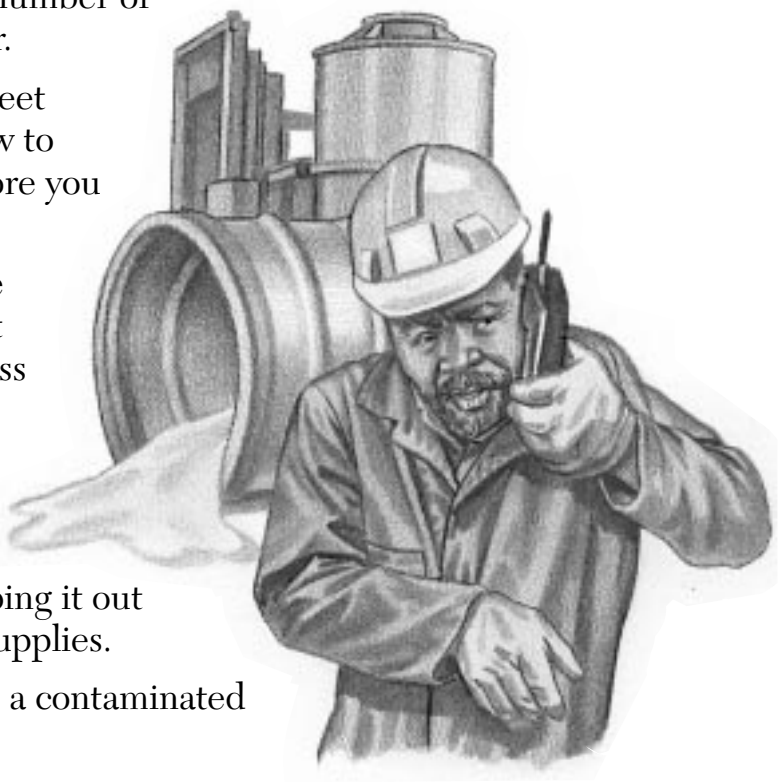
No matter what poison you're working with, you must protect yourself with personal protective equipment such as a respirator, gloves, safety goggles and chemical-resistant boots. Since poisons vary in toxicity, always read the material safety data sheet (MSDS) for any poisons you work with to determine the correct type of personal protection for each poison. Ask your supervisor if you have any questions about the MSDS.

HANDLING POISONS

- Be informed about the potential hazards of each poison you work with, what safety equipment to use and what to do in case of an emergency.
- Always be on the lookout for signs of leakage: defective containers or hoses, odors, drips and chemical residue in loading areas.
- Handle containers carefully.
- Store poisons in a well-ventilated area, away from other substances that could be contaminated if a leak occurs.
- Avoid touching your mouth or eyes, and always wash your hands before eating, drinking, storing food or smoking where poisons are present.
- Know the phone number for your area's poison control center.
- Have emergency instructions posted.

Responding to Emergencies Involving Poisons

Your life and the lives of others may depend on you knowing how to react quickly and correctly during an emergency involving poisons. Use the following guidelines during poison emergencies:



- Know where to find the phone number of your area's poison control center.
- Read the material safety data sheet (MSDS) and instructions on how to handle a poison emergency before you need them.
- If a poison spill occurs, evacuate the area immediately and report the spill to your supervisor, unless you're trained and equipped to handle the type and size of the spill.
- Reduce contamination by containing the spill, and by keeping it out of drainage systems and water supplies.
- Avoid using water to wash down a contaminated area.
- Decontaminate or properly dispose of clothing and equipment that has been contaminated.
- If a poisoning occurs, immediately call for emergency medical personnel; move the victim into fresh air and contact your local poison control center. Read the poison's label for further help.
- If dangerous skin or eye exposure has occurred, immediately flush the affected area or eyes with running water for 15 to 20 minutes. Remove contaminated clothing and seek medical help immediately.
- Send a copy of the poison's MSDS to the hospital with the victim, if possible.

Working Safely With Oxidizers

Oxidizers are chemicals that release large amounts of oxygen. Because oxygen feeds fire, oxidizers can be unpredictable and dangerous. Commonly used oxidizers are concentrated nitric acid, compressed oxygen and hydrogen peroxide.

Oxidizers Are Firebugs

Fire needs oxygen to burn. Oxidizers provide oxygen that can make fires bigger. Inorganic oxidizers can increase the danger of fire around flammable or combustible materials, while organic oxidizers are flammable in themselves. Some organic oxidizers can even explode when they're exposed to heat, shock or friction. Oxidizers can supply oxygen to a fire and support combustion even if there's no oxygen present in the air. They must be kept away from flammable liquids and materials such as wood and paper.

Using Oxidizers

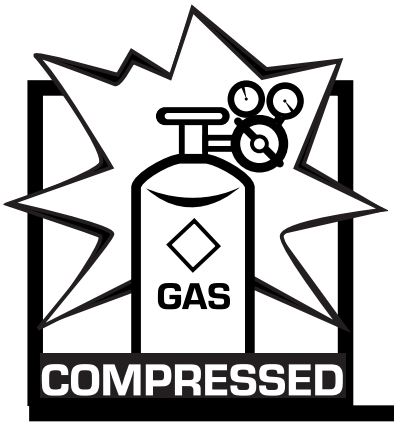
- Before using an oxidizer, read its material safety data sheet (MSDS) to become familiar with its hazards.
- Be familiar with fire response procedures and the location of fire extinguishers.
- Most oxidizers are corrosive and can irritate skin and lungs.
- Wear appropriate personal protective equipment and work under a hood.

Storing Oxidizers

- Always keep containers of oxidizers tightly closed.
- Store oxidizers away from other materials, including other oxidizers, in a fire-protected room.
- Check containers for leaks.
- Make sure all containers are clearly labeled.
- Report containers with missing or illegible labels.

IN CASE OF SPILLS

- **Clean up small spills immediately.**
- **In the case of a large spill, evacuate the area and report the spill immediately.**
- **Let an emergency response team clean up large spills.**
- **Dispose of cleanup materials in an approved manner.**



Working Safely With Compressed Gases

Any material that is under pressure can be dangerous if it's not handled properly. If the material is a compressed gas, it may be flammable, explosive, reactive, toxic or a combination of these. Because of the hazards of compressed gases, it's very important to know what you're working with, what its hazardous properties are and how to safely handle its container—the compressed-gas cylinder.

Tips for Compressed Gas Safety

- Before handling any compressed-gas cylinder, identify the type of gas it houses by its identification and hazard labels, not its color. Different manufacturers use different color codes.
- Check the cylinder's label for hazards, and read the material safety data sheet (MSDS) for instructions on protective equipment and handling.
- Look for the maximum approved pressure label and make sure a current test date is indicated. If the cylinder is missing this information, it should not be handled.
- Only trained personnel should unload compressed-gas cylinders.
- Inspect cylinders for damage or leaks.
- Move defective cylinders to an isolated storage area; a ruptured cylinder can become a rocket with enough force to blast through a concrete wall.
- When moving cylinders, use special cylinder hand trucks, keeping the cylinder lashed to the cradle and standing as upright as possible.
- Avoid dropping, banging or rolling cylinders.
- Keep compressed-gas cylinders away from fire, heat and sparks.
- When using a cylinder, open the valve slowly, with the cylinder pointed away from people.
- Make sure the hoses and connections are clean and in good condition each time you use the cylinder.
- When a cylinder is not in use, screw down the protective metal cap to the last thread.
- Label empty cylinders with "MT" and keep them separate from full ones.
- Store compressed-gas cylinders upright, secured with a chain or cable, in a safe, well-ventilated, fire-resistant area with a controlled temperature below 125° F (51.7° C).
- Keep cylinders out of direct sunlight and away from heat sources, combustible materials and electrical wiring.
- Group cylinders with others housing the same contents.
- Rotate stock, using older cylinders first.
- Avoid using cylinders in confined spaces.
- Keep oxygen cylinders at least 20 feet away from flammable-gas containers, combustible materials, oil and grease.

Compressed Gases That Need Special Handling

Acetylene and hydrogen: Both of these gases are highly explosive and must be handled with extreme caution. Hydrogen escapes easily from threaded fittings that aren't completely tight, and such leaks can ignite spontaneously from the friction of the escaping gas. Hydrogen has no odor to warn of a leak.

Oxygen: While not flammable itself, oxygen increases the tendency of things around it to burn or explode. Keep oxygen cylinders away from combustible or flammable materials and fire hazards, including grease and oil on your clothes, hands and work area. Oxygen should not be used in place of compressed air.

Chlorine and fluorine: These gases are highly corrosive and irritating. When mixed with acetylene and exposed to light, they may explode. Chlorine will form corrosive hydrochloric acid in water, eating into iron or steel equipment. The proper respirator and other protective equipment should be available in case of a leak.

Ammonia: This is a highly corrosive gas. When using it, make sure you have quick access to the proper respirator and other protective equipment.

Chemical Leaks and Spills

There's much you can do to prevent spills and leaks, but if one occurs, your safety and the safety of others may depend on your quick response.

PREVENTION

- Inspect containers regularly for leaks, corrosion and worn seals.
- Make sure containers are labeled with their contents.
- Handle containers with care, removing only as much of their contents as you need at a time.
- Keep containers tightly closed.
- Find out how to dispose of chemicals that you no longer need.

PREPARATION

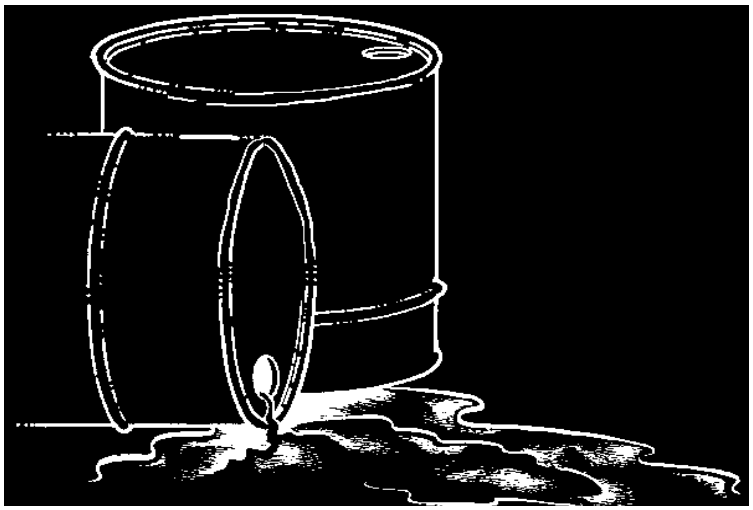
- Be familiar with your employer's emergency response plan and evacuation routes and your assigned role in a spill situation.
- Make sure that the phone number of the emergency coordinator to whom you must report a spill is clearly posted.
- Read labels and material safety data sheets of the chemicals you use. You should know the potential hazards—fire, explosion, reactivity, toxicity—that are possible in a spill.

GUIDELINES FOR HANDLING A CHEMICAL LEAK OR SPILL

- Report a leak or spill immediately.
- Be prepared to report what's leaking or spilled, where it is, the size of the spill and the leak's rate of flow.
- Avoid touching it, walking in it or breathing around it, even if it has no odor.
- If you're asked to clean up a small spill, follow company policy and MSDS procedures.
- If a spill response team is cleaning up the spill, evacuate the area, warn others and stay away until you're told it's safe to return.
- Discuss with your coworkers how the spill could have been prevented and what steps can be taken to prevent spills in the future.

If you're on a spill response team:

- Wear protective clothing and respirators.
- In the case of flammables, avoid using tools that spark.
- Use corrosive-resistant tools with corrosives.
- Try to stop the leak or spill by securing a valve, closing a pump, plugging a hole in a leaking container or shifting a container to stop the flow. A barrel may be placed under the leak, or the leaking container may be placed in a larger container or bag.
- Keep the spill from spreading by putting dikes around drains or reactive chemicals.



- Use absorbent pillows, pads or substances like clay and vermiculite for small spills.
- A vacuum truck or specially designed squeegee may be used to move larger spills to a chemical drain or to special drums for disposal.
- Decontaminate or properly dispose of clothing and equipment used in spill cleanup.

Responding to Chemical Burns

Know Your Chemicals

The following chemical groups can cause chemical burns:

- ◆ reducing agents such as sodium, potassium and lithium used in metal cleansers and soldering processes
- ◆ strong acids such as sulfuric, muriatic, tannic and hydrofluoric
- ◆ bleaching agents
- ◆ strong bases such as lye

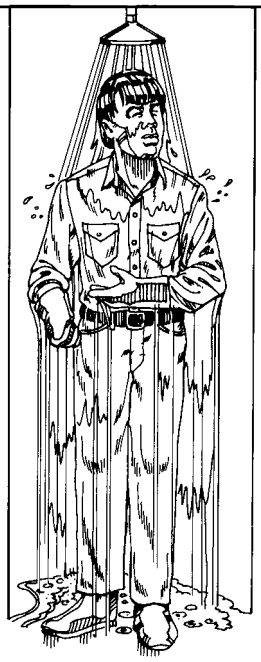
What Are Chemical Burns?

Chemical burns are different than heat burns in two ways: They usually produce no heat, though the victim may feel a burning sensation, and they go on burning until every bit of the chemical is removed. This is because the chemical reacts with body tissue to cause the burn. The longer the chemical remains on the body, the deeper the burn.

Prevention

- ✓ Follow safety procedures to prevent chemical burns.
- ✓ Read the label before using any chemical and know the hazards involved.
- ✓ Follow instructions for the chemical's use, storage and disposal.
- ✓ Always wear the appropriate protective equipment.
- ✓ Know how to react quickly to a chemical emergency.

First Aid



- ⊕ Know the quickest route to the emergency shower and eyewash station. You should be able to get there in 15 seconds or less.
- ⊕ Get under running water as fast as possible and stay there for at least 15 minutes.
- ⊕ Remove contaminated clothing after you're in the shower.
- ⊕ Use tap water or a garden hose only if a shower is not available.
- ⊕ Cover the burn with dry, sterile dressings.
- ⊕ Get medical attention immediately.
- ⊕ Avoid using neutralizing solutions or ointments on the burn.
- ⊕ Watch for shock symptoms: clammy, pale skin; rapid pulse; irregular breathing; nausea; confusion; and enlarged pupils.
- ⊕ Treat shock by keeping the victim warm and lying down with feet and the burned areas raised. Turn the victim's head to the side if he or she is vomiting and give cool water if medical help is more than an hour away.

Eyes

- ⊕ Go to the eyewash station and turn your head sideways, with the affected eye below, so that chemicals won't wash into your other eye.
- ⊕ Remove contact lenses and let water flow for 15 minutes or more.
- ⊕ If you must use water from other sources, avoid spraying the water directly on your eye; the pressure can cause damage.
- ⊕ A helper should pour water over the bridge of your nose, letting it flow over your eye.

Working With Chemical Drums

Drums vary in size, construction and materials and must be used and stored correctly to protect against chemical leakage.

Types of Drums

Open-Head—used for storing solid materials; has a lid held in place by a bolt ring that's loosened to remove it

Closed-Head—used for storing liquid materials; has one or more small bungs on the top, rather than a removable lid

Metal—most are steel and are stamped on the bottom with markings that indicate their purpose and type: 17H designates an open-head drum for solids; 17C designates a heavy-gauge, open-head drum for solids; 17E indicates a closed-head drum for liquids

Fiber—used for storing solids

Plastic—used for storing certain corrosive liquids

Handling Drums

- Before filling a drum, inspect it for dents, cracks and rust, especially around the seams.
- Before handling a drum, read its label to find out what kind of material it contains.
- Check the condition of lid gaskets or bungs to make sure they're in good working order.
- Use mechanical aids, such as a forklift or drum dolly, to move drums.
- If you must move a drum by yourself, slowly roll it on its rim.
- Get help to lift a drum if it's on its side.
- Report missing or illegible labels immediately.
- Avoid handling a drum if its contents are unknown.
- Check the condition of a drum before moving it.
- If a drum has a bulging lid, handle it with extreme caution. It may mean a chemical reaction is going on inside of it.
- Be careful when handling drums that have been exposed to heat or direct sunlight.

Storing Drums

- Store drums in rows in designated storage areas.
- Leave enough room between rows for access by equipment.
- Store dangerous chemicals by type.
- Store flammables and combustible materials away from other materials, especially oxidizers.
- Ground drums to prevent explosions.

Drum Leaks

- A leaking or damaged 55-gallon drum can be put into an 85-gallon drum.
- Clean spills according to company guidelines.
- Know your employer's emergency response plan.
- Read the material safety data sheet (MSDS) for instruction.
- Know where the emergency eyewash stations and showers are located.

Lead Safety

More than 900,000 construction workers are exposed annually to lead hazards, according to OSHA. Construction workers have some of the highest blood lead levels. In construction, the main sources of lead exposure are torch cutting, abrasive blasting, stripping, sanding, heating and other work that disturbs surfaces coated with lead-based paint.

Health Hazards

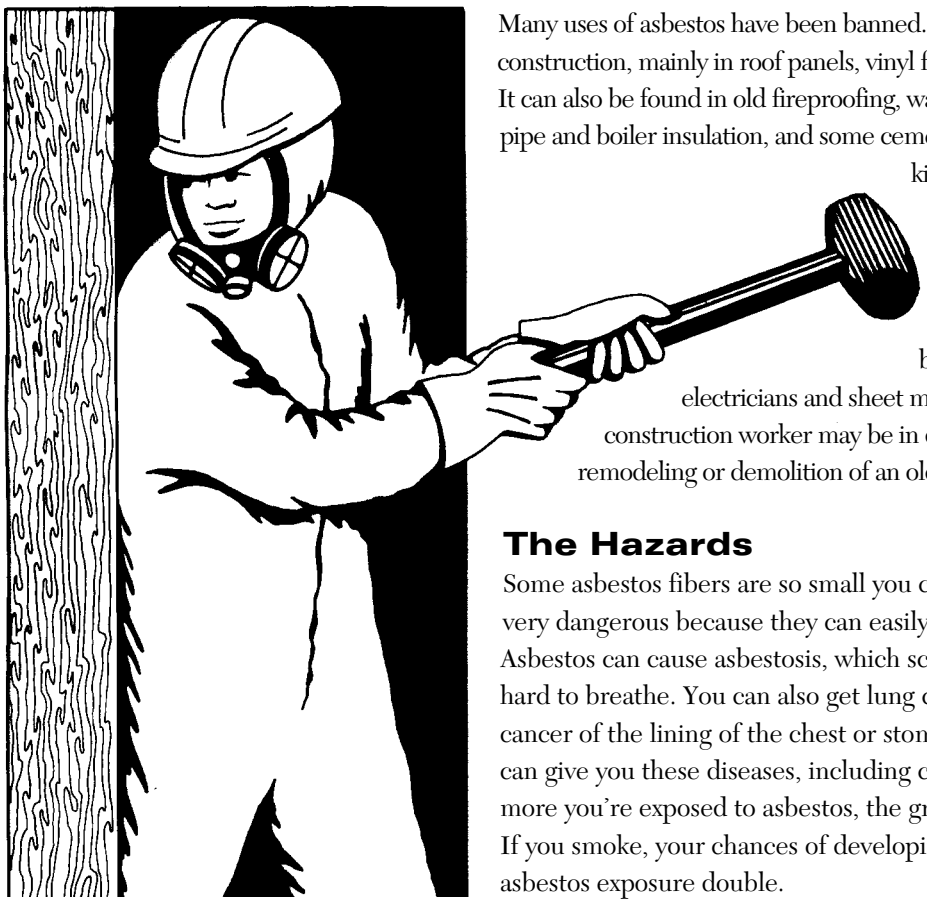
Lead is toxic if you breathe or swallow it. Large amounts of inhaled or ingested lead can cause severe anemia, harm reproductive function and damage the kidneys, brain and nervous system. The first symptoms of severe lead poisoning may be an upset stomach (or cramps), weakness, joint pain and fatigue. However, not all people with lead poisoning have noticeable symptoms.

Protect Yourself

- If you're working with or near a painted surface that will be disturbed, ask your supervisor if the paint contains lead. The OSHA Hazard Communication Standard requires your supervisor/contractor to train you if you will be exposed to a lead hazard.
- Until you're sure that there's not a lead hazard, act as if there is one and protect yourself.
- If you must work with a lead hazard, or the possibility of one, use wet methods, if you can, to keep down any dust.
- Before you use a torch for cutting, safely remove lead paint. Heating lead paint will produce lead fumes.
- Use long-handled torches to keep your distance.
- Use local-exhaust ventilation.
- Use the correct respirator for the job.
- Never smoke, eat or drink around work with lead surfaces.
- Always wash your hands and face to remove any lead dust before smoking, eating, drinking or going to the bathroom.
- Never wear your work clothes home. Lead dust on your clothes and shoes can poison your family, especially children.
- Have your blood lead level checked often. OSHA requires your employer to have your blood tested for lead if you're exposed to it. If your blood lead level is above 50 micrograms per deciliter, your employer must give you a different job away from lead until you're well; and your employer must arrange for your medical examinations.

Asbestos Safety

Asbestos is a hazardous mineral that can severely damage your lungs and even kill you. Thousands of construction workers have died from diseases caused by working with or near asbestos without proper protection. Asbestos diseases can sometimes take 20 years or longer to show up after you've been exposed.



Many uses of asbestos have been banned. However, it's still used in construction, mainly in roof panels, vinyl flooring and packing gaskets. It can also be found in old fireproofing, wallboard, waste tank linings, pipe and boiler insulation, and some cement and road surfaces. All kinds of asbestos are dangerous. The construction trades most at risk from asbestos are insulators, plumbers, pipefitters, bricklayers, roofers, electricians and sheet metal workers. But any construction worker may be in danger during maintenance, remodeling or demolition of an old building or road.

The Hazards

Some asbestos fibers are so small you can't see them. These are very dangerous because they can easily get into your lungs. Asbestos can cause asbestosis, which scars your lungs and makes it hard to breathe. You can also get lung cancer or mesothelioma, a cancer of the lining of the chest or stomach. All kinds of asbestos can give you these diseases, including chrysotile asbestos. The more you're exposed to asbestos, the greater chance you'll get sick. If you smoke, your chances of developing lung cancer from asbestos exposure double.

PROTECT YOURSELF

- Before you work with or around asbestos you must receive special training.
- If you disturb or remove asbestos, you must wear a respirator with at least type 100 HEPA cartridges. These cartridges are magenta (red-purple) in color.
- Even though you're wearing a respirator, try to reduce the asbestos in the air by keeping it wet and by vacuuming the dust using a special HEPA vacuum designed to capture the smallest fibers.
- Collect and close all asbestos waste in specially approved removal bags.
- Never eat, drink or smoke in a work area with asbestos.
- Always wash your hands and face before you eat, drink, smoke or use the bathroom.
- Never wear or take asbestos contaminated clothing or shoes home. Use disposable clothing or launder your clothing at work.
- If you do certain asbestos abatement work, OSHA requires that you shower before leaving work.
- If you've been exposed to asbestos on the job, report it to your supervisor.

Working Safely With Paint

We don't usually think of paint as a hazardous chemical—after all, millions of people use paint in all sorts of situations without wearing any special protective equipment. But understanding the health hazards of prolonged or repeated exposure to paint substances can help you understand why OSHA requires you to protect yourself when using them.

Health Hazards of Paint

Paint contains pigments, solvents, resins and other ingredients to give it color, texture, spreadability and durability. Many of these ingredients are hazardous to your health; among them are solvents, such as mineral spirits, naphtha and turpentine, that evaporate quickly from paint exposed to the air. Even short-term exposure to these chemicals can cause dizziness, eye irritation, nausea, coughing and other symptoms. In addition, paints containing polyisocyanate hardeners can cause shortness of breath, chills and fever. Long-term exposure to paint ingredients, even when no short-term effects are noticed, can damage the kidneys, liver, blood or nervous system. Some even cause cancer and birth defects in laboratory animals.

You may work with paints for a long time with no ill effects. But you can suddenly develop rashes, hives, swelling or scaling of the skin or coughing and shortness of breath, which often lead to permanent lung damage or severe respiratory stress. This is sensitization, an allergic reaction to one or more of the ingredients in paint. Once you become sensitized, it's possible you may never be able to work with the sensitizing substance again. To prevent sensitization, you must avoid contact with the paint in the first place by using the correct personal protective equipment.

Other Hazards

The volatile solvents in paint are flammable. Painting in an unventilated area near an ignition source—such as a cigarette, spark or static electricity—can be very dangerous. Paint containers exposed to high heat may explode. And some paints contain chemicals that may react violently with other substances.

Educate Yourself

Always read the labels of the materials you're going to use before you begin painting. Use the labels and material safety data sheet (MSDS) as a guide to the hazards the paint contains, the type of protective equipment to use and whether the paint may ignite easily. The MSDS will also tell you how to contain and clean up a paint spill and what you can do in case of overexposure to paint.

Protect Yourself

- You can prevent exposure to harmful paint chemicals by wearing the appropriate personal protective equipment—a respirator designed for painting, coveralls, chemical-resistant gloves and eye protection.
- Some safety glasses made for painting have special layered peel-off lenses you can remove as they get covered with paint.
- Paint only in well-ventilated areas if possible.
- Make sure to use an appropriate respirator when spraying polyurethane paints and other paints in enclosed areas.
- Change your respirator's cartridges often, as specified by the manufacturer's guidelines.

Clean Up for Safety

- Keep paint and other paint-related containers tightly sealed and properly labeled when not in use.
- Store paints at the proper temperature to avoid explosion.
- Dispose of empty cans and paint- or solvent-soaked rags in airtight containers to avoid spontaneous combustion.
- Use soap, water and a washcloth to clean your hands; solvents and paint thinners can cause irritation, infection and severe drying of the skin, as well as toxic effects.
- Remove clothes soaked in solvents and properly clean them.

Preventing Explosions

There's a risk of explosion when working with explosives, reactive or unstable chemicals and pressure vessels. Many explosions occur when gases are exposed to sources of heat or an increase in pressure. Some chemicals can even explode if exposed to water or air. By understanding the materials and the factors that trigger an explosion, you can help prevent this dangerous workplace emergency.

Categories of Explosives

Explosives can be classified into three categories according to level of hazard:

Class A explosives, the most powerful, include dynamite and nitroglycerin.

Class B explosives include such substances as propellants and flash powders.

Class C explosives are usually manufactured materials that contain small amounts of Class A or B explosives, such as fireworks.

Chemicals

The majority of explosive hazards found at the worksite involve chemicals that aren't classed as explosives but can be explosive under certain circumstances. The following materials and situations can be dangerous:

- explosive vapors, which can be ignited by a spark, friction or heat
- flammable vapors in confined areas
- reactive chemicals such as oxidizers, which can ignite when mixed with or stored near certain other chemicals or explode when exposed to air or water
- pressure vessels, such as compressed-gas cylinders or steam boilers, when there's a rupture or valve failure
- old chemicals that may undergo changes, making them increasingly unstable

Know the Hazards

Since explosions can occur under many different circumstances, it's important to know about the chemicals you work with. Read the MSDS for the chemicals you use, and be sure you understand the flash point and upper and lower explosion limits for volatile chemicals. If necessary, ask your supervisor to explain these numbers to you. These numbers tell you what ranges of temperature and concentration are safe to work with.

- Learn what substances are incompatible with each chemical and whether the chemical may be safely exposed to air, water or combustible materials.
- Be especially cautious when working in confined spaces.
- Treat any buildup of heat in the container or surrounding air as a danger signal.
- Report any defects or damage to containers.
- Ventilate properly.
- Clean up spills, dust and oily rags.
- Stay alert for leaks and other dangers.

Store Explosive Materials Safely

- Explosives are generally stored in areas called "magazines" posted with signs reading "Explosives—Keep Off."
- Keep explosive storage areas clean and dry and accessible to emergency equipment.
- Keep possible explosives away from heat sources.
- Use only approved storage and transfer containers.
- Store packages of explosives flat, following "This Side Up" directions, and rotate stock, using the oldest first.
- A permit is usually required to store black powder, which must be kept separate from other explosives.
- Never smoke, light matches or use spark-producing tools near explosives or within 50 feet of an explosives magazine.
- Follow MSDS guidelines when storing incompatible or flammable chemicals.
- Unstable chemicals and explosives that have exceeded their expiration dates should be disposed of, by professionals trained to handle them.

If There's an Explosion:

- **Follow your company emergency plan.**
- **Evacuate quickly.**
- **Close windows and doors behind you.**
- **Report the explosion and its circumstances to your emergency response coordinator.**
- **Stay upwind.**

Suit Up for Safety

Wearing the proper clothing and personal protective equipment for each job you do can help protect you from serious injury and even death. Each year, more than 2 million workers suffer serious on-the-job injuries and illnesses. Most personal protective equipment (PPE) may seem bulky and uncomfortable, but you need to have it on before it's too late. It's important to learn which hazards you may encounter before you work.

HEAD HAZARDS

If you work in an area where there is a possible danger of head injury from impact, falling or flying objects or electrical shock or burns, then you must wear head protection. Hard hats are specifically designed to resist penetration and to absorb the shock of a blow. Ask your supervisor which type of hard hat you need to wear.

RESPIRATORY HAZARDS

If the air in your workplace contains fine particles, sprays, mists or toxic gases, you should wear respiratory protection. Air-purifying respirators filter contaminants out of the air. Supplied-air respirators provide a source of air when there's not enough oxygen. Masks for fumes, dust and particulate can also protect your respiratory system. Talk with your supervisor about which type of respirator you should use.

EYE HAZARDS

If anything in your workplace can fly, splash or drift into your eyes, you need eye protection. Common causes of eye injury when eyes are unprotected include flying objects or particles; splashing liquids and metals; drifting gases, vapors, dusts, powders, fumes and mists; thermal and radiation hazards, such as heat, glare, ultraviolet and infrared rays; lasers; and electrical hazards. Safety glasses, goggles and face shields are designed to protect against impact from objects, irritating substances, chemical and other splashes, extreme heat and many other hazards. Ask your supervisor which type of eye protection you need and when to wear it.

HEARING HAZARDS

If you have to shout to be heard on the job, you're working in noise levels that are high enough to damage your hearing, so you need to wear hearing protection. Hearing protection devices, such as earplugs and earmuffs, screen out loud, harmful noises while allowing you to hear what you need to hear. Talk with your supervisor about the correct hearing protection for you.

FOOT HAZARDS

If you work in an area where it's possible that your toes, ankles or feet could be injured by sharp objects, falling objects, impact, slipping, tripping, electrical hazards, chemical spills or heat hazards, then you need to wear foot protection, such as steel-toed boots. Consult with your supervisor to find out which type of foot protection you should wear.

HAND HAZARDS

If your hands are exposed to possible injury from machinery, heat, cold, electricity, chemicals, toxic substances, materials such as metal, wood, concrete, mortar, paint, tools, etc., you need to wear hand protection. The proper hand protection, in the form of gloves, mitts, thimbles, finger cots, hand pads, barrier creams and arm cuffs can protect you from abrasions, cuts, lacerations, punctures, crushing, burns, heat and cold, dermatitis and other injuries. Ask your supervisor which type or types of hand protection you need.

Dress for the Job
PPE Checklist

What you wear on the job and how you care for it is just as important as knowing how to do the job. Your personal protective equipment (PPE) can save you from injury and even save your life. Follow these guidelines for using PPE:

- ☑ Wear your personal protective equipment properly. Ask your supervisor if you're not sure how to use any item.
- ☑ Always check with your facility's rules for any PPE guidelines.
- ☑ Use equipment that fits you properly.
- ☑ Keep your equipment clean.
- ☑ Decontaminate your equipment when necessary.
- ☑ Follow guidelines for removing contaminated PPE.
- ☑ Check your gear for leaks, tears, cracks and other signs of wear before use.
- ☑ If your equipment is defective, repair or replace it before use.
- ☑ Report any health problems while using your protective equipment.
- ☑ Never wear street-wear eyeglasses in place of certified ANSI Z87 safety glasses.
- ☑ Never store your hard hat in a car, window or other hot place. The sun and heat can reduce its effectiveness.

- ☑ Avoid wearing jewelry or long, full or loose clothing with flaps that can catch in machinery.
- ☑ Avoid wearing fuzzy or flammable synthetic clothing around flames or sparks.
- ☑ Avoid wearing slick-soled shoes, loose or frayed shoelaces or long hems that can make you slip or trip.
- ☑ Wear clean clothing. Oily and greasy clothes catch fire more easily and dust and grease can irritate your skin.
- ☑ Dress for the weather. Wear wool, tightly woven, insulated or layered waterproof clothing for cold and wet weather. In hot weather, wear sunscreen, a hat and lightweight, breathable cotton clothing that protects your skin from sunlight.

PPE for Chemical Exposure

Personal protective equipment (PPE) for chemical work is identified with four levels of workplace hazards. Your supervisor or safety representative can help you choose the right protective clothing for the job.

PPE for Level A completely shields your skin, eyes and respiratory system from contact with anything in the environment.

LEVEL A—EXTREME HAZARD

PPE for this highest level of respiratory hazard protects you from high concentrations of extremely hazardous substances. PPE for Level A completely shields your skin, eyes and respiratory system from contact with anything in the environment. The following elements are mandatory at Level A:

- ► pressure-demand, self-contained breathing apparatus
- ► fully enclosed, chemical-resistant suit that prevents the environment from coming into contact with your skin
- ► built-in inner and outer chemical-resistant gloves and boots

You would wear this type of protective equipment when entering an uncontrolled hazardous waste site, a site where toxic chemicals are burning or where hazardous substances are suspected. You may also wear a hard hat inside the suit. Level A protective clothing requires special training and an assistant to help you put it on correctly.

LEVEL B—BREATHING HAZARD

Environments at this level contain known hazards that are unsafe to breathe, as in Level A, but are less toxic to the skin. Thus, you're not required to wear a fully enclosed suit. PPE for Level B includes:

- ► pressure-demand, self-contained breathing apparatus
- ► chemical-resistant clothing, such as coveralls, hooded chemical splash suit or disposable chemical-resistant coveralls
- ► inner and outer chemical-resistant gloves and boots

Use Level B for entering areas where the chemical hazard is known or where the environment is oxygen deficient.

LEVEL C—BREATHING HAZARD REDUCED

Level C requires the same clothing protection as Level B—chemical-resistant clothing, gloves and boots—but offers a lower level of respiratory protection. You'll be equipped with a full-face air-purifying respirator or a half-face respirator with splash goggles. Operations such as spray painting, pesticide spraying or work with toxic fumes, dusts and gases require Level C protection.

LEVEL D

No respiratory hazard exists at Level D. Level D protects from a variety of physical hazards. PPE depends on the job you do and the workplace and may include coveralls, chemical-resistant boots and gloves, safety glasses or splash goggles, disposable outer boots, face shield, hard hat, hearing protection or a five-minute escape bottle for unexpected respiratory hazards.

Save Your Sight

Eye protection is the most important protective gear you can wear. If you're not wearing safety glasses or goggles on the job, you're risking permanent eye damage and blindness. Think about all the work activities you may do each day that can cause eye injury: grinding, sanding, brushing, sawing, drilling, buffing, hammering, cutting, welding and working with chemicals. A speck of dust flying from a power sander, traveling at the speed of a bullet, can severely and permanently injure your eye.

SAFETY GLASSES

If your job involves hazards from dust, flying objects or particles that may strike you from the front, you should be using safety glasses. They may look similar to normal street-wear glasses, but they're made of much stronger lenses. The lenses of safety glasses are specifically designed to be impact resistant, and the frames are built to keep the lenses from being pushed into your eyes. You can't get this kind of protection from regular prescription glasses.

Types of Safety Glasses

- ► All safety glasses must meet the American National Standards Institute (ANSI) standards for strength and heat resistance. Look for the "ANSI Z87" imprint on the frames of your safety glasses.
- ► Some safety glasses have side shields to provide protection for the sides of your eyes.
- ► Eye-cup side shields curve around your eye area providing protection for the front, side, top and bottom of your eyes.
- ► For high-impact protection, choose lenses of plastic or polycarbonate, the most impact-resistant material used.
- ► Glass lenses are more resistant to scratches from dust and grit better than other lenses.

SAFETY GOGGLES

Safety goggles offer effective protection from impact, flying particles coming from many different directions, fumes, vapors, dust and chemical splashes. For this reason, safety goggles should be worn when grinding, chipping, riveting and working with wood, chemicals and fumes.

Safety goggles are surrounded by a shield that fits snugly on your face all the way around your eyes. Because of their snug fit, the shields of standard safety goggles have ventilation holes to keep them from fogging up. Some goggles have hooded or indirect ventilation openings to keep out thick hazardous dust, chemical splashes or molten materials. There are many special types of safety goggles designed for specific jobs. Ask your supervisor which type of goggles your job requires.

Types of Safety Goggles

- ► wire-screen goggles with wire-mesh lenses instead of glass or plastic
- ► respirator goggles with a high nose bridge so they can fit with a half-mask respirator
- ► rubber-frame goggles to protect from fast-moving, fine dust
- ► visor goggles to shade from overhead lights and protect from falling particles
- ► splash goggles with no ventilation, to protect against chemical splashes and hazardous mists and dusts
- ► tinted goggles to reduce glare from bright lights or molten materials

CARE AND USE OF YOUR SAFETY EYEWEAR

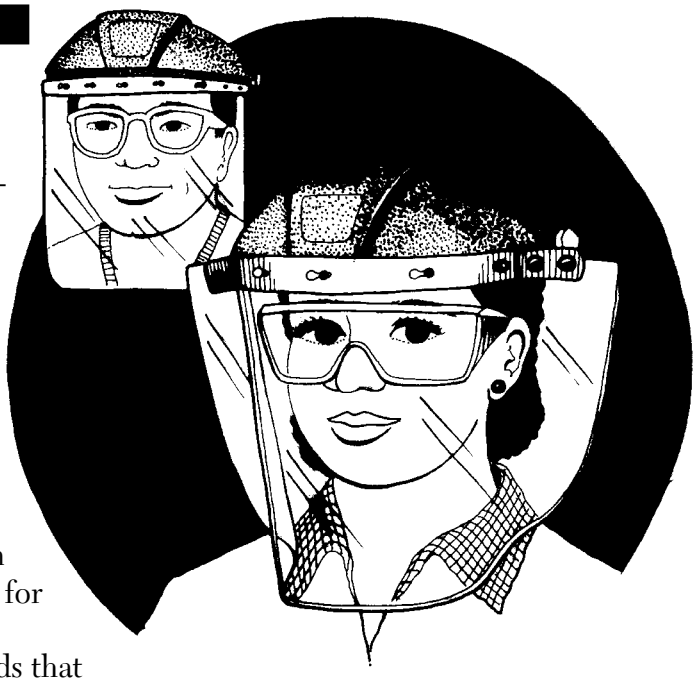
- ► Use the right eyewear for your job.
- ► If you find your eye protection uncomfortable, try a different size or style.
- ► Remember to regularly inspect your eye protection equipment for wear and damage, such as scratches and cracks.
- ► Never wear worn, damaged or otherwise defective equipment.
- ► Keep your equipment clean according to the manufacturer's instructions and store it in a clean, dry place.
- ► You may need to wear a headband or strap with safety glasses to keep them from falling off.
- ► If you wear prescription glasses, use special goggles to fit over them, or get safety glasses with your prescription.
- ► Make sure your goggles fit snugly but comfortably around the bridge of your nose, cheeks, temples and forehead.
- ► If you wear contact lenses, let your supervisor know. Your company may have a special policy.
- ► Make sure eye protection equipment conforms to the American National Standards Institute (ANSI) standards.

Protect Your Face

FACE SHIELDS

For full-face protection, face shields are the best choice. They protect your face from splashes, heat, flying particles and other hazards, while allowing for plenty of ventilation. Face shields are especially recommended for welding, riveting and activities that involve extreme heat. It's important to remember that face shields don't protect your eyes—they must be used in combination with safety glasses or goggles.

TYPES OF FACE SHIELDS



- Most face shields are constructed of high-strength, flexible plastic, such as acetate.
- Face shields designed for use in a high-impact environment may be made of polycarbonate, the material used in many safety glasses.
- Wire-screen face shields are used in extremely humid environments.
- Face shields may be equipped with a crown to protect against falling particles or sparks, or a chin scoop to guard against chemical splashes.
- Some shields are tinted to protect from glare, while others feature glass inserts for the best visibility.
- There are specially designed face shields that can be fitted to hard hats.
- The welding helmet, a complete face-and-head covering that protects the wearer from sparks, intense light and splashes of molten metal, is a variation on the face shield.

CARE AND FIT

- Choose a face shield with adjustable straps that fits snugly, but not uncomfortably, around your head, without sliding forward or to the side.
- A strap across the top of your head provides support.
- Your face shield should not be uncomfortable.
- The shield should cover your face from your forehead to the base of your neck, without obstructing your vision.
- Face shields can be worn over as a hard hat attachment, or directly on your head if hard hat protection is not required.
- Because face shields scratch easily, store your shield in a protected area.
- Replace a scratched face shield before it causes a vision-related accident.

Keep Your Head

Each year there are thousands of head injuries in the construction industry. Injuries range from minor concussions to death. Head injuries are caused by falling, flying, swinging or dangling objects, by bumping your head against a fixed object and by electrical shocks and burns. Hard hats are specifically designed to resist penetration and absorb the shock of a blow.

ANATOMY OF A HARD HAT

- Hard hats are made of semirigid materials such as fiberglass, thermoplastics and aluminum.
- Inside the hat are straps that pass over your head and connect to an adjustable headband. These straps hold the shell of the hat away from your head. There should be an inch and a quarter between you and the shell.
- The outer shell and the unique inner suspension system of a hard hat protect you from injury by absorbing and distributing impact over a wide area of your head.
- Full-brimmed hats (such as those worn by firefighters) have a brim that extends all the way around the hat to protect your neck, shoulders and the back and sides of your head.
- Visored hats have a brim in front, an advantage in tight spaces.
- Chin and nape straps keep the hat from being bumped or blown off.

Types of Hard Hats

CLASS A—is used for protection against impact and penetration hazards and low-voltage shock, and are typically used during building construction, tunneling, lumbering and mining activities.

CLASS B—protects against high-voltage shock and burns as well as impact and penetration hazards and are used during electrical work.

CLASS C—offers lightweight protection against impact and penetration hazards when there's no danger from electrical hazards.

TIPS TO REMEMBER

- Always wear your hard hat with the bill in the front.
- Be sure to select the proper type of hard hat for your job.
- Make sure your hard hat is marked with the American National Standards Institute label (ANSI Z89.1) next to the manufacturer's name, and a Class A, B or C marking.
- Never use the space between the suspension straps and the hard hat as a storage area.
- Avoid wearing headgear under your hard hat, except for cold-weather liners specially designed for such use.
- Never borrow a hard hat or loan yours.
- Adjust your hard-hat straps to fit you snugly. Your hard hat should not tilt or slide around.
- Check your hard hat daily for signs of damage such as dents, cracks or penetration.
- Never use your hard hat if you find any signs of damage.
- Replace any worn or frayed webbing.
- Never drill holes in your hard hat for ventilation or any other reason.
- Avoid dropping your hard hat, and replace it if it is ever dropped or hit.
- Never store your hard hat in your car window or other hot place—sunlight and heat reduce the hat's protective ability.
- Follow the manufacturer's instructions for cleaning and periodic inspection of your hard hat.
- Never paint your hard hat—certain paints and thinners can damage and weaken it.
- Never put decals or stickers on your hard hat. They can hide damage.
- Replace your glossy fiberglass or thermoplastic material hard hat if it becomes dull.

Protect Your Lungs

Respirators can prevent fibers, mists, fumes, dusts, powders, gases, vapors and other contaminants from getting to your lungs. You might notice the effects of contaminants right away, but there are also dangerous long-term effects of buildup over time. Using the right respirator in the right situation is your key to good health.

Air-Purifying Respirators (APR)

This broad class of respirators includes any device that filters or purifies the air. They come in half-masks, which cover your nose and mouth, or full-face masks, which also cover your eyes.

PARTICLE-FILTERING—This type of APR contains a filter designed to screen out contaminants such as dust, fumes, mists, fibers and powders. The respirator may be a simple, loose-fitting disposable mask or a rubber mask fitted with disposable or cleanable filters. These masks don't protect against gases or oxygen deficiency.

VAPOR- AND GAS-REMOVING—This type of APR is fitted with a cartridge or canister containing chemicals designed to absorb or chemically reduce dangerous gases and vapors. A valve allows air you exhale to escape and then closes so contaminated air can't enter. The particular cartridge or canister you use must be specific for the type of gas or vapor in your work area—the wrong one will not protect you.

Supplied-Air Respirators (SAR)

If the atmosphere in your work area has such a high level of contaminants that there's not enough oxygen in the air, you must use this type of respirator. Supplied-air respirators, also called air-line respirators, connect you by an air hose to an outside source

of clean air supplied by a compressor or compressed-air cylinder. This type of respirator is also used when contaminants can't be filtered or absorbed by APRs. Other situations requiring SARs are environments that are dangerously hot or cold or so toxic that they've been identified as "immediately dangerous to life and health." Under these conditions, you must use a respirator with positive air pressure so there's no chance of contaminants being drawn into the mask when you inhale.

Self-Contained Breathing Apparatus (SCBA)

With a self-contained breathing apparatus you carry a supply of air in a portable tank on your back. This type of protection is used when you need great mobility, when falling objects or machinery can damage an air hose or when the job to be done takes 30 minutes or less. SCBAs are also used to explore an environment where the air quality is unknown.

POINTS TO REMEMBER

- ► Use the appropriate respiratory equipment for the job.
- ► Use the proper filters, cartridges or canisters for the respirator and contaminants.
- ► If you wear glasses with a full-face mask respirator, you may need a specially modified model.
- ► Contact lenses should not be worn with a respirator because pressure changes can pull them off your eyes.
- ► If you experience difficulty breathing, fatigue, irritation in your eyes or respiratory system, dizziness, illness or an unusual odor or taste when using your respirator, leave your work area immediately and report to your supervisor. These could be signs that your respirator is not working properly.

Respirator Fit and Maintenance

Your respiratory safety on the job depends on you wearing a properly functioning and fitting respirator. Tell your supervisor if your respirator interferes with your ability to see, hear or be heard properly, if it restricts movement so that you are unable to do your job safely, or if it has any damaged or worn parts.

Checking the Fit

- Whether you use a full-face respirator or one that covers only your nose and mouth, choose a respirator that's the right size for you and feels comfortable.
- Don't try to make a respirator more comfortable or better-fitting by altering it in any way or repairing it with parts from another respirator.
- Follow instructions for fitting the respirator, adjusting the straps if necessary.
- When a respirator fits properly, the soft, pliable edges of the mask will mold to form a seal to your face, preventing contaminated air from entering.
- Adjust disposable fiber masks by pinching the metal nose strip to fit around your nose.
- Make sure no hair sticks out from the edges of your face mask. Beards, mustaches and long sideburns can interfere with the seal.

Testing the Seal

Perform these tests each time you use your respirator. Enter your work area only if your respirator passes the tests. Some employers provide a test atmosphere of banana oil or irritating smoke that you'll detect if your mask is leaking.

Positive Pressure Test

Cover the exhalation valve so that air can't escape, then exhale gently. The mask will bulge and you should feel increased air pressure until you inhale or uncover the valve. This means that no air is escaping the mask.

Negative Pressure Test

Cover the air intake ports of the respirator with your palms and inhale. Not only should it be difficult to inhale, but the soft parts of the respirator should collapse inward toward your face and remain that way as long as you're inhaling. This means that no air is getting into the mask from the edges. If you feel air coming in, and the mask regains its shape, there's a leak that must be corrected before you use the respirator.

RESPIRATOR MAINTENANCE

- Test your respirator's fit regularly.
- Check filters, cartridges or canisters before each use.
- Regularly check for cracks, dents, holes, hardening and broken or worn straps or buckles.
- Replace elastic straps that have lost their stretch.
- Replace your respirator if the material around the edges has become hard and brittle.
- Replace cartridges or canisters, valves and hoses according to the manufacturer's guidelines.
- Avoid changing parts from one model to another.
- Use only approved parts.
- Make sure cartridges are threaded correctly into place.
- Do pressure tests after replacing cartridges or filters.
- Keep valves clean and functioning properly.
- Replace dry or cracked valves.
- Clean your respirator after each use.
- Wash in mild, soapy water and scrub with a soft brush.
- If sanitizing, leave your respirator in the solution for at least two minutes and rinse thoroughly.
- Never use solvents or harsh cleaning agents on rubber or plastic parts.
- Replace your disposable respirator when it becomes clogged or breathing becomes difficult.
- Store your respirator in a plastic bag away from sunlight and chemicals.
- Avoid placing objects on top of your respirator.

Protect Your Hearing

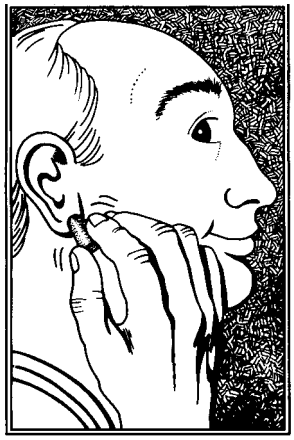
If you're one of the 20 million people exposed to hazardous noise on the job, you'll want to protect yourself from hearing damage. Loud noise over a period of time causes nerve cells in your ears to die, permanently damaging your hearing. This usually happens so gradually that you're not aware of the loss until it's too late. It sometimes takes many years.

You can help protect your hearing by having your hearing tested; giving your ears a rest by getting away from noise whenever you can; and wearing earplugs or earmuffs for protection. They come in a variety of styles and levels of protection.

Types of Earplugs

- Formable earplugs—come in two varieties, the disposable kind made of waxed cotton or acoustical fibers that can be molded to your ears, and the semidisposable type made of molded foam, which can be used for up to a week.
- Premolded earplugs—are made of soft silicone rubber or plastic and are reusable.
- Custom-molded earplugs—are molded to fit the individual by inserting silicone rubber or plastic molding compound into each ear and allowing it to set. The compound may then be used as earplugs or as molds for earplugs.

Using Earplugs

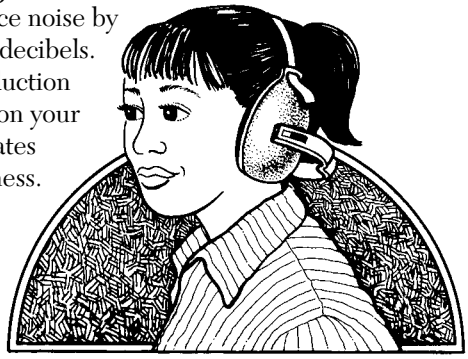


- Earplugs screen out harmful noise while allowing you to hear your coworkers.
- Earplugs can reduce noise levels by up to 30 decibels.
- Check the Noise Reduction Rating (NRR) on your earplugs' package. The higher the number, the better the protection.
- Earplugs are lightweight, inexpensive and low-maintenance.
- Earplugs are the protectors of choice for work in hot, enclosed environments or in situations where you keep hearing protectors on all day.
- They're easily worn with eyeglasses and hard hats and other head protection.
- Follow the manufacturer's instructions exactly when inserting earplugs.
- To work properly, earplugs must completely fill your ear canal.
- Make sure your hands are clean when inserting earplugs. Dirt and oils could cause an ear infection.
- Keep reusable earplugs clean by washing them after each use in warm, soapy water to avoid an ear infection.

Types of Earmuffs

- Earmuffs consist of cushioned cups made of molded plastic filled with foam, liquid or air that are attached to a band that can be worn over your head, behind your neck or under your chin.
- Cap-mounted earmuffs can be attached to hard hats.
- Dielectric earmuffs have no metal parts, for workers exposed to high voltage.
- Electronic earmuffs reduce hazardous noises while magnifying sounds you need to hear.

Using Earmuffs



- Earmuffs reduce noise by about 20 to 30 decibels.
- The Noise Reduction Rating (NRR) on your earmuffs indicates their effectiveness.
- Inspect the condition of your earmuffs before each use.
- Your earmuffs should fit comfortably, without the headband being too tight or too slack.
- Earmuff cups should adjust up and down and in and out for a good fit.
- To work correctly, earmuffs must form a seal around your ears, completely enclosing them, without pinching your earlobes.
- No hair or clothing should stick out from under the cups.
- Earmuffs are easy to put on and take off.
- Earmuffs are bulky and may not fit well with other protective equipment.
- You can use earplugs with earmuffs for added protection.
- If you wear safety or other eyeglasses, they may need to be modified to fit with earmuffs.
- Follow the manufacturer's instructions for proper cleaning and storage.
- Be sure to replace hardened, cracked or worn earmuff cushions.

Keep Your Hands Safe

Hands are the most used and most versatile tool in the workplace, and are also the most frequently injured body part on the job. Think of all the ways you use your hands and how valuable they are to you. Many sudden and devastating injuries could be prevented by wearing the proper hand protection for your job.

Gloves

Gloves are perhaps the most commonly used type of hand protection. They protect your entire hand and sometimes your wrists and forearms. Be sure to use the gloves that are right for your job. Gloves made of the wrong material could injure you or even dissolve when they come in contact with certain substances.

- ► Fabric gloves are used for mild heat and cold.
- ► Wear rubber gloves with insulated liners for electrical work.
- ► Gloves for working around electrical hazards are color-coded for their resistance to different types of voltage.
- ► Gloves for chemicals or corrosives are made of rubber, neoprene or vinyl.
- ► Use leather gloves for work with sparks, rough and abrasive materials, scraping and extreme heat.
- ► Wear metal mesh or Kevlar gloves when working with saws and sharp edges.
- ► Wear flame-retardant gloves around open flames.
- ► Use reflective gloves, such as aluminized gloves, for intense, radiant heat.
- ► Only wear gloves that fit your hands. Gloves that are too small can pinch and tire your hands, and gloves that are too large are clumsy to work with.
- ► Avoid wearing gloves around moving equipment or machinery parts.

Chemical Gloves

- ► Inspect them carefully before each use.
- ► Avoid using them if they're torn, cracked or swollen from exposure to solvents.
- ► Rinse them before taking them off.
- ► Clean them before putting them away, so chemical residue doesn't build up on them.
- ► Store them away from light, with the cuff unfolded to allow vapors to escape more easily.
- ► Wash your hands thoroughly after wear.

Other Hand Protection

- ✓ **hand pads**
- ✓ **mitts**
- ✓ **finger guards**
- ✓ **forearm protectors**
- ✓ **barrier creams**
- ✓ **anti-vibration gloves**

TAKE CARE OF YOUR HANDS

- ► Avoid injuries by being alert to potential hand hazards before accidents happen.
- ► Use the correct personal protective equipment for the job.
- ► Check all of the safety guards on your equipment.
- ► Always use push sticks and shields when you're supposed to.
- ► Use brushes, not your hands, to wipe away debris.
- ► Never use your hands to do a task that was meant to be done with a tool.
- ► Use lockout/tagout procedures before cleaning or repairing any machinery and keep your equipment in good working order.
- ► Store heavy materials properly so they can't fall on your hands.
- ► Avoid wearing jewelry and loose sleeves.
- ► Use tools and positions that keep your wrists straight.
- ► Rest your hands every 15 minutes, shaking them out and stretching your fingers.
- ► Alternate tasks, if possible, to avoid repetitive stress injuries.
- ► Avoid exposure to chemicals and extreme heat and cold which can damage your skin.
- ► Keep a first aid kit available to treat cuts, scratches and bruises.

Protect Your Feet

Your feet are particularly vulnerable to injury on the job. Mechanical hazards, falling objects, compression from rolling objects and punctures are the top causes of foot injury. Other foot hazards include: slipping, exposure to chemicals, extreme cold and heat, electrical shock and wetness.

Mechanical Hazards

Standard safety shoes come in a variety of types, styles, materials and weights. They're comfortable and many look like street shoes. They have steel, reinforced plastic or hard rubber toes. Typically, they'll have steel toe caps to guard against injuries from falling objects and compression, and instep protection of aluminum, steel, fiber or plastic to protect the top of your foot. Steel insoles or reinforced metal soles protect from puncture.

Electrical Hazards

Conductive shoes permit the static electricity that builds up in your body to drain off harmlessly into the ground. For high-voltage hazards, use conductive shoes: insulated shoes with a connector from calf to heel to pass electricity to the floor or ground. Wear safety shoes with leather, cork or other conductive soles and no exposed metal. For protection against live electrical current, shoes must have rubber soles. Electrical hazard shoes must be kept dry.

Chemical Hazards

Many chemicals and solvents can burn or eat away ordinary shoe materials. For protection from these hazards, wear rubber, neoprene or plastic footwear depending on your company's policy and the type of chemical you're exposed to. Rubber or plastic safety boots can protect your feet against oil, water, acids, corrosives and other industrial chemicals. They're available with steel toe caps, puncture-resistant insoles and metatarsal guards.

Extreme Heat or Cold

In extreme cold, wear shoes with moisture-proof insulation and insulated socks. Wool socks provide greater warmth than cotton in cold weather. Icy surfaces may require strap-on cleats. Wooden-soled shoes or slip-on sandals protect against heat; surfaces too hot for wood soles require aluminized heat-protective shoes or boots. When working around molten metal and sparks, use foundry boots with elastic gores for quick removal in case hot metal or sparks get inside.

Wetness

To protect against slipping on wet or oily surfaces, wear shoes with wooden soles or cleated, nonslip rubber or neoprene soles. Hip boots, also called waders, are ideal for working in water over a foot deep.

Concrete Work

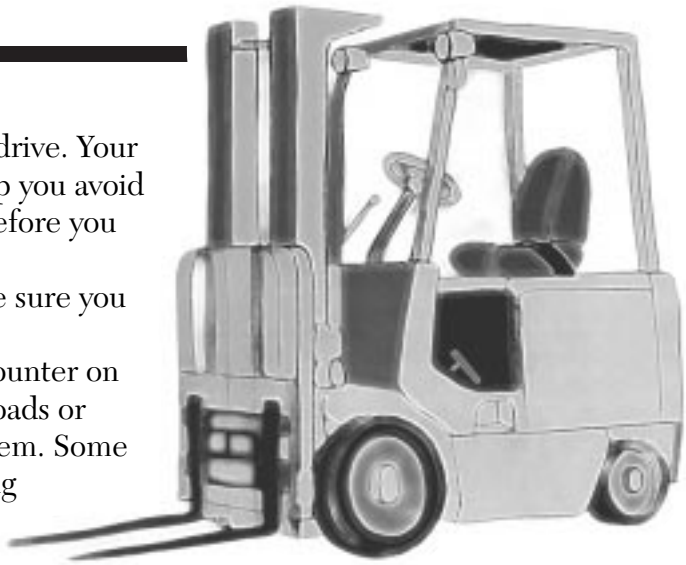
For concrete work, special protective shoe coverings are necessary. You must use overshoes that won't be pulled off by the concrete. Overshoes with buckles will keep the shoes from falling off. Always wear overshoes or boots that are higher than the depth of the concrete to prevent cement from seeping into the shoes and causing cement infection.

YOU AND YOUR SHOES

- ► Be sure your safety shoes are approved by the American National Standards Institute (ANSI). The rating should be stamped inside your shoes.
- ► Wear appropriate footwear for the job.
- ► Wear the right size shoe. Tight shoes result in cold feet and pinched toes. Loose shoes can make you stumble or turn an ankle.
- ► Choose shoes you can wear comfortably for hours.
- ► Keep your shoes clean and dry.
- ► Inspect your shoes regularly for cuts, cracks and embedded metal.
- ► Replace your shoes when they get worn out.
- ► Be on the lookout for hazardous conditions and equipment.

Know the Rules of Forklift Safety

Forklifts are powerful machines, and while they don't go as fast as cars or trucks, they require even more attention to safety. Forklifts are taller and narrower than cars and can tip over more easily. Most forklift accidents result from operator error, so even the most experienced forklift drivers need to review and follow the basic rules of forklift safety.



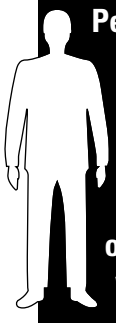
Before You Drive

- Check safety devices each day before you drive. Your horn, lights, brakes and back-up alarm help you avoid accidents and must be working properly before you start the engine.
- Check all the fluid and gas levels and make sure you have enough before you start your job.
- Look around for any hazards you may encounter on your route, such as pedestrians, unstable loads or obstacles, and figure out how to correct them. Some hazards are hard to spot once you're driving the forklift.
- Develop a checklist to track the condition of your forklift.

Driving Basics

- Avoid sharp turns and fast speeds. Forklifts aren't built to handle them. A sharp, fast turn can shift your load and cause you to tip over.
- Never engage in horseplay or stunt driving maneuvers when driving a forklift.
- When you move a high load, drive backward and look in the direction of travel.
- Drive backward down slopes with more than a 10 percent incline.
- Keep loads low whenever possible. Too-tall or top-heavy loads can obstruct your vision or cause you to tip over.
- If you have to park on a slope, always block your wheels, lower your forks and set the parking brake.
- Never lift people on the forklift unless it has an approved personnel-lifting platform.
- Never move forward or backward with people on the lift.
- Keep loads within your forklift's rated capacity.
- Raise or lower loads only when stopped.
- Start and stop the forklift gradually to avoid shifting the load.
- Use your horn and lights at corners, crossings and before reversing.
- Back out slowly after unloading, looking over your shoulder to make sure it's clear.
- Always wear your safety belt if the forklift is equipped with one.

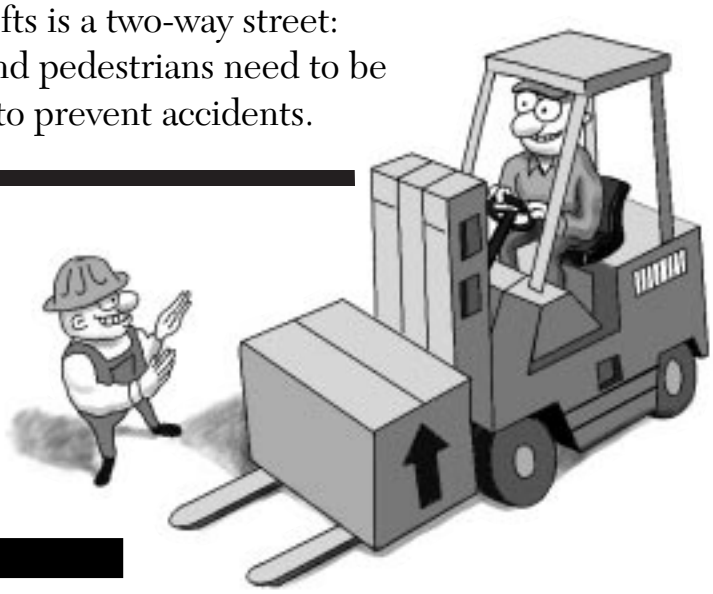
WATCH FOR PEDESTRIANS



Pedestrians are involved in the majority of forklift accidents. Prevent these accidents by always keeping others' safety in mind when you drive. Don't assume pedestrians can hear you coming.

Preventing Forklift Accidents

Working safely with and around forklifts is a two-way street: Operators need to take precautions and pedestrians need to be alert and stay out of the way in order to prevent accidents.



Forklift Dangers

- ✓ **injuries to pedestrians**
- ✓ **collisions**
- ✓ **falling loads**
- ✓ **tipping over**

SAFETY RULES FOR OPERATORS

- Get training on how to operate the forklift.
- Always wear your safety belt and hard hat.
- Keep your hands and feet inside the cab.
- Always check for pedestrians.
- Inspect the forklift daily and report any problems.
- Make sure pallets are well-stacked and secured.
- Keep loads centered to avoid losing balance.
- Keep loads low to the ground when moving—no more than 10 inches high.
- Make extra trips instead of overloading.
- Know your forklift's capacity and stay within the load limit.
- Use a forklift only for its intended purpose—it's not a means of transportation.
- Make sure the forklift you're unloading has been secured to prevent its movement during unloading.
- Make sure loads don't obstruct your view.
- Use extreme caution when turning.
- Move slowly when on wet surfaces.
- Keep your forklift in good working order.
- Always park on a flat surface away from traffic and set the parking brake.
- Never give people a ride on the forklift.
- Sound your horn at intersections.
- Always lower forks to the ground when parking.

SAFETY RULES FOR PEDESTRIANS

- Work in designated areas only.
- Avoid shortcuts through traffic areas.
- Never walk under the raised load of a forklift.
- Stop and look both ways at intersections.
- Stay clear when a forklift is backing up or turning.
- Watch that you don't trip on the lowered forks of a stopped forklift.
- Pay attention to what's going on around you at all times.
- Listen for horns and look for flashing lights.
- Let the forklift operator know when and where you're working in an area.
- Never hitch a ride on a forklift.
- Never engage in horseplay around a forklift.

Loading and Unloading Forklifts Safely

Forklifts make loading and unloading materials faster and easier, but they can be dangerous if not operated properly. Because so many steps are involved, loading and unloading forklifts have special risks. Follow these basic rules to stay safe.

Loading Forklifts

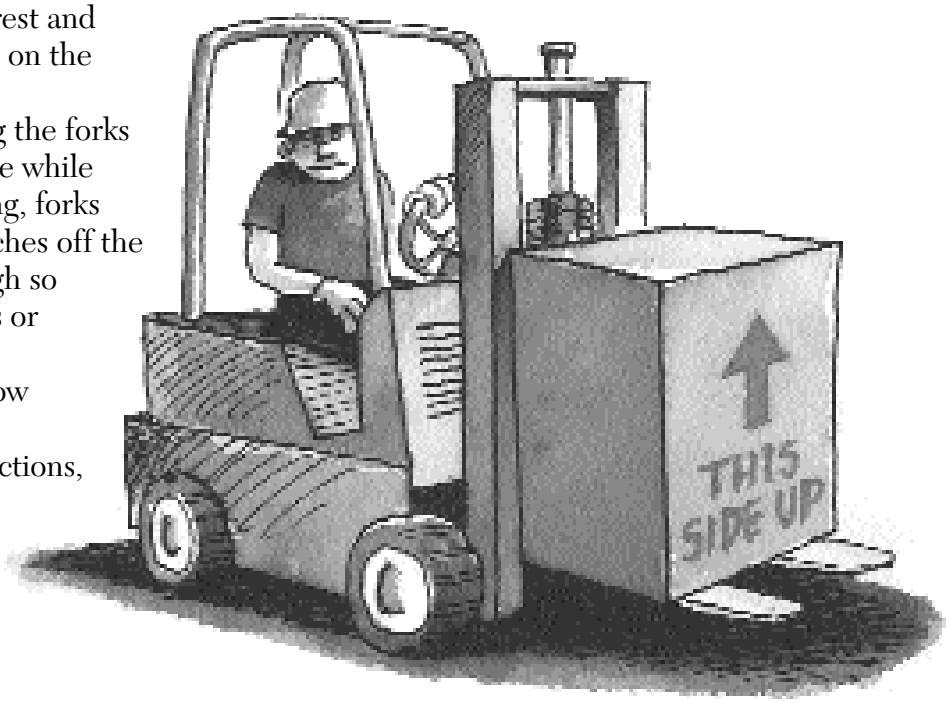
- Plan your load. Think in advance about how to make each load stable and centered.
- If the load consists of loose items, stack and secure them carefully.
- Before driving into a truck or trailer, make sure it has been secured, either with chocks under the rear wheels or with another type of restraint system. Trailer movement is the leading cause of loading accidents.
- Always inspect the floor of a trailer or truck floor for weak spots before driving your forklift into it.
- Never cut corners by overloading. Overloads remove weight from the rear wheels, causing steering loss. Keep loads well within your forklift's rated capacity.
- Never stack a load higher than the height of the forklift's backrest and never carry anything on the overhead guard.
- Raising and lowering the forks should never be done while driving. When driving, forks should be 6 to 10 inches off the ground—high enough so they don't hit bumps or curbs.
- Plan your route. Know where to expect obstructions, intersections, pedestrians and ramps.

Unloading Forklifts

- Always take the time to position the load accurately.
- Finish lowering the forks before you back out of a vehicle or trailer.
- Always back out slowly and carefully, looking over your shoulder, after unloading.
- Never place a load in an aisle or fire access or in front of a stairway or fire equipment.

Forklifts and Pedestrians

- Keep pedestrians a safe distance away from your vehicle while loading and unloading.
- Only lift coworkers if you have special people-lifting equipment, and be alert for overhead obstructions.
- Never travel with anyone riding on the forklift.

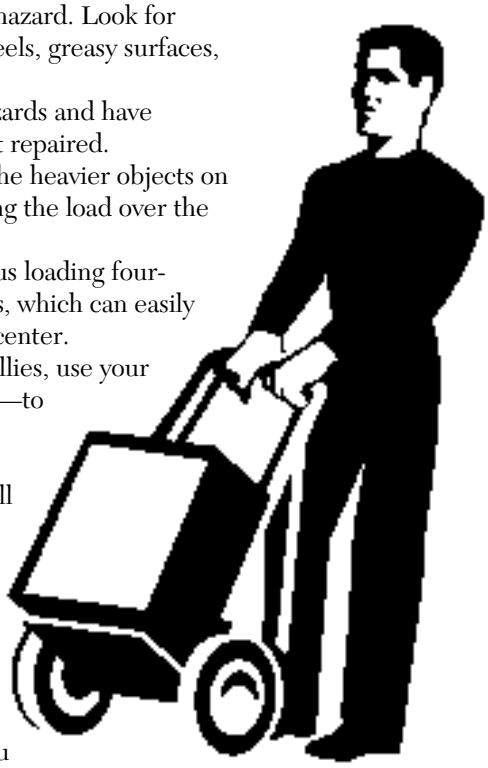


How to Use Dollies and Hand Trucks Safely

Dollies and hand trucks make lifting and moving loads easier. But inattention and carelessness can lead to accidents, such as collisions with people, objects or other trucks, or injuries to the operator. If you use dollies and hand trucks correctly, take your time and stay alert, you can lift and move more safely.

Dollies and Hand Trucks

- Before loading a dolly or hand truck, check for any defects that could affect its operation or pose a hazard. Look for loose parts, torn wheels, greasy surfaces, etc.
- Report potential hazards and have defective equipment repaired.
- When loading, put the heavier objects on the bottom, balancing the load over the axles.
- Be especially cautious loading four-wheeled hand trucks, which can easily tip if the load is off-center.
- For two-wheeled dollies, use your legs—not your back—to shift the load into a travel position.
- Push loads; don't pull them.
- When pushing a dolly or hand truck, keep your knees bent and your back straight.
- Avoid walking backward, unless you need to maneuver in a tight space.
- When loading, make sure nothing hangs over the edges.
- When moving a dolly through a doorway, stop, turn the dolly and pull it through the doorway.
- To avoid getting pinned against something in a tight space, position the dolly or hand truck ahead of you.



Powered Hand Trucks

- Before using a powered truck for the first time, get special training.
- Before moving your first load, know how to start and stop the truck smoothly.
- Never operate a truck when your hands are wet or greasy.
- Keep one hand on the handle and lead the truck from the side; never walk in front of it.
- Before using your truck each day, inspect it and have any problems serviced.
- Make sure your loads are low enough to see over.
- When moving pallets or skids, move only those that have been loaded safely.
- Never operate a motorized hand truck faster than a normal walking speed.
- Always face your direction of travel when moving a load.
- To travel close to a wall, in a tight space or down a hill, operate the truck in reverse and walk behind it.
- Stay away from areas with flammable, combustible or toxic materials, unless the truck is especially identified for such use.
- Stop at corners and doorways, sound your horn and stay to the right in aisles.
- Always give pedestrians the right of way.
- Watch out for other vehicles and always be prepared to stop quickly.
- Never ride the truck or carry people on it.
- Keep your limbs and clothing away from moving parts.

Choose the Right Equipment for the Job

Your workplace may have a selection of dollies and hand trucks that differ in design, load capacity and other features. It's important to learn about their differences so you can choose the best equipment for each job.

Cornerstones of Crane Safety

Cranes can be dangerous pieces of equipment. When a crane boom fails, lives can be lost. The major causes of crane boom failure are overloading, improper loading and poor maintenance. Fortunately, most crane boom accidents can be avoided by following safety guidelines and proper operating procedures.

Safe Crane Operation

- Cranes may only be operated by qualified people.
- Designate one person to communicate with the operator using hand signals.
- Before you begin loading, always check load limits for the length, size and angle of the boom.
- Make sure you correctly calculate the weight of the load.
- Regularly inspect all cables and hooks for wear or damage. Faulty cables and hooks are the causes of most crane boom failures.
- Make sure cranes are positioned so that the boom or bucket won't swing over workers.
- Avoid raising the boom too high.
- Use good judgment when positioning and lowering the boom.
- Avoid the quick release of the load on a near-vertical boom.
- Make sure boom stops are in place to keep the crane from flipping backward.
- Take extra caution when executing side-pulls and when working on uneven surfaces.
- To prevent load swinging, center the top block over the load before beginning.
- Position the boom to avoid long side-pulls, and use tag lines or other controls to limit swinging when you move a load horizontally.
- Turn the crane slowly and smoothly to keep the boom from twisting.
- Use properly shored outriggers to keep the crane chassis from tilting. A tilted chassis can cause a side-bend in the boom.
- Make sure you have sufficient counterweight to prevent tipping the cab.
- Be sure you're thoroughly familiar with the operation of your crane.
- Know the length of the boom and the arc it makes when it's raised and lowered.
- Avoid taking chances because you "think" it's clear.
- Never use a boom that's been damaged and not properly repaired.
- Never attempt makeshift repairs on a crane boom.
- Inspect your crane daily. Check the brakes, clutch, boom splices and braces to make sure they're in good working order.

On the Ground

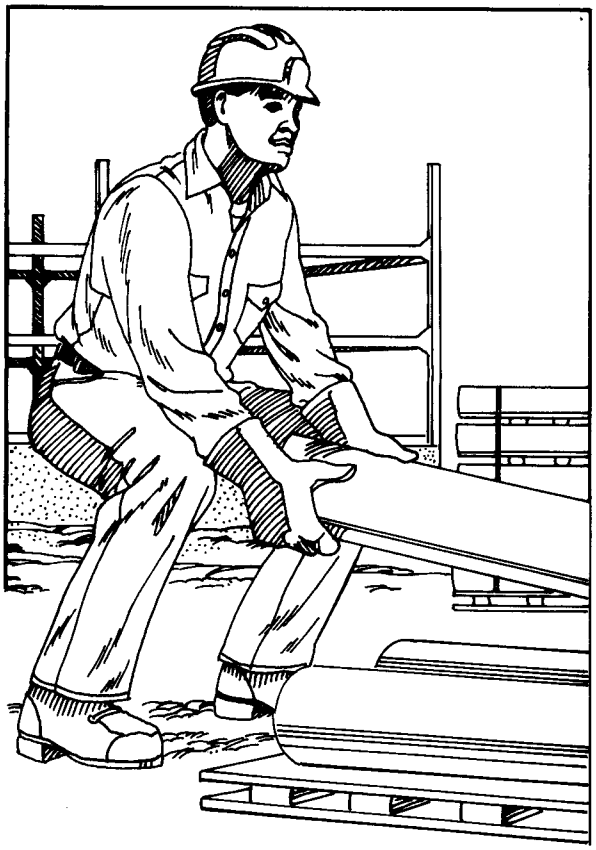
- If you're going to be anywhere near a crane, you must wear a hard hat.
- Stay out from under crane booms, buckets and suspended loads, whether you're working, standing around or walking by.
- Whenever you're around a crane be aware of falling objects.
- Never enter a roped-off or barricaded area below a crane.
- Position cranes when workers aren't in the area.
- The swing area should be roped off or barricaded and clearly marked with warning signs.
- A traffic controller should be posted on crowded sites.

Cranes and Power Lines

- Always be aware of overhead hazards such as power lines.
- If you must work near power lines, have the current shut off if possible.
- If the current must remain on, be sure you understand all procedures before you begin working and make sure you maintain the proper distance.
- Stay alert and constantly keep the power lines in mind.
- Make repeated visual checks of your position in relation to power lines.
- Make sure the signal man can clearly signal the operator if the boom is too close to a power line.

Working Safely With Pipe

Pipe can be awkward to handle. It's hard to balance and it has a tendency to roll when loose. Here are some tips to help you work safely with pipe:



Stay clear of moving or rolling pipe. It's tempting to jump over rolling pipe as it approaches you, but it's a dangerous game. You may slip or trip as you jump.

Like any other heavy load, lift pipe by bending your knees, not your back.

Watch out for moving pipe, both to the side and above you. From one end, pipe looks like a very small load. But pipe swings a wide and deadly arc. And if pipe slips in a sling, one end can suddenly drop and hit you.

When transporting pipe on two-wheeled trailers, place a wooden strip or piece of belting across the bolsters before loading the pipe. This makes it easier to tighten the ropes that keep the pipes from slipping.

When you're moving pipe in a sling, make sure it's balanced so it won't slip out when it's raised. Move only one loose section at a time. It's not safe to try to move pipe that's covered with frost, ice or snow in a sling. Use a caliper-type clamp for these situations.

Protect your fingers by keeping your hands on the outside of the pipe when you're guiding it. If your fingers are over the end of the pipe, the sharp edges can cut your fingers, or if the end of the pipe hits something, your fingers could break.

Wear gloves when carrying or working with pipe.

If two of you are carrying a length of pipe on your shoulders, keep each other informed of what you're going to do next. You can injure your partner by dropping your end of the pipe unexpectedly or by not lifting at the same time as your partner.

Store pipe with timbers or beams between each layer and securely tie them down.

When moving pipe, watch your swing, be aware of others around you, and be careful not to strike people or equipment with your load.

Using Wheelbarrows Safely

Wheelbarrows don't have any motorized parts or sharp edges and are simple to use. But wheelbarrows have caused some serious injuries. Anytime you balance a heavy load on a single wheel, you have to pay attention to what you're doing.

Because there's no top to a wheelbarrow, some workers may think they can keep loading it as long as the material doesn't fall out. But overloading a wheelbarrow is a sure way to lose control of it. Use the following tips to stay safe while using a wheelbarrow:

- Only put in a wheelbarrow the amount of weight you can physically handle on a hill or when turning a corner.
- Make several trips for large loads.
- When you raise and lower the handles of a wheelbarrow, treat them like any other heavy load you lift. Keep your back straight and bend your knees.
- Balance your load over the wheel for good control.
- Keep your speed under control.
- Keep a tight grip on the handles.
- If you lose control of a wheelbarrow, let go of the handles and shout a warning to others.
- Avoid trying to move such things as planks with a wheelbarrow. Use a hand truck for long or awkward loads.
- Keep wheelbarrows properly lubricated for easier use.
- Store wheelbarrows out of the way of aisles and stairways and away from emergency equipment.

Welding and Cutting Safety

Welding and cutting are extremely dangerous activities which require special training and much attention to safety. It's very important for you to know and understand the hazards and how to protect yourself and others from injury. Fires, toxic fumes and facial burns are the most common welding and cutting hazards.

FIRES

- Work far away from anything that can burn.
- Take plenty of time to clean up and prepare the area before you begin work.
- Clear away combustible materials within 30 feet of your welding or cutting job.
- Sweep the floor clean of dust and debris.
- Protect open doorways and windows with a fireproof curtain or screen.
- Cover wooden beams, partitions, floors and scaffolds with sheet metal.
- Before welding tanks or drums that may have held flammable liquids or gas, test them to make sure there aren't any dangerous fumes left inside.
- Wet down combustible floors, but remember, this can create a shock hazard if you're using electric welding equipment.
- Put containers of water or sand below dripping slag or where pieces of hot metal might fall.
- Keep water, sand or a fire extinguisher on hand to put out fires caused by sparks.
- In extremely hazardous situations, have someone stand by with a fire extinguisher while you work.
- Never weld where flammables have been used recently or where there's dust in the air.
- Use a combustible-gas indicator to check for flammable fumes or vapors.

FUMES

- Use a respirator.
- Never weld in a tank or small enclosed area without making sure you've got enough ventilation.
- Remove all paint and solvents before welding or torch cutting as required by OSHA, and make sure all residues are removed.
- Use the safest welding method for the job. Stick welding produces fewer fumes than flux core welding.
- Use welding rods that produce low fumes.
- In a confined space, follow all OSHA confined-space rules such as air monitoring, avoiding storing the torch in the space and providing adequate ventilation.
- Use local-exhaust ventilation to remove fumes and gases at their source in still air. Keep the exhaust hood 4 to 6 inches from the source of the fumes.
- Use air blowers to blow fumes away from you when you're outdoors and it's windy.
- Keep your face far from the welding flame.

FACIAL BURNS AND OTHER INJURIES

- OSHA requires gas welders to wear impact- and heat-resistant goggles.
- Arc welders must wear helmets and goggles that resist heat, fire, impact and electricity.
- Be sure to wear full-body protection such as heat-resistant gloves, sleeves, aprons and footwear.
- Always protect your face and eyes from sparks, slag and molten metal and from flash burns caused by radiation from welding equipment.
- Put screens around your work area to protect other workers in the area from potential flash burns to their eyes.

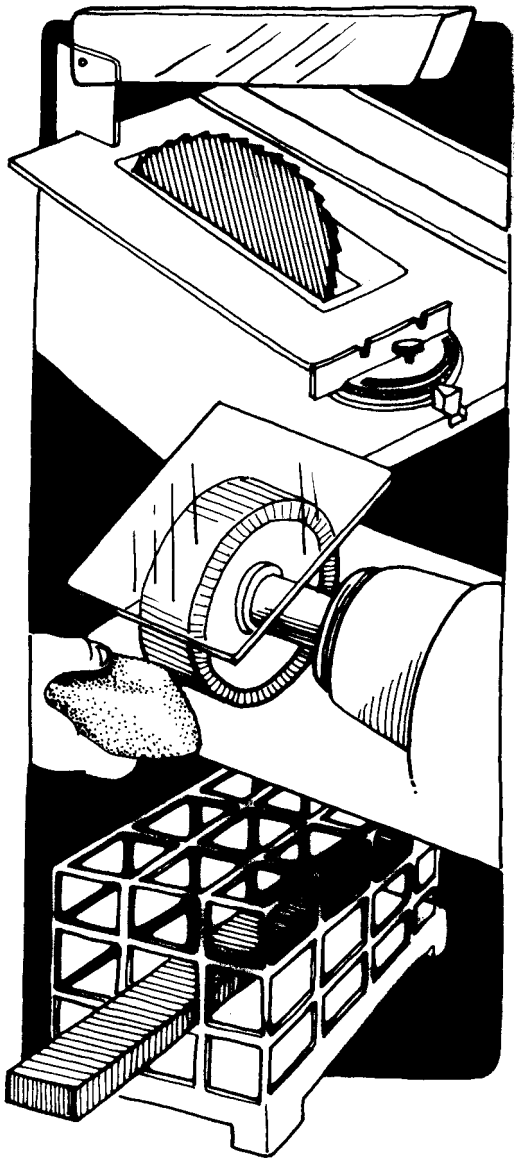
Using Machine Guards for Safety

Most of the machinery you work with is probably equipped with safety guards. Guards are designed to protect you from numerous dangers, from hot surfaces and moving or sharp machine parts, to flying sparks or particles.

Guards help protect your arms, hands and fingers, which are especially vulnerable to injury from a variety of machinery parts: cutting edges, punching and shearing parts, rotating and in-running shafts and pointed objects.

The machines you use should have guards if there's any way your hands could come into contact with the point of operation or any moving parts. There should be no way for your hands or fingers to get in from any angle, and the guard itself should not have any sharp surfaces or pinch points. Common guarding methods include:

- ✓ **enclosures.**
- ✓ **interlocking devices.**
- ✓ **remote control.**
- ✓ **electronic safety devices.**
- ✓ **removal devices.**
- ✓ **moving barriers.**
- ✓ **two-handed tripping devices.**



Machine Guard Safety Rules

- Never remove or bypass a guard or other safety device.
- Never operate a machine if a guard is missing, modified or not working properly.
- If a guard must be removed for maintenance, make sure it's replaced and working properly before resuming operations.

WORKING WITH GUARDS

If you're worried about meeting production goals or if you think the guard should be changed, talk to your supervisor. There is never a good reason to remove or modify a guard on a machine that you're using. Even if you think you can work faster without the guard, it's there to protect you and help you do the job more safely.

Watch Out for Pinch Points

Every year, workers are seriously injured when their hands, arms or feet get caught in pinch points, such as between rollers, presses, cutters, gears and belts. Any moving part has the potential to injure you. Pinch point accidents are typically the result of carelessness or inattention and can be prevented.

How It Happens

Large or small moving parts have the potential to catch and mangle fingers, hands and feet. Injuries occur when workers reach into machines or when moving parts catch clothing, jewelry or hair. These accidents can happen easily if a worker is distracted, inattentive, under stress, working too quickly, or is improperly trained or acting foolish. Forty percent of workers caught in moving equipment are experienced and familiar with the equipment, but believe they can safely reach into the machine.

Don't Get Caught

- Follow all instructions for machinery and tool use.
- If you're unfamiliar with a machine, insist on proper training before using it.
- Avoid wearing gloves, loose sleeves or cuffs, or rings, watches and other jewelry when you work with machinery. They can get caught and pull your hand into danger.
- Use a push stick—never your hands—to feed materials into moving machinery.
- Keep hands away from moving machine parts or pinch points.
- When stacking materials, keep your fingers on the sides, not the bottom, of the stack.
- Before any repair work is done on a machine, make sure an authorized person locks it out and disconnects the power. Power should only be restored after proper restart procedures are followed.

Using Hand Tools Safely

Hand tools may be a familiar part of your everyday work life. For this reason, it's easy to forget that they can be dangerous if used or maintained improperly. For example, a simple screwdriver can slip and cause a puncture wound, and a cracked or loose head on a hammer can fly off and hit you or a bystander. Know and practice the safety rules for hand tools.

HAND TOOL SAFETY TIPS

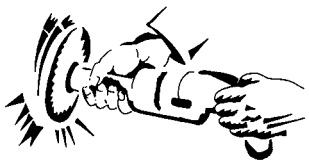
- Use the right tool for the job and make sure it's the correct size for the job. When you use a wrench as a hammer, or a knife as a screwdriver, you risk damaging the tool, the material you're working on or yourself.
- Keep your tools in good working order. A clean, sharp tool is a safe tool. A tool with a greasy handle or dull cutting surface can slip and cause injury.
- Learn the correct way to use your tools. Ask how to use new or unfamiliar tools—never assume you know how.
- Never modify a tool to increase its leverage or force.
- Wear the proper protective equipment for the job, such as mesh gloves, a leather apron and sleeve guards when using knives.
- Follow common-sense tool rules such as: Always cutting away from yourself, and pulling on a wrench, rather than pushing it.
- Use tools with awareness and patience.
- Never horse around or daydream while using tools.
- Store tools in a clean, dry place to keep them free from rust, grease and dust.
- Carry tools with sharp parts pointed down and away from you.

Using Power Tools Safely

Power tools make it possible to do many tasks quickly and efficiently. But because they use electricity and have fast-moving parts, you must exercise extra caution when using them. Follow these safety rules when using power tools:

POWER TOOL SAFETY TIPS

- Wear the proper personal protective equipment for the job.
- Before you use it, inspect the tool for broken parts, loose bolts, defective or broken cord insulation, plugs or switches, or improper connections.
- Only use equipment that is in good condition.



- Test the tool before you use it. For example, for a cutting tool, test its sharpness with a piece of wood, not your fingers.
- To prevent shock, make sure your tool is properly grounded and double-insulated.
- Keep power cords away from heat, sharp objects and chemicals that could damage their insulation.
- Be sure to keep your work area dry.
- Never use electrical equipment when your hands are wet or any part of you is touching water.
- If you must work in a wet area, keep the power cord clear of wet surfaces and use a ground fault circuit interrupter (GFCI).
- Keep your work area free of debris.
- Use tools in well-lit areas.
- Never use electric tools where flammable vapors or gases are present.
- Report unsafe conditions, such as defective cord insulation, poor connections to terminals, broken switches or plugs, sparking or overheating equipment, and outlets without GFCIs in damp areas.
- Never carry a power tool by the cord or hose.
- Disconnect tools before changing accessories, such as blades, bits or cutters, and before servicing or inspecting them.
- Secure your work material with clamps or a vise if possible.
- Avoid wearing clothing or jewelry that may become caught in a tool.
- Report equipment as unsafe if it has insulation defects, if it sparks or if you feel any shock or tingling when using it.
- Start and end from "off." Make sure the power switch is off before plugging in equipment. When you're finished, turn the equipment off before unplugging it to protect yourself and the next user.
- Never horseplay around power tools.
- When you turn off a tool, let it stop completely before putting it down in a safe place.
- Avoid kinking, cutting or crushing any electrical cord.
- If equipment has a three-prong plug, use a three-slot outlet or extension cord.
- Never modify three prongs to fit two slots by removing the third prong. Use an adapter instead, making sure that the metal grounding piece on the adapter is connected to a grounded object, such as the screw on the receptacle cover plate.
- Avoid overstraining equipment by using it improperly.
- Service equipment regularly and repair or replace it as needed.
- Pay attention to the direction of the tool's rotation. You're responsible for seeing that no one is in the path of flying objects.
- Use the switch lock only when the tool is in a stand or jig.

- Make sure you have solid footing when you're using heavy tools or working at an awkward angle, such as overhead.

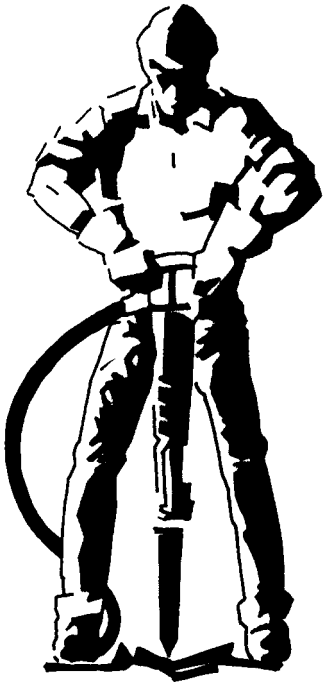
Using Hydraulic, Pneumatic and Liquid-Fuel Tools Safely

Hydraulic, pneumatic and liquid-fuel tools, like all other power tools, should be respected and used with great care and attention. Improper use of liquid-fuel tools can cause serious consequences. Fuel-powered tools emit vapors that can burn or explode and give off dangerous exhaust fumes. Pneumatic tools are powered by compressed air. They include chippers, drills, hammers, sanders and nail, staple, spray and rivet guns.

General Tool Safety Rules

- Inspect the tool for damage before operating it.
- Always wear the proper personal protective equipment for the job.
- Always follow the manufacturer's instructions for operation and maintenance.
- Store your tools properly.

Hydraulic Tools Safety Rules



- Check the fluid levels of equipment before use and make certain the proper fire-resistant fluid is being used.
- Never exceed the manufacturer's recommended safe operating pressure for hoses, valves, pipes, filters and other fittings.
- Make sure all tools are maintained and lubricated regularly.
- If a tool is subjected to an abnormal load or shock, it should be inspected thoroughly for damage by a trained person.
- When using hydraulic jacks, make sure they have a working limiting device.
- Fill hydraulic jacks exposed to freezing temperatures with the proper antifreeze liquid.

Pneumatic Tools Safety Rules

- Wear eye, face, hearing and other appropriate protective equipment when operating these tools.
- Check to make sure that the tool is securely fastened to the air hose.
- Never point pneumatic tools, such as air guns, at yourself or anyone else.
- Never store or leave a loaded air gun unattended.

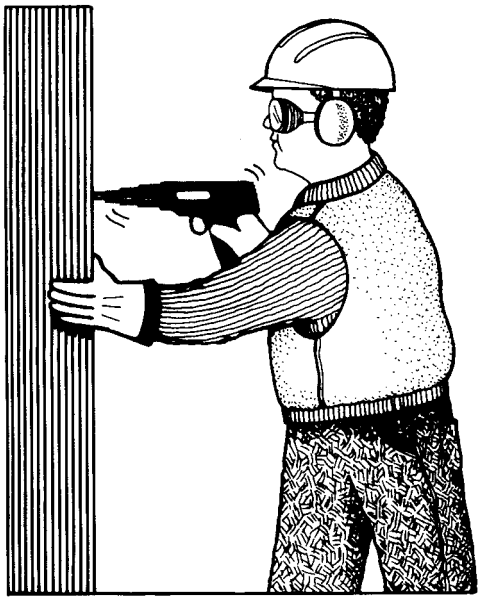
Liquid-Fuel Tools Safety Rules

- Handle, transport and store gas or fuel only in approved flammable-liquid containers, according to proper procedures.
- Before refilling a fuel-powered tool, shut off the engine and allow it to cool to prevent igniting the vapors.
- Use fuel-powered tools in well-ventilated areas. If this is not possible, wear the proper respirator to avoid breathing carbon monoxide.
- Make certain a fire extinguisher is nearby when using this type of tool.
- Never smoke while using a liquid-fuel tool.

Using Powder-Actuated Tools Safely

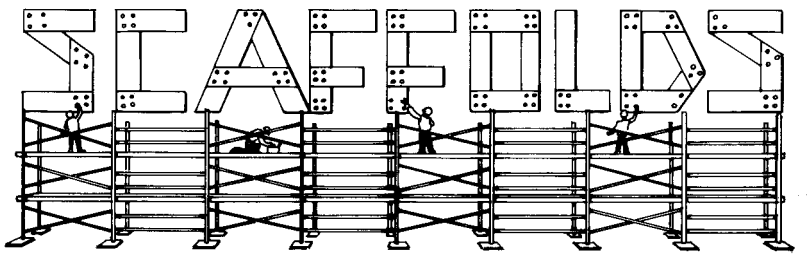
Powder-actuated tools can make your work easier, but these tools are as dangerous as loaded guns. This is why you must be specially trained and certified to use them.

A powder-actuated tool uses a powder charge the way a gun shoots a bullet. It "shoots" a fastener or stud into hard surfaces such as concrete, brick or steel. Like bullets, improperly shot studs can injure or kill workers. The power loads for powder-actuated tools are essentially blank cartridges. They're color coded for power level. All powder-actuated tools are equipped with special guards and muzzle fittings to keep you from getting hurt by a ricocheting stud or chips of flying masonry. The tool won't fire without such guards. Know and follow these safety rules for using powder-actuated tools:



- Always read and follow the manufacturer's warnings, recommendations and procedures.
- Always treat the tool as if it were a loaded gun.
- Never put your hand over the muzzle or drop the tool or point it at anyone.
- Always unload the tool to transport or store it.
- Keep the tool unloaded until you're ready to drive a stud. Never leave it unattended when it's loaded.
- Like a gun, a powder-actuated tool has a kick. Brace yourself when using it, especially when on ladders or scaffolds.
- Never use a powder-actuated tool in an explosive or flammable area.
- Before using the tool, inspect it. Make sure it's undamaged and that the barrel is unobstructed.
- Always wear eye and hearing protection when using this type of tool.
- Before loading the tool, always make sure that the chamber is clean.
- Always follow the manufacturer's instructions to select the correct power load for the material you're firing into.
- Before using the tool, test drive a fastener with a hammer to double-check that the surface is really the concrete or steel surface you think it is. Studs accidentally fired into wood, plasterboard, lath or plaster will go right through the material and come out the other side with the force of a bullet.
- Make sure no one is working behind your material.
- Avoid firing into brittle materials, such as glass bricks, tile or cracked concrete or stone, which are likely to shatter and injure you.
- To drive a stud, press the tool firmly against the surface at right angles.
- Fire studs well away from the edge of the surface or any holes—at least a half inch for steel and 3 inches for concrete.
- If the tool misfires, keep holding it firmly against the surface for 30 seconds, then try firing it again. If it still won't fire, wait another 30 seconds, so that the faulty cartridge is less likely to explode, and then carefully remove the load. The faulty cartridge should be put in water.
- Clean and maintain your tool according to instructions and use only factory replacement parts.

Staying Safe Around Scaffolds



Scaffold Safety Rules

- Supported scaffolds must sit on base plates and mud sills or other steady foundations.
- Objects such as blocks of wood or buckets must not be used to support scaffolds or be used as working platforms.
- Supported scaffold poles, legs, posts, frames and uprights must be perfectly vertical and braced to prevent swaying and movement.
- The inboard ends of suspension scaffold outriggers must be stabilized by bolts or other direct connections to the floor or roof deck, or stabilized by counterweights.
- All connections must be checked before you use a suspension scaffold.
- Counterweights must be secured by mechanical means to the outrigger beams of a suspension scaffold. They should not be made of flowable material, such as gravel, or construction materials, such as masonry units or rolls of roofing felt.
- Suspension ropes must be inspected before each work shift and after every event which could affect a rope's integrity.
- Report any rope problems to your supervisor, such as any physical damage which doesn't allow the rope to work properly or that makes it weaker; kinks that might cause a problem during tracking or wrapping around a drum; and broken wire strands, abrasions, corrosion or flattening, causing loss of more than one-third of the original diameter of the outside wires.
- Gasoline-powered equipment and hoists must not be used on suspension scaffolds.
- Gears and brakes of power-operated hoists used on suspension scaffolds must be enclosed to prevent pinch hazards.
- Two-point and multipoint suspension scaffolds must be tied or secured to prevent them from swaying. Window cleaners' anchors should not be used for this purpose.

Platforms and You

- For every 4 feet of a scaffold's height, its plank must be at least 1 foot wide. If it isn't, it must be protected from tipping by tying, bracing or guying.
- The front edge of the platform must not be more than 14 inches from the face of your work unless guardrails are erected along the front edge. Note that the maximum distance from the face of work for plastering and lathing is 18 inches.
- The ends of your platform, unless cleated or somehow restrained, must extend over the center line of its support at least 6 inches except when each end of your platform is 10 feet or less in length, and then it must not extend over its support more than 12 inches. When each end of a platform is greater than 10 feet in length, it must not extend over its support more than 18 inches, unless it's designed to support workers and/or materials without tipping, or it has guardrails to block workers' access to the platform end.
- Wooden platform planks should be rough-dressed, seasoned, straight-grained and free of knots.
- Never drill, cut or nail into planks or allow them to be damaged by welding sparks or by throwing them.
- Test the plank by laying it across two concrete blocks and having two people stand in the center.
- Always secure the plank by wiring it to the scaffold.

Using Scaffolds

- Before each shift, inspect the scaffold and plank for defects.
- Always inspect the scaffold to ensure all pins and clips are in place. Look for any damage or parts that need repair.
- Never load a scaffold to more than its maximum intended load or rated capacity.
- Never work on scaffolds during storms or high winds.
- Avoid letting debris accumulate on your scaffold.
- Remove elements such as ice, snow, water, grease, mud and other slippery materials from your scaffold.
- Always use fall protection when working on a scaffold platform.
- Never use the crossbraces to gain access to a scaffold.
- Never use improvised scaffolding such as piling boxes on top of the plank.
- Remove all materials and tools from scaffolding at the end of the day.
- Place screen or toe boards around the scaffold to keep objects from falling off.
- Never allow vehicles or materials to bump or strike scaffolds.

Using Grinders Safely

Grinders can be valuable tools for polishing, honing, cutting and buffing. But careless use of these machines can subject your eyes, fingers, hands and arms to serious injury and bring your job to a grinding halt.

The Ring Test

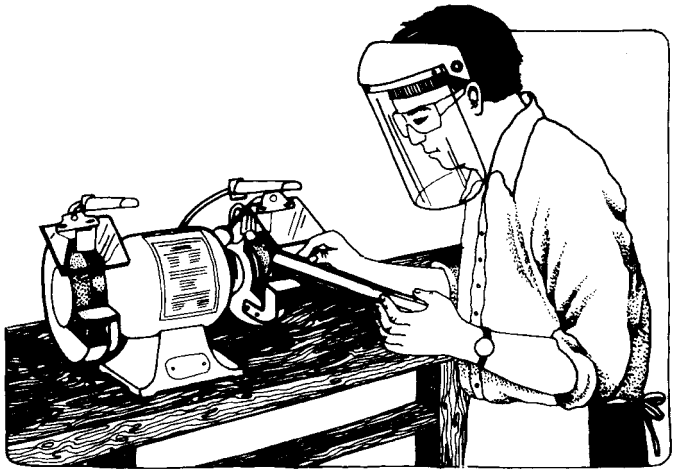
Before an abrasive wheel is mounted, it should be inspected closely and tested to be sure it's free from cracks or defects. A defective grinding wheel can break during use. To test the wheel, suspend it or hold it vertically and tap it 1 or 2 inches from the outer edge and 45 degrees from the vertical center line. Tap a light wheel with a light tool, such as a screwdriver handle, and a heavy one with a mallet. A sound and undamaged wheel will give a clear, metallic tone or "ring." If it sounds cracked or "dead," it could fly apart during use and must not be used.

Inspections

- Inspect grinding machines daily to make sure the side and tongue guards are properly aligned so the wheel doesn't scrape them.
- The tongue guard should be less than a quarter-inch from the wheel.
- Make sure that the glass shield is clean, unscored and in place.
- Make sure that the grinder frame is mounted securely and doesn't vibrate during operation.
- Make sure that the speed is correct for the wheel being used.
- The tool rest should be securely clamped and positioned within an eighth-inch of the wheel, with its height on the horizontal center line of the machine's spindle.
- Never adjust the tool rest while the wheel is running; you could catch a finger between the rest and the wheel, or the rest could bump the wheel and break it.
- The clamp that holds your work should always be tight.

When You Work

- To prevent a wheel from cracking, be sure it fits freely on the spindle.
- The spindle must be tightened enough to hold the wheel in place, but not tight enough to distort the flange.
- Take care to ensure that the spindle wheel doesn't exceed the abrasive wheel specifications. Follow the manufacturer's recommendations.
- Because a wheel might disintegrate or explode during start-up, you should never stand directly in front of the wheel as it accelerates to full operating speed.
- Always wear proper eye protection.
- Turn off the power when not in use.
- Never clamp a hand-held grinder in a vise.
- Never remove guards or guard fasteners.
- Never wear gloves when using a polishing or buffing wheel. Gloves can catch in the machine and drag your hand against the wheel.
- Use a jig or fixture to hold small items against the wheel. Never use your bare hand.
- Never grind nonferrous metal such as aluminum and brass. It will adhere to the wheel and expand with heat, raising the potential for the wheel to explode.
- When using a wet grindstone, make sure you're wearing slip-resistant shoes to prevent slips and falls.
- Hold materials with a relaxed grip to prevent vibration-related injury.
- Never touch any moving parts.
- Operate within the manufacturer's recommended speeds.
- Never try to alter the machine or its wheel speed.
- Always immediately smooth out rutted, uneven or rough wheels.



Keys to Ladder Safety

Ladders can be a great help on the job. They're simple to use and get you where you need to be. Although ladders are uncomplicated devices, they can be dangerous. It's important to know and follow ladder safety guidelines.

Choose the Right Ladder for the Job

- Make sure your ladder's strong enough and long enough for the job.
- Don't exceed the duty rating limits for a ladder. Type I, an industrial ladder, holds 250 pounds. Type II holds up to 225 pounds. Type III, the household ladder, holds up to 200 pounds.
- Remember to consider the weight of your tools when selecting a ladder.
- If you work around electrical wires or power lines, use a wooden or nonconductive fiberglass ladder, not a metal one.
- Never connect two short ladders to form a long one.

Inspect Your Ladder Before You Use It

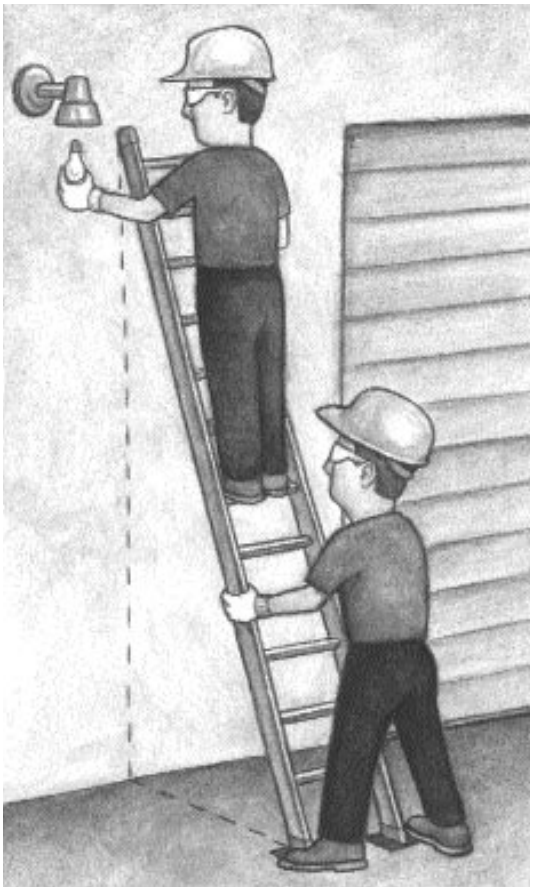
- Check for loose or bent rungs, cracked side rails or bent or missing parts.
- Make sure the spreaders can be locked in place when opened.
- Metal ladders should have plastic or rubber feet and step coverings.
- Check the rungs for oil and grease on the rungs which could cause you to slip.
- Replace missing parts and tighten loose hardware.
- Avoid repairing major structural damage. Instead, get a new ladder.
- Make sure the steps are wide enough for you to spread your feet for balance.

Set Up Your Ladder Carefully

- Place your ladder on a firm, level surface with its feet parallel to the wall it's resting against.
- Use the 4-to-1 ladder rule: Set the base of your ladder 1 foot away from the wall for every 4 feet of ladder height.
- In busy areas, use a barricade to prevent collisions.
- Lock nearby doors that could open toward you.
- Always tie off your ladder. Lash straight ladders at the top and bottom.
- The top of a straight ladder should extend 3 feet beyond its resting point.
- Carry your ladder vertically, or use two people—one at each end.

Climb Cautiously

- Face the ladder when you climb up or down.
- Hold on to the side rails with both hands.
- Carry only necessary tools on your belt.
- Use a rope to raise heavier equipment.
- Never overreach.
- Use the "belt buckle" rule. Always keep your body centered between the rails.
- Allow only one person on a ladder at a time.
- Wear shoes with nonskid soles.
- Make sure your hands are dry and free of grease.
- Never step on the top two rungs of a ladder.
- Never use a ladder for anything other than its intended purpose.



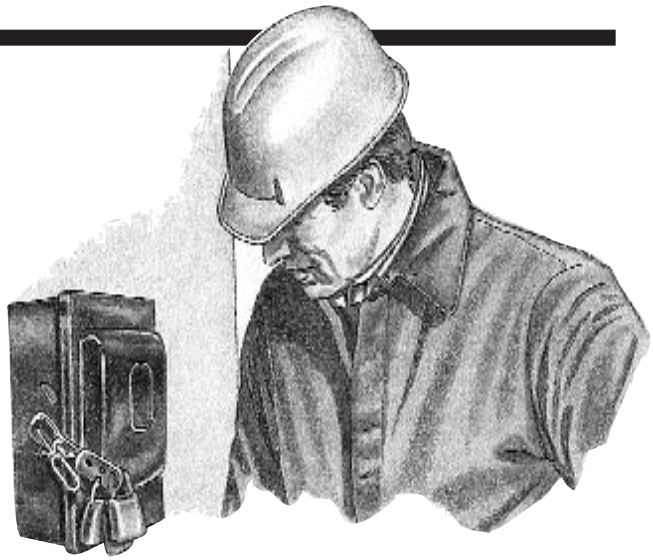
Lockout/Tagout Is Serious Business

Machinery or equipment that starts up unexpectedly or releases stored energy while someone is performing maintenance or repairs can cause serious injury. Lockout/tagout procedures prevent these types of accidents from happening. Although only authorized employees are permitted to perform lockout procedures and to remove locks and tags, all employees need to understand lockout and tagout procedures.

What Is Lockout?

Lockout means putting a lock on a machine or piece of equipment to make sure it stays off. Electrical, mechanical, chemical, thermal, hydraulic, pneumatic, raised-weight, pressurized and coiled-spring systems must be neutralized for safety during maintenance and repairs.

A lockout device is a lock, block or chain that keeps a switch, valve or lever in the "off" position. Lockout locks must meet special requirements and must be identified by the name of the worker who installs and removes them. Only use locks provided by your employer for lockout purposes. Never use these locks for toolboxes, storage sheds or other uses.



What Is Tagout?

When equipment can't be locked out, it must be tagged out with a special tag that warns workers to not start up the equipment. A tag is not a physical restraint. Tags must clearly state: "Do not operate or remove this tag." Tags must be placed on each handle, push button, lever or circuit breaker used to energize the equipment.

Tags must meet special requirements and show the identity of the authorized employee. Both locks and tags must be strong enough to prevent unauthorized removal and to withstand various environmental conditions.

LOCKOUT STEPS

1. Identify all parts of any systems that need to be shut down. Find the switches, valves or other devices that need to be locked out.
2. Tell employees that the equipment will be locked out and why.
3. Locate all power sources, including stored energy in springs or hydraulic systems.
4. Neutralize all power at its source. Disconnect electricity; block moveable parts; release or block spring energy.
5. Drain or bleed hydraulic and pneumatic lines.
6. Lower suspended parts to rest positions.
7. Lock out all power sources. Use a lock designed for this purpose. Each worker should have a personal lock.
8. Test operating controls. Turn on all controls to make sure the power doesn't go on.
9. Turn controls back to "off."
10. Perform necessary repairs or maintenance.

Restarting Equipment

After the maintenance or repair work is completed, only the same authorized employee who installed the lock may remove and restart the equipment. Before restarting the equipment:

- make sure all other workers are a safe distance away.
- remove tools from the equipment.
- reinstall machine guards.
- notify workers that the energy is restored and the machine is working.

How Much Do You Know About Lockout/Tagout?

Electrical shock, burns, amputations and death are some of the horrible consequences of not locking and tagging out equipment before servicing or repairing it. Lockout/tagout procedures are a proven way to reduce accidents from unexpected start-up. Although only authorized employees are permitted to perform lockout/tagout, to be safe, you should know and understand the procedures. Take this quiz to find out how much you know about lockout/tagout.

1. Lockout is accomplished by:

a. locking the gates at your job site.
b. shutting down equipment for service or maintenance work.
c. installing a lockout device at the power source so equipment can't be operated.
d. tagging equipment to indicate it shouldn't be used.
e. none of the above.

2. Attaching a warning tag to a power source or piece of machinery telling others not to operate it is called:

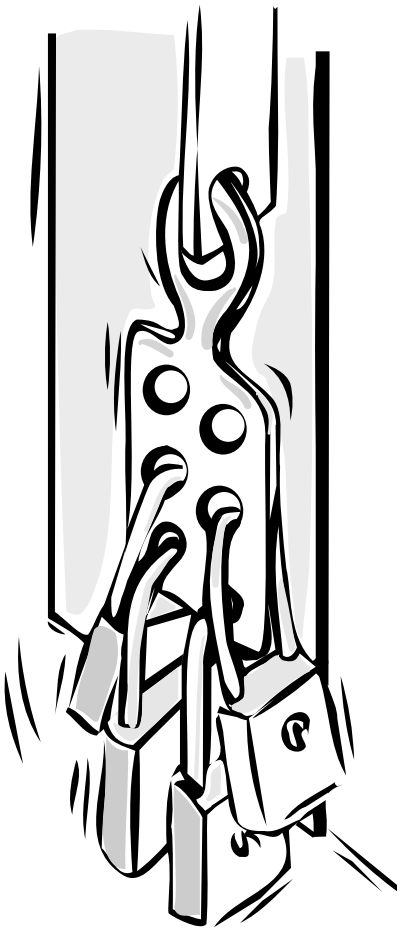
a. lockout.
b. tagout.
c. shutout.
d. none of the above.

3. OSHA rules require your employer to:

a. maintain a written copy of the lockout/tagout procedures.
b. make the procedures available to you.
c. instruct you in lockout/tagout procedures.
d. all of the above.

4. Lockout/tagout procedures are in place to prevent:

a. the accidental start-up of equipment.
b. workers from taking shortcuts while servicing equipment.
c. the release of stored, residual or potential energy.
d. all of the above.



5. Anytime electrical equipment is deactivated for repair:

a. it must be locked or tagged at the point where it can be turned on.
b. anyone can turn it back on.
c. it must stay off for 24 hours.
d. none of the above

6. Locks provided by your company for lockout purposes:

a. must be strong enough to prevent unauthorized removal.
b. can be used to lock your tool box.
c. can be taken home when not in use.
d. none of the above.

7. General requirements for your lockout/tagout procedure include:

a. Circuits and equipment must be disconnected from all electrical energy sources.
b. Control devices can't be the only means of de-energizing equipment.
c. Interlocks for electrical equipment may not be used as a substitute for proper procedures.
d. all of the above.
e. none of the above.

8. Tags must have a statement on them that:

a. refers you to the authorized person.
b. says what time the tag should be removed.
c. prohibits unauthorized operation of a switch and removal of the tag.
d. tells you where the tagout procedures are located.

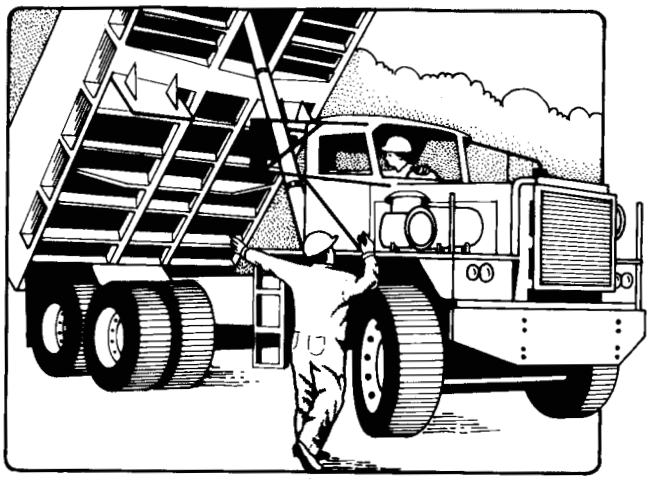
Answers:: 1. c; 2. b; 3. d; 4. d; 5. a; 6. a; 7. d; 8. c.

Working Around and Operating Heavy Equipment Safely

Heavy equipment is both powerful and dangerous, not only for the operator, but also for those who work around it. It's important that you know the safety precautions to take when working with and around heavy equipment such as dump trucks, front-end loaders, cranes, tractors and cement trucks.

SAFETY RULES FOR HEAVY EQUIPMENT OPERATORS

- When you operate heavy equipment, always check the brakes, steering and other controls before starting the engine.
- Before you start up, make sure no one is near your equipment. The safest way to do this is to walk around your vehicle.
- Always wear the proper personal protective equipment such as safety glasses and a hard hat when operating heavy equipment.
- Always wear your safety belt.
- When you park your machine, lower buckets, shovels or dippers, set the parking brake and shut off the engine.
- Resist the temptation to jump off of your machine; instead, use the handholds, rails and steps. Be sure to keep these areas clean and free from grease.
- Always stop the engine before lubricating or working on a machine. And make sure all safety guards are in place.
- Avoid backing up heavy equipment unless it's absolutely necessary.
- Check the surrounding area for obstacles before beginning an operation.
- Keep other vehicles, materials, equipment and people out of areas where heavy equipment is operating.



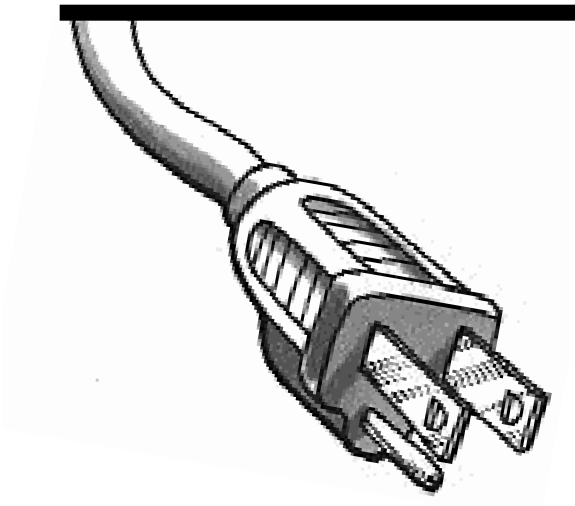
- Make sure your mirrors are angled to reduce blind spots.
- Check your reverse alarm before operation.
- If you're unable to see behind your machine, use a person on the ground as a "spotter" to help direct you and look for obstacles.
- Only use equipment you're trained to use.
- Be familiar with the limitations of your equipment.
- Never assume your path is clear if you can't see it.

SAFETY RULES FOR WORKING AROUND HEAVY EQUIPMENT

- Keep clear of moving equipment.
- Never assume the operator knows where you are or where you're going.
- Keep an eye out for moving equipment at all times.
- Watch out for and stay clear of pinch points, earth-moving equipment and cranes.
- If you must walk around a piece of heavy equipment, alert the operator to stop the machine before going by.
- Always stay out from under loads on cranes or hoists—even if it means taking the long way around.
- Avoid walking behind a piece of equipment that's backing up. You could trip and fall.
- Never walk beside moving equipment or ride on its running board or drawbar in case it slides or turns or the load shifts.
- Never ride on top of a truck loaded with masonry blocks or other materials that could shift and injure you.
- If you're working on portable staging, scaffolds or platforms, get off while the machine is being moved.

Understanding Electricity and Conductivity

Working safely around electricity requires a basic understanding of conductive materials, the hazards they present and how these hazards can be controlled.



Electricity's Pathways

Electricity always follows the easiest path to the ground. It will travel there through any conductive material, such as water, metal, some chemical solutions and the human body. If you come into contact with live electrical parts or wires—either through direct touch or via a conductor—electric current will pass through your body on its way to the ground, delivering a shock and possibly severe burns or death.

A complete circuit is necessary for electricity to flow through a conductor. A complete circuit is made when there's a source of electricity, a conductor and a consuming device such as a portable drill. Most electrical accidents occur when workers come into contact with electrical current—either directly or through conductive materials or equipment.

PROTECT YOURSELF

- Whenever you work around electrical equipment, always identify all conductors that could come in contact with electricity. Metal tools, pipes, ladders, steel wool, some chemical solutions and water are a few common conductors.
- Avoid wearing metal jewelry and headgear when working around energized parts or equipment.
- Avoid using electrical equipment when your hands are wet or sweaty.
- If you must work in a damp area, use a ground fault circuit interrupter (GFCI).
- Lockout/tagout procedures enforce the shutoff of all energized parts during equipment maintenance and repairs to protect workers from accidental contact with live electrical parts.
- If you must work with energized parts and lockout/tagout isn't possible, always use protective equipment, such as rubber boots, sleeves, blankets and mats and nonconducting tools rated for the voltage of the parts.
- Inspect all cords and power tools regularly.
- Never use damaged equipment.
- Report any damaged insulation, loose parts or connections you find.
- Never patch worn or frayed extension cords with tape.
- Never carry equipment by its cord.
- When using extension cords, never fasten them with staples, hang them from nails, suspend them by wire or otherwise damage the cord's insulation.
- Never remove or modify a guard.
- Make sure insulation is adequate for the voltage, undamaged, clean and dry.

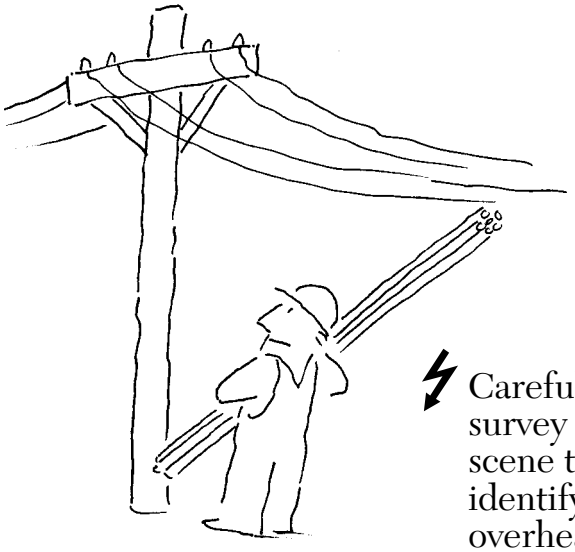
Working Near Overhead Power Lines

A worker who climbs onto a tall truck bed to unfasten a load can be electrocuted instantly if he or she contacts a nearby power line. And a worker who positions a crane or dump truck beneath a power line risks electrocution when the boom or bed is raised.

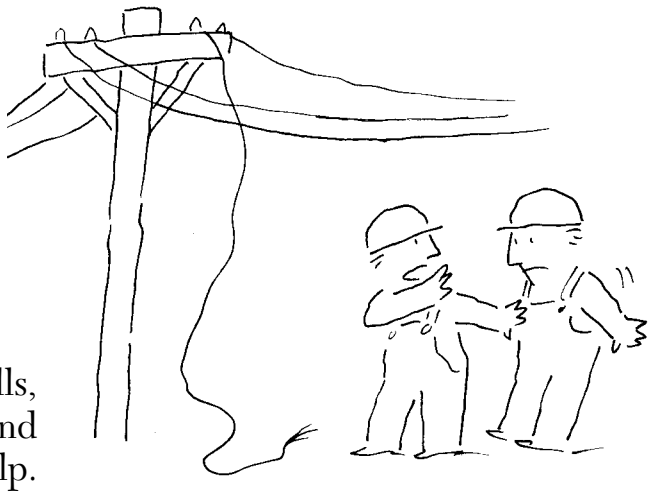
Accidents involving overhead power lines are serious and usually result in death. They're typically caused by carelessness and can be prevented.

IF YOU WORK BENEATH POWER LINES...

- Estimate clearances between power lines and the highest point of your equipment.
- Keep yourself and your equipment at least 10 feet from power lines.
- Have the power company install protective barriers or de-energize the lines.
- Make sure workers on the ground don't touch vehicles or equipment.
- Ground all vehicles and other equipment near the power lines, and make sure workers aren't near the grounding location.
- Be extra cautious when handling long conductive materials, such as pipes and metal rods.
- Use ladders with nonconductive rails.
- Wear protective equipment, such as nonconductive headgear and rubber sleeves, gloves and boots.
- If a live power line hits your vehicle, stay inside; if there's a fire, jump out—with feet together—as far from the vehicle as you can. Avoid touching the vehicle and the ground at the same time.



Carefully survey the scene to identify any overhead hazards.



If a live power line falls, stay away from it and call for help.

Arcing:

What You Should Know

Arcs—small, sparklike leaps of electricity that result from a short circuit or other interruption of current flow—can be as dangerous as electrical shock.

Hazards

An arc occurs when faulty wiring, a break in cord insulation or a short circuit causes electric current to leap out in a spark. If the current is great enough, an arc can cause shock or burns or start a fire. In environments that contain explosive gases, vapors or combustible dusts, even low-energy arcs can cause violent explosions. Extremely high-energy arcs can damage equipment and send fragments flying.

PREVENTING ARCS

- Insulation—the material that covers electrical wires and encloses live elements on some equipment—must be appropriate for the voltage and must remain undamaged, clean and dry.
- Inspect cord and equipment insulation before each use.
- If a cord is frayed or a connection is loose, replace it.
- Never use a cord that has the ground prong missing.
- Keep power cords far from cutting edges.
- Don't step on or run over power cords with equipment or vehicles.
- Grasp the plug, not the cord, when unplugging equipment.
- Stay within cord voltage requirements for tools and equipment.
- If you must use electrical equipment in wet areas, use double-insulated tools and a ground fault circuit interrupter (GFCI).
- Make sure your power cord isn't lying in water or on a damp surface.
- Keep your hands and body dry.
- Avoid standing in or near water.
- Inspect your equipment before use and report any loose or broken wiring or connections.
- Always use grounded tools and equipment and plug them into grounded outlets.

Preventing Electrical Fires and Explosions

Electricity is one of the most common causes of fire and is an ignition source for many explosions.

Electrical Fires

Fires can be started by electrical arcing or connections where wires are improperly spliced to other components, such as receptacle outlets and switches. Also, if heat develops in an overloaded conductor from too much current flow, a fire can be ignited. An electrical fire is one where the source is energized.

What to Do...

- Small electrical fires can be put out with a Class C or combination fire extinguisher.
- Never use water on an electrical fire.
- If the fire appears to be growing rapidly, or if it's already too large or smoky to use an extinguisher, evacuate immediately.
- Call 911 or your local fire department or emergency response system.
- Stay low to avoid smoke inhalation and encourage others to do the same.
- If someone's clothing catches fire, force him or her to stop, drop and roll to extinguish the flames.

Electrical Explosions

Explosions can occur when electricity provides a source of ignition for explosives, such as when flammable or combustible chemical vapors or gases are present.

Prevention Tips

- Never store flammable or combustible materials where there's a chance of an electrical fire.
- Never put more current through a conductor than it can handle; avoid changing breakers or fuses to higher ratings.
- Look for high-resistance connections and have them corrected.
- Inspect all cords and equipment for proper insulation.
- Use only tools and equipment that are in good working order.

What to Do About Electrical Shocks and Burns

An electrical shock can severely burn you, stun your muscles and nerves or even stop your heart and breathing. Quick action in an electrical emergency can save lives. But a haphazard response can do more harm than good. Becoming familiar with the following response procedures will make it easier for you to think clearly and act decisively if an emergency occurs.

Responding to Electrical Shock

- To protect yourself from shock, turn off the power before touching the victim or equipment.
- If you can't turn off the power, use a nonconducting tool, such as a dry wooden stick, to move the person; then call for help.
- Make sure you don't complete a circuit between the source and the ground.
- If the victim is touching a power line, stay clear and call for help.
- Before giving any treatment, check the victim's breathing and pulse.
- If breathing has stopped, give artificial respiration.
- If you don't detect a heartbeat, start CPR if you've been trained to do so.
- Continue CPR until medical help arrives or until the victim begins to breathe on his or her own.

How Shock Happens

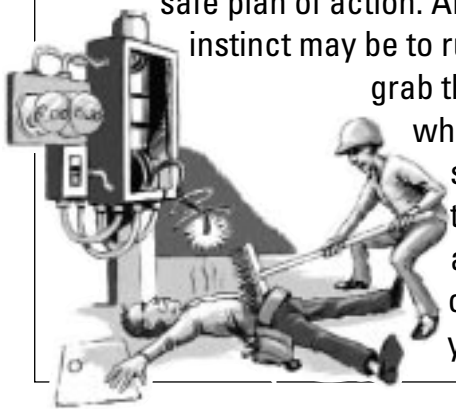
Electricity follows the easiest path to the ground. It will flow through any conductive material, such as water, metal, certain chemical solutions and the human body. If you come into contact with electricity while you're in contact with the ground, you become part of an electrical circuit and current passes through your body, causing a shock. Even a small shock can kill you if it passes through your heart and lungs. Deep internal burns can also occur.

Responding to Burns

- Burns suffered in electrical accidents may affect your skin, muscles, organs and bones.
- The first hour is crucial for treating burns.
- Look for two wounds: an entrance and exit burn.
- Treat minor burns to the skin with cool water, then cover it with a clean, dry cloth.
- Never use ointment, ice or butter on a burn.
- Serious burns require immediate medical attention.
- If the victim goes into shock, keep him or her lying down with feet elevated until help arrives.
- Never try to pull charred clothing off of burned skin.

Think Before You Act

No matter which type of electrical emergency confronts you, always stop to notice what's going on and think about a safe plan of action. Although your instinct may be to rush in and grab the person who's being shocked, that type of action could cost you your life.



Why Electrical Grounding Is Important

Electricity can kill if not used properly. Power tools and other electrical equipment can easily cause electrical shocks if they're not in good condition, if insulation is inadequate or if they come into contact with water or moisture. The most important thing you can do to ensure your safety around electricity is to properly ground all electrical tools and equipment.

Grounding Tools and Equipment

When there's a current leakage from a tool or piece of equipment, the current will flow through any available conductor until it reaches the ground. If your body is in contact with that tool, you are the nearest conductor, unless the tool is grounded.

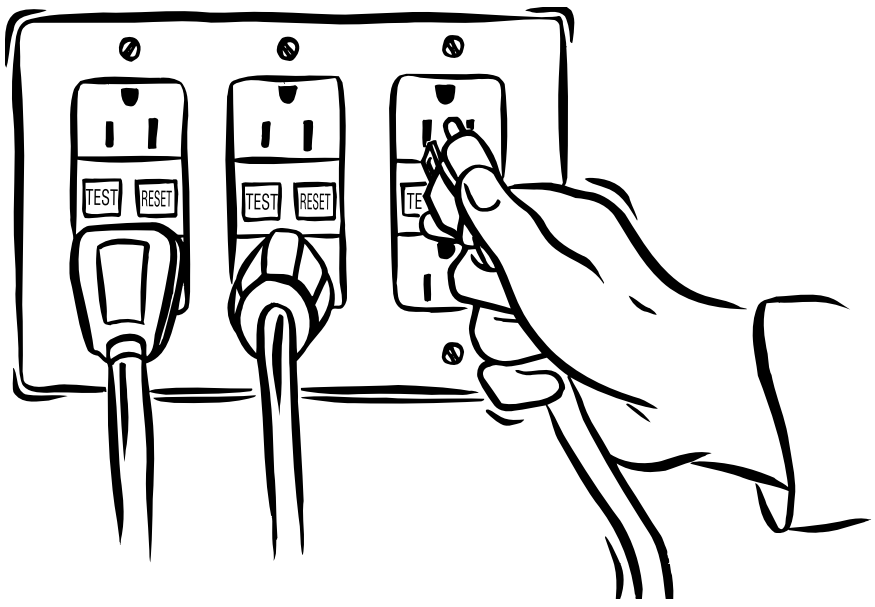
To prevent ground-fault hazards, all electrical tools should be connected by a three-pronged, grounded plug. If grounding is not available, always use double-insulated tools, which are covered with a nonconductive surface to protect you from contact with the circuit. Another device, a ground fault circuit interrupter (GFCI), is required at most construction sites. It shuts off electricity if a ground fault occurs.

Ground Fault Circuit Interrupters

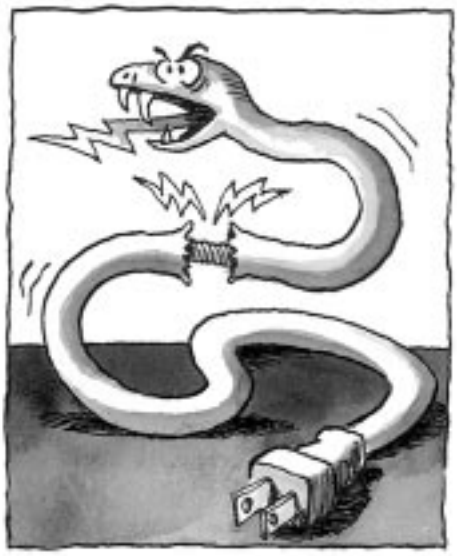
A ground fault circuit interrupter provides extra protection from electrical shock, especially when you work in wet or outside areas.

A GFCI is a fast-acting circuit breaker that senses small imbalances in a circuit caused by current leakage and, in a fraction of a second, shuts off the electricity. A GFCI protects against shock, overheating, fires and destruction of wire insulation. However, it won't protect you against line-to-line contact hazards, such as direct contact with two live wires.

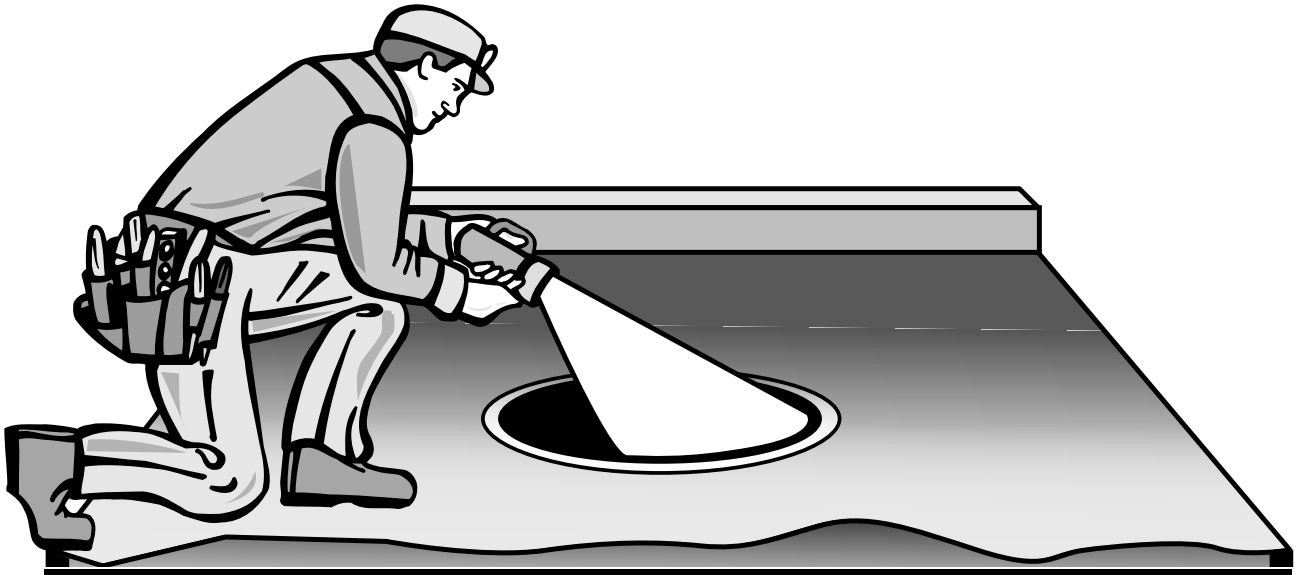
Install GFCI outlets where power tools are used or wherever electrical equipment is used near water or dampness, such as outdoors. GFCIs can be wired into circuits at a panel box or used to replace ordinary outlets.



Fifteen Things to Remember When Working With Electricity



1. Keep water and electricity far apart.
2. Make sure all equipment is properly grounded and plugged into grounded circuits.
3. Inspect all electrical equipment, tools, cords and outlets for defects. Only use equipment that is in good working order. Report any unsafe conditions you may find.
4. Never wear metal jewelry or headgear when working with electrical parts.
5. Always wear protective equipment such as rubber gloves, sleeves and boots.
6. Use nonconductive or double-insulated tools.
7. Keep electrical cords and cables clean and free from kinks.
8. Never carry equipment by its cord.
9. Never use worn or frayed extension cords.
10. Be aware of flammable or corrosive chemicals and follow your company's procedures for operating electrical equipment in their vicinity.
11. Use ground fault circuit interrupter (GFCI) outlets.
12. Keep clear of energized parts.
13. Keep conductive materials, such as steel wool, metallic cleaning cloths and some chemical solutions, away from sources of electricity.
14. Be aware of lockout/tagout procedures to keep electrical equipment turned off during maintenance and repairs.
15. Never fasten extension cords with staples or hang them from nails or wire which can damage the cord's insulation.



Confined Spaces and You

A confined space can be any space which has a limited means of exit, and where an oxygen-deficient, toxic or flammable environment may exist. They're spaces that aren't designed for normal human occupancy. Confined spaces can include:

- ✓ **tunnels**
- ✓ **trenches**
- ✓ **pipelines**
- ✓ **underground utility vaults**
- ✓ **ventilation and exhaust ducts**
- ✓ **sewers**
- ✓ **storage bins**
- ✓ **manholes**
- ✓ **silos**
- ✓ **vats**
- ✓ **pits**
- ✓ **tubs**
- ✓ **tanks**
- ✓ **vessels**
- ✓ **vaults**
- ✓ **boilers**

CONFINED SPACES HAZARDS

- They may have too little or too much oxygen.
- They may contain explosive or combustible atmospheres.
- They may contain toxic substances.
- They may contain physical hazards such as live wires, moving parts, fall hazards or high levels of heat or noise.

Describe confined spaces in your work area. Learn about the hazards, safety procedures and other requirements by reading the entry permits.

Confined space: _____
Hazards: _____
_____
_____
Procedures: _____
_____
_____
Requirements *(lockout tags, entry permit, barriers, attendants)*:
_____
_____
_____

Confined space: _____
Hazards: _____
_____
_____
Procedures: _____
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_____
Requirements *(lockout tags, entry permit, barriers, attendants)*:
_____
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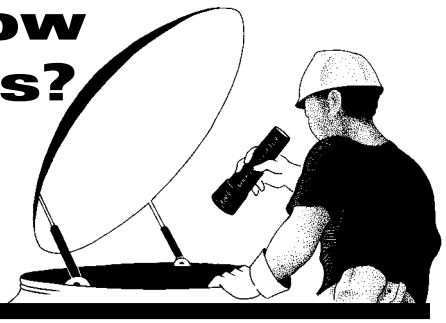
How Much Do You Know About Confined Spaces?



If you work in or around confined spaces, it's important to know what they are and what's dangerous about them. Use this quiz to test your knowledge of confined spaces.

1. List four examples of confined spaces:

_____

_____

_____

_____

2. List four hazards of confined spaces:

_____

_____

_____

_____

3. What basic safety precautions should you take in a confined space?

_____

_____

_____

4. Name three things that may mean a space is a confined space?

_____

_____

_____

5. When must a confined space's air first be tested?

a. after entering the space
b. after a confined space is exited
c. before entering a confined space
d. 24 hours before entering

6. When testing the air of a confined space, what are you testing for?

a. density
b. temperature
c. hazardous toxic gases and other substances
d. dust

7. Signs that a confined space has a problem and could be deadly include:

a. total darkness.
b. a distinct odor of a toxic atmosphere.
c. an awkward shape.
d. dust.

8. Which of the following can cause dangerous vapors and gases to accumulate in a confined space?

a. welding
b. tank coatings and preservatives
c. previous contents
d. all of the above

ANSWERS:

1. Examples might include tanks, trenches, pits, vaults, silos, storage bins and hoppers.
2. Answers could include explosive or combustible hazards, asphyxiation, engulfment, toxic contaminants and physical hazards such as extreme temperatures, noise, moving parts and unsafe surfaces.
3. Always work with an attendant, monitor atmospheric conditions in the space, use proper personal protective equipment and follow entry permit and other established confined space safety and emergency procedures.
4. They're not designed for human occupancy. They have restricted entry or exit. They're big enough for a human to get into.
5. c
6. c
7. b
8. d.

Confined Space Hazards:
Engulfment, Physical Conditions and Oxygen Deficiency or Enrichment

Some hazards of confined spaces include engulfment, physical conditions and oxygen deficiency or enrichment. Know the hazards that are present in your confined work area and the precautions you'll need to take.

ENGULFMENT HAZARD

Engulfment is when a person is suffocated or crushed by liquid or "flowing" solid material such as:

- **dirt**
- **sand**
- **gravel**
- **cement**
- **asphalt**
- **powdered talc**
- **grain**

Protect Yourself

- Avoid entering a confined space when the potential for engulfment exits.
- If you must work in a situation where engulfment may occur, such as in a trench where a chance of a cave-in exists, be sure to consult and carefully follow the OSHA excavation rules for construction.

PHYSICAL CONDITIONS

Physical conditions in confined spaces can create these hazards:

- **Extreme Temperatures:** Heat can increase quickly in a confined space and cause dizziness, exhaustion or heatstroke.
- **Noise:** High noise levels may keep you from hearing important warnings or instructions, and noise reverberation can cause hearing damage.
- **Pipes and Valves:** Entering gases or liquids can cause injury.
- **Awkward Positions:** Working in tight spaces and on platforms, sloping floors or ladders can lead to fatigue, falls or entrapment.
- **Electrical Equipment:** Live wires and energized equipment can kill you.
- **Underground Utilities:** Utilities containing hazardous materials, such as gases, steam and coolants, can be harmful.

Protect Yourself

- Pipes and valves must be shut off, locked out, blanked and tagged.
- Avoid working in confined spaces when temperatures are extreme.
- Always wear appropriate personal protective equipment.
- Make sure all electrical, mechanical and hydraulic equipment in the space is properly de-energized and locked and tagged before you begin working.
- Have all underground utilities containing hazardous materials such as gases, steam or coolants shut off.
- Make sure you can communicate with your confined space attendant at all times.
- Use a harness or other fall protection equipment when there's a danger of falling.

OXYGEN DEFICIENCY OR ENRICHMENT

Oxygen can be reduced in a confined space by being used up or replaced by another gas. Oxygen enrichment (too much oxygen in the air) is dangerous because it can be a fire hazard.

Oxygen Enrichment

- Fires start much more easily in air with more than 23.5 percent oxygen. (Normal air contains 20.8 percent oxygen.)
- Oil in the presence of pure oxygen will self-ignite.

Causes of Oxygen Deficiency

- **Fire or Explosion:** Oxygen is used up as fire burns. Activities such as welding, cutting and brazing use up oxygen.
- **Displacement:** Oxygen is sometimes replaced with a noncombustible gas such as argon, carbon dioxide or nitrogen to reduce the danger of explosion.
- **Rust:** When metals rust it takes oxygen out of the air.
- **Bacterial Action:** Oxygen is used for processes such as fermentation.

Protect Yourself

- Make sure that the atmosphere is monitored during any confined space entry.
- Only enter an oxygen-deprived space if you have an outside source of breathable air.
- Ventilate oxygen-poor areas before entering them when possible.

Confined Space Hazards:
Toxic Contaminants and Explosive or Combustible Atmosphere

The hazards of confined spaces include toxic contaminants and explosive or combustible atmosphere. Know the hazards that are present in your confined work area and the precautions you need to take.

TOXIC CONTAMINANTS

Confined spaces often contain toxic contaminants such as vapors, fumes or gases from previously stored materials or from the use of cleaning solvents, coatings or preservatives. Work such as welding in confined spaces can also produce toxic gases such as carbon monoxide. Remember, you can't always see or smell toxic substances. Some common toxins are:

- **hydrogen sulfide.**
- **sulfur dioxide.**
- **carbon monoxide.**
- **oxide of nitrogen.**
- **oxide of ozone.**

Two Ways Toxic Materials Can Hurt You

1. **Irritation:** The substance may irritate your respiratory system (throat, lungs) or your nervous system. If this irritation is extreme, it can be deadly.
2. **Chemical Asphyxiation:** Some toxins can decrease your oxygen supply or get into your lungs and asphyxiate you.

Protect Yourself

Never rely on your own senses to detect toxic hazards. Before you enter a confined space, make sure:

- ✓ you know what hazardous substances are present and what levels are acceptable for entry.
- ✓ you know the health effects from exposure.
- ✓ you wear the appropriate personal protective equipment.
- ✓ ventilation is present if necessary.
- ✓ the atmosphere is monitored before and during entry.

EXPLOSIVE OR COMBUSTIBLE ATMOSPHERE

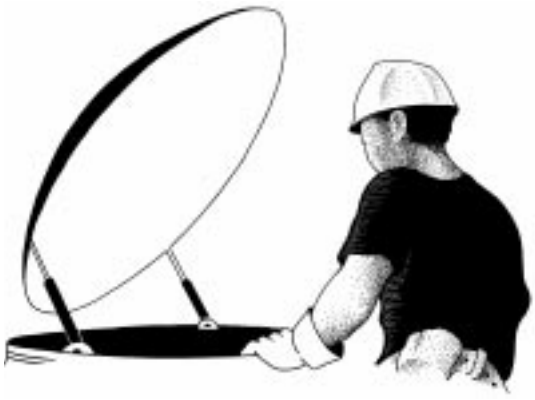
Fires and explosions are serious dangers in confined spaces. They can be caused by:

- **flammable gases or vapors.**
- **chemicals.**
- **solvents.**
- **oxygen enrichment.**
- **petroleum products.**

Protect Yourself

Provide continuous monitoring of the space if any hot work is necessary. Eliminate anything that can ignite vapors or gases in a confined area, such as:

- **heat sources.**
- **sparks from machinery or tools.**
- **static electricity.**
- **friction.**
- **torch cutting.**
- **welding.**
- **hot surfaces.**
- **smoking.**



Confined Space Entry Permits

If a confined space is identified as a permit-required space, a written entry permit is required before a worker can go into the space. The entry permit should describe:

- the space to be entered.
- the reason for entering the space.
- the date of entry.
- the duration of entry.
- acceptable entry conditions.
- the hazards of the space and ways to control or remove them.
- the names of the workers entering the space, the attendants and the entry supervisors.
- information about atmospheric testing done on the space.
- appropriate communication procedures.
- information about rescue and emergency services.
- information about necessary equipment when entering the space.
- whether additional permits, such as permits for hot work, are needed.

ENTRY PERMIT GUIDELINES

- An entry supervisor must fill out and sign the permit before any activity can begin.
- If problems occur during the work in the space, they must be recorded on the permit.
- Permits must be kept on file for at least one year.
- Warning signs must be posted at entrances to all permit-required spaces to let everyone know a written permit is needed before entry.

Testing and Monitoring the Atmosphere

Everyone working in a permit-required confined space must be familiar with basic air monitoring. The space must be monitored before entry. Depending on the hazards and the type of work being performed, testing will be conducted either continuously or periodically. Confined spaces can be monitored for:

- ✓ oxygen deficiency or enrichment.
- ✓ fire or explosion hazards.
- ✓ toxic contaminants.

CONTINUOUS MONITORING IS REQUIRED IF:

- ventilation is necessary to control atmospheric hazards.
- welding or other hot work is being done.
- chemicals with airborne hazards are being used in the space for cleaning or other purposes.

TESTING GUIDELINES

- Test for sufficient oxygen and hazardous levels of toxic or combustible substances.
- The air in the confined space should be tested from top to bottom since some gases such as butane and propane are heavy and will sink to the bottom.
- Excavations more than 4 feet deep, where oxygen deficiency or other hazardous atmosphere exists or could exist, must also be tested.

Controlling the Atmosphere

Atmospheric dangers are the primary hazards of permit-required confined spaces. Before anyone enters a confined space, atmospheric control measures must be taken. These controls are chosen based on the hazards present in the space and the type of work being done.

INERTING

To help control the potential for explosion or fire, inerting is used to displace fuel or oxygen with nonflammable gas such as nitrogen, argon or carbon dioxide.

VENTILATING OR PURGING

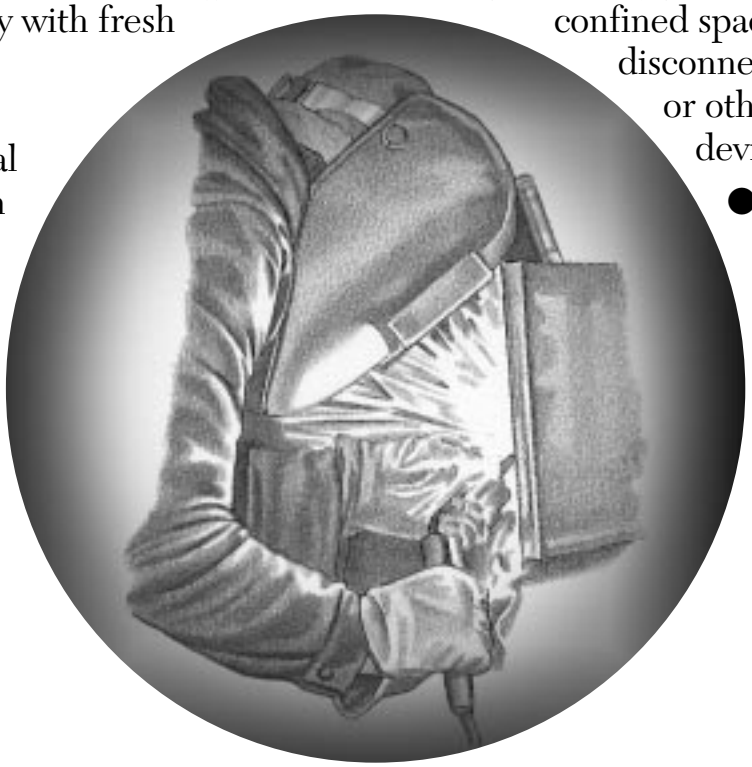
Purging or ventilating must follow inerting because inerting agents are colorless, odorless asphyxiants that can affect your breathing or even kill you. Purging is a process where breathing-quality air is added to the space. Ventilating removes contaminated air and replaces it with breathing-quality air. It's probably the best and most effective method of cleaning a hazardous atmosphere. A common method of ventilation uses a large hose with a fan attached to one end. The hose is placed in the confined space and the fan draws in fresh air from outside.

Hot Work and Confined Spaces

When hot work activities such as welding, cutting and heating are done in a confined space, there are a number of potential dangers. It's important to follow all confined space safety regulations and guidelines to help reduce the risk of danger.

WORKING SAFE

- Obtain entry and hot work permits for your confined space.
- Test the confined space's atmosphere for combustible gases and liquids. If flammable substances are found, have them removed entirely and then retest the site.
- Have emergency rescue equipment and personnel in place outside the confined space.
- Ventilate the confined space continually with fresh air.
- Use mechanical ventilation when the natural fresh air supply is not enough.
- Use air-line respirators when ventilation isn't adequate.
- A worker outside the space must stay in constant communication with the workers inside the space in case there is an emergency.
- Avoid taking cylinders containing oxygen, acetylene or other fuel gases into confined spaces.
- Immediately remove open-end fuel-gas and oxygen hoses from a confined space when they are disconnected from a torch or other gas-consuming device.
- When torches are not in use, close torch valves and remove the torches from the confined space.



Confined Spaces: Know Your Role

When it comes to confined spaces, it's especially important to know the role you play. Each role—entrant, attendant, supervisor and rescue team member—is critical and each has a carefully defined set of responsibilities.

ENTRANT

An entrant is a person who goes into the space to do the work. Entrants must:

- follow company procedures at all times.
- know the hazards of the space.
- know how to use equipment for entry and work in the space.
- perform assigned work in a safe, efficient manner.
- stay in communication with the confined space attendant.
- wear protective clothing and equipment such as harnesses, retrieval lines and respirators.
- alert the attendant to any danger.
- evacuate the space when ordered to do so.
- lockout/tagout all energy sources.
- make sure the area is tested and well-ventilated.

ATTENDANT

The attendant observes, assists and calls for rescue in case of emergency. The attendant must:

- follow company procedures at all times.
- know all emergency procedures.
- monitor conditions in and around the confined space.
- know all the hazards of the space.
- stay in constant contact with workers in the confined space.
- assist the entrant as required.
- recognize signs that an entrant is in trouble.
- prevent unauthorized people from entering the space.
- be prepared to order an evacuation if necessary.
- never go inside to rescue anyone, but will call rescue personnel instead.

SUPERVISOR

The supervisor is responsible for the planning and completion of the confined space entry permit. The supervisor must:

- follow company procedures at all times.
- know the hazards of the space.
- remove unauthorized people from the space.
- authorize the beginning and end of the entry permit.
- decide on all control measures such as lockout/tagout, isolation and ventilation and make sure that they've been completed.
- arrange for rescue services.
- ensure that rescue equipment is set up and ready to use.

RESCUE TEAM

The rescue team is responsible for rescuing the entrant if necessary. Team members must:

- always follow company procedures.
- have the same level of training as entrants.
- know first aid and CPR.
- be able to use all necessary rescue equipment and rescue techniques.
- be able to understand the information given to entrants.

Be Prepared for a Confined Space Emergency

It's no secret that confined spaces are dangerous places. Each year, approximately 54 workers die in confined spaces. Nearly two-thirds of these deaths result from people attempting to rescue workers in a confined space. Use the following guidelines when planning for confined space emergencies:

- **Establish written emergency plans for each type of confined space site and activity.**
- **Put together and thoroughly train a confined space emergency rescue team.**
- **Review emergency plans with workers and make sure each worker understands his or her role during an emergency.**
- **Whenever a worker is inside a confined space, make sure that at least one trained attendant (certified in first aid, CPR and rescue procedures) is on site and in constant communication with the confined worker. The attendant should communicate by radio, field telephone or sight, and must never leave the space or opening.**
- **Have emergency rescue equipment such as a self-contained breathing apparatus (SCBA), a safety harness and line (preferably a full-body harness and a lifeline attached to a block and tackle) or a basket stretcher readily available.**

Trenching Safety

In the construction industry, excavation work such as trenching can be extremely hazardous. A trench is defined as a narrow excavation made below ground in which the depth is greater than the width, and the width is 15 feet or less.

The most common type of trenching accident, a cave-in, is also the most deadly. Cave-ins are usually the result of unsafe work practices such as: not using shoring, using inadequate shoring, excavating too close to a building or utility pole, misjudging the stability of the soil, vibrations caused by construction work, or weather conditions that change the soil around the excavation. Remember the following tips when working with trenches:

BEFORE YOU DIG...

- **Contact** all local utility companies as well as the owner of the property to find if there are any underground fixtures that may present a problem.
- **Remove** or secure any surface objects that may create a hazard, such as rocks, trees, poles and sidewalks.
- **Plan** for emergencies during trenching. Make sure you have emergency rescue equipment and trained rescue personnel on site.
- **Classify** the type of soil and rock deposits at the excavation site as either stable rock or type A, type B or type C soil. Soil classification must be made by using one visual and at least one manual analysis. Use the following definitions to help you type your soil:
  stable rock—natural solid mineral material that can be excavated with vertical sides and will stay intact while exposed
  type A soil—examples include clay, silty clay, sandy clay and clay loam
  type B soil—examples include silt, silty loam and sandy loam
  type C soil—examples include granular soils such as gravel, sand, loamy sand, submerged soil, soil from which water is freely seeping and submerged rock that is not stable

DURING TRENCHING...

- Always wear the proper personal protective equipment for the job.
- Know how and where to exit the trench. Remember, if a trench is 4 feet deep or greater, an exit must be provided within 25 feet of each worker.
- Keep trenching machines level to prevent undercutting the soil and keep the shoring as close as possible to the trenching machine.
- Pile excavated soil at least 2 feet from the edge of the trench.
- When there has been a change in weather, such as a heavy rain or thawing after a freeze, check with your supervisor before going into the trench. Trench walls that were safe when dry or frozen can collapse when saturated with water or thawed out.
- In excavations deeper than 4 feet or where hazardous atmospheres exist or could exist, the air must be tested before entry.
- Keep materials and equipment that could roll or fall into a trench at least 2 feet away from the edge.
- Before getting into any trench, make sure that the cross-bracing is in place and tight. Cross-bracing may be screw jacks, hydraulic jacks or cleated and rigidly jacked or wedged timbers.
- Make sure the sheeting that forms the walls of the shored trench extends at least 18 inches above the top of the trench.
- Use extra caution when walking around or moving equipment around trenches. Equipment or soil dropped into a trench could injure workers below.
- If equipment such as wheelbarrows and cement mixers must be used over a trench, be sure to provide extra vertical supporting members between the stringers of shoring.

The Price of Accidents

When Jerry Wong was asked to take a measurement on an overhead conveyor, he didn't follow his company's lockout/tagout procedures to shut down the conveyor because it "was only going to take a minute" and shutting down would interrupt production. As a result, Jerry fractured and dislocated a finger when his tape measure was pulled into the moving belt. In addition, Jerry's injury cost the company nearly $15,000 in medical expenses, investigation, lost work hours and replacement parts for the damaged equipment.

If Jerry had shut down the machine to do the work, the company estimated that it would have cost only $250 in lost production and Jerry would have escaped injury.

Accidents Cost Everyone

Every on-the-job accident has costs, and the costs always include more than money.

You might be surprised at the ripple effect an accident can cause. When someone you work with is injured on the job, it affects you. Accidents directly affect your company's productivity, which can cause your company to lose business. When your company loses revenue, it can mean layoffs or less money and benefits for workers. In addition, when accidents occur, your company's workers' compensation insurance premiums go up. The more money spent on insurance, the less money available for workers' wages.

When a serious incident occurs on a site, such as a fire or explosion, you may be out of work while the damage is being repaired. And many badly damaged worksites shut down permanently or are taken over by other companies. Workers are likely to lose their jobs when this occurs.

When accidents happen, everyone feels stress. You can't perform your best when you're worried about your safety and health. And when coworkers lose their jobs because of disability, everyone suffers emotionally.

It's worth it to take the time and care to use the right equipment and procedures, wear the right personal protection and follow safe work practices at all times. You must also be alert to the safety needs of your coworkers.

Remember, accidents affect everyone and everyone pays a price. By simply following safe work procedures and seeing that your coworkers do the same, you will be doing your part to ensure a healthy and safe future for both you and your company.

Always Be on the Lookout for Hazards

Think about the last accident that happened at work. Chances are it happened because someone wasn't looking out for hazards. Staying aware of all that is going on around you is one of the keys to preventing construction site accidents.

Most construction sites are very busy with people, vehicles, machines and hoisting equipment, all of which are constantly moving around, both on the ground and in the air. To protect yourself and those around you:

- ✓ **Keep a constant lookout in all directions (front, back, sides, above and below).**
- ✓ **Watch for moving objects. These include trucks, heavy equipment, hoists, machinery, crane booms and buckets, etc.**
- ✓ **Assume equipment operators can't see you and act accordingly.**
- ✓ **Be especially aware when sitting or crouching behind vehicles that might back up.**
- ✓ **If you're a driver, watch for people who aren't aware.**
- ✓ **Look before dropping anything to the ground from ladders, scaffolds or second stories.**
- ✓ **Look below you as you climb down a ladder.**
- ✓ **Stay away from swinging loads and from areas where debris is being lowered.**
- ✓ **If you work below, make sure those above you know you're there. And look up often to keep track of what's going on above you.**
- ✓ **Watch your step. Avoid walking into an open stairwell, off the edge of an unfinished platform, through a false ceiling or temporary covering or into the path of a moving truck.**
- ✓ **Keep your eyes on the path ahead of you so that you won't trip on a pile of lumber that wasn't there the last time you walked by.**
- ✓ **When carrying objects, make sure that you can see ahead of you so you won't trip or fall.**
- ✓ **Keep your protective eyewear clean and free from scratches so that you can see where you're going.**

Fall Protection for Scaffold Work

Fall hazards account for a high percentage of the injuries and deaths suffered by construction workers. When you're on a scaffold platform more than 10 feet above a lower level, you must use some type of fall protection. The type of fall protection required depends on the type of scaffold you're using. Use the following chart to make sure you're using the correct equipment.

SCAFFOLD TYPE	FALL PROTECTION REQUIRED
ladder jack, needle beam, float, catenary, boatswain's chair	personal fall arrest system
single-point or two-point adjustable suspension	personal fall arrest system and guardrail system
chicken ladder	personal fall arrest, guardrail or grab-line system
self-contained adjustable scaffold (when the platform is supported by ropes)	personal fall arrest and guardrail system
self-contained adjustable scaffold (when the platform is supported by a frame)	guardrail system
walkway within a scaffold	guardrail system within 9½ inches of and along at least one side of the walkway
overhand bricklaying from a supported scaffold	personal fall arrest or guardrail system

REQUIREMENTS OF PERSONAL FALL ARREST SYSTEMS FOR SCAFFOLDS

- They must meet the OSHA requirements of 1926.502 (d) and 1926.452 (g) (3).
- They must be attached by a lanyard to a vertical or horizontal lifeline or scaffold structural member.

REQUIREMENTS OF GUARDRAIL SYSTEMS

- They must meet the physical OSHA requirements of 1926.452(g) (4).
- Guardrails manufactured or put into service after Jan. 1, 2000, must be between 38 and 45 inches high. Before this date, guardrails must be between 36 and 45 inches high.
- When screens or mesh are used, they must extend from the top edge of the guardrail system to the platform, along the entire opening between the supports.
- Steel or plastic banding can't be used as a top-rail or midrail.
- They should be inspected by a qualified person before each use.

Beware of Extreme Temperatures

In construction, working outdoors in all sorts of weather is just part of the job. Because you can't stop working when it gets hot or cold, it's important to know how to protect yourself and what to do if someone on your crew gets a temperature-related illness.

HEAT-RELATED INJURY

Heat exhaustion—

symptoms include:

- ❊ fatigue
- ❊ weakness
- ❊ cramps
- ❊ sweating
- ❊ dizziness
- ❊ giddiness
- ❊ nervousness
- ❊ fainting
- ❊ nausea
- ❊ vomiting
- ❊ sweaty, clammy, pale skin

What to Do

- ■ Get the person to a cool spot and give him or her cool water.
- ■ Loosen the person's clothes and then sponge his or her body with cool water.
- ■ If the person is vomiting or unconscious, take him or her to a hospital immediately.
- ■ Massage cramped legs, arms or abdomen.
- ■ Give a half teaspoon of salt dissolved in a cup of water.

Heatstroke—

symptoms include:

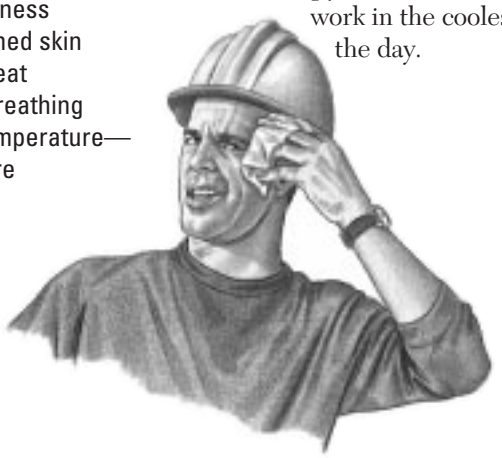
- ❊ confusion
- ❊ delirium
- ❊ unconsciousness
- ❊ hot, dry, flushed skin
- ❊ rapid heartbeat
- ❊ loud, rapid breathing
- ❊ high body temperature—105° F or more
- ❊ dizziness
- ❊ headache
- ❊ convulsions

What to Do

- ■ Call an ambulance immediately.
- ■ Cool the victim by placing in a tub of cool water, or wetting him or her with a hose or wet cloths.
- ■ Massage the victim's hands and feet to distribute circulation.

Prevent heat-related injury by:

- ■ starting work slowly.
- ■ drinking cool water frequently—at least 8 ounces every 20 to 30 minutes.
- ■ avoiding alcohol and carbonated drinks which can cause cramps.
- ■ taking frequent rest breaks to cool down.
- ■ wearing light-colored, loose, light-weight clothing.
- ■ working in the shade if possible.
- ■ wearing a hat if you work in the sun.
- ■ paying attention to how you feel.
- ■ paying attention to the appearance and actions of your coworkers.
- ■ doing your heaviest, hardest work in the coolest part of the day.



COLD-RELATED INJURY

Hypothermia—

symptoms include:

- ❊ uncontrollable shivering
- ❊ cool, pale skin
- ❊ slow pulse
- ❊ confusion
- ❊ weakness or drowsiness
- ❊ apathy
- ❊ cold abdomen

What to Do

- • Get out of the cold.
- • Remove cold, wet clothes and dry off.
- • Drink warm fluids and eat high-energy foods.
- • Cover up with blankets.
- • Seek medical attention.

Prevent hypothermia by:

- • dressing in warm layers.
- • wearing windproof clothing.
- • choosing clothes that stay warm when wet, such as wool or polypropylene.
- • wearing a warm hat.
- • seeking shelter often.

Beware of Stairs and Slippery Surfaces

Stairs can be dangerous, especially around construction sites. Loss of traction causes the highest number of slipping and falling accidents and is usually due to water, grease, mud or other slippery substances. Slips are more likely to happen when you hurry or run, when you wear the wrong type of footwear, or when you don't pay attention to where you're walking. Because we use stairs so often, it's easy to forget that they can be hazardous. Follow these safety precautions to avoid slipping:

- **Use handrails.**
- **Never run up or down stairs or jump from landing to landing.**
- **Never carry a load that you can't see over, especially when going up or down steps.**
- **Never store materials, tools or equipment on stairways.**
- **Always watch where you're stepping.**
- **Report broken stair treads, handrails or other unsafe conditions.**
- **Keep stairs free from water, grease, oil, dirt, mud and other slippery substances.**
- **Clean up spills immediately.**

If the Shoe Fits...

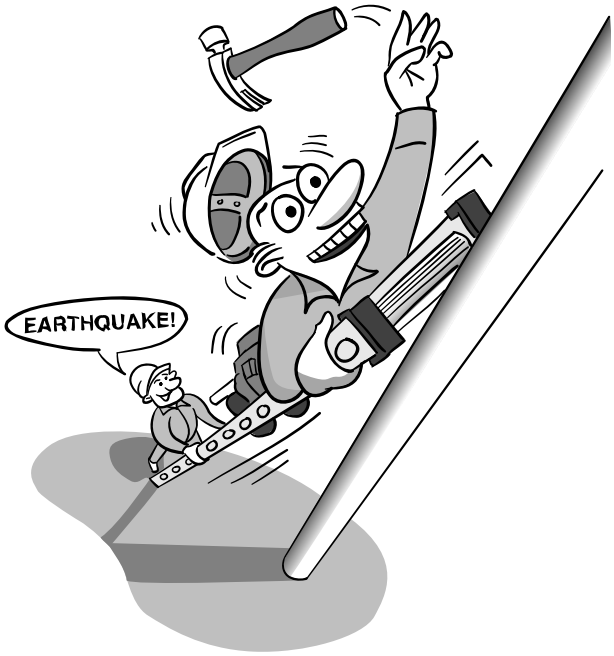
When selecting safety footwear, determine what conditions and/or hazards you face most often on the job. Shoes with neoprene soles work well for most wet or dry work surfaces. However, they're not recommended for oily conditions. Nonslip shoes and soles are the most useful when climbing ladders or scaffolds. And shoes with crepe soles are best for rough concrete, either wet or dry, but are not suggested for tile, smooth concrete or wood surfaces. Use nonskid devices such as strap-on cleats for icy conditions and slip-on covers for your shoes for encounters with oil, chemicals, grease and ice.

Horseplay Can Be Deadly

It seemed like a sure way to get some laughs. Some of the guys greased the rungs of Jose's ladder while he was up there with a can of paint. But the punch line wasn't very funny. Jose decided to press charges and is preparing a civil lawsuit to cover the cost of his broken leg and lost work time. Some old friendships came to an end that day.

Practical jokes and horsing around in the workplace are always wrong. Chances are that in Jose's case, one person suggested the joke and the others went along with it against their better judgment. There always seems to be someone who is thinking of ways to get a laugh at another person's expense. Most of us feel uneasy around this type of person. The best thing you can do for yourself and others is listen to your inner voice. Let the joker know in no uncertain terms that you're not going along with the joke and that you think it's wrong. You'll often be surprised to find out how many other people have been thinking the same thing but didn't have the courage to say it.

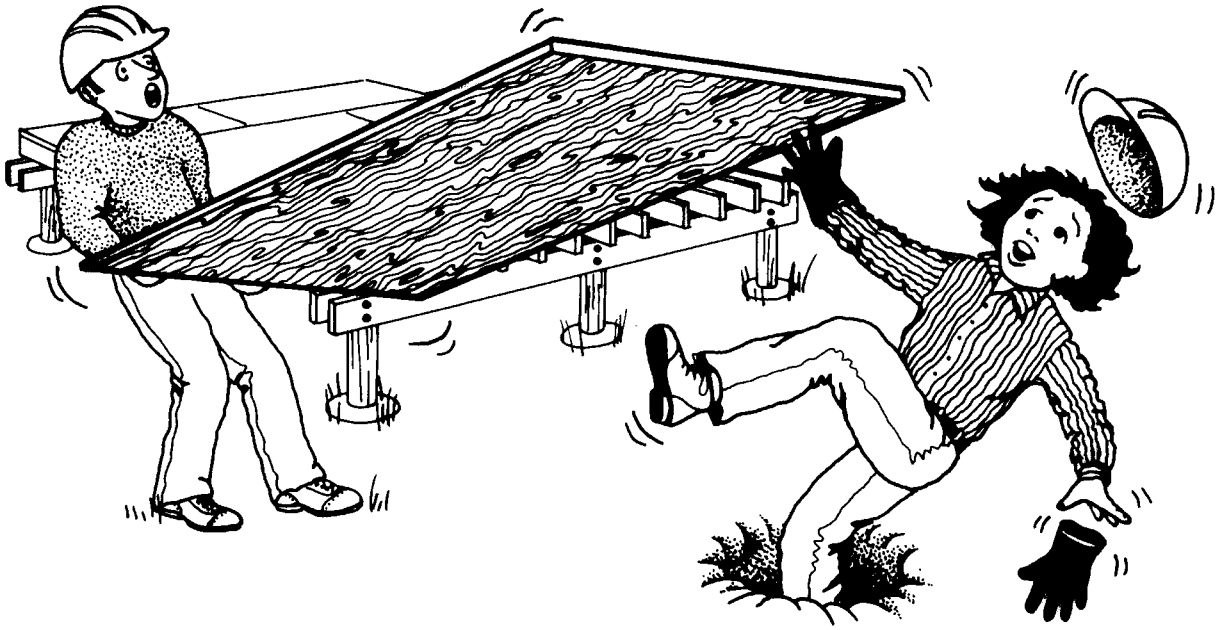
Even if a joke or horseplay isn't dangerous in itself, it can result in humiliation, embarrassment, anger, hurt feelings, distrust and even a desire for revenge. When practical jokes are common at the worksite, it's hard to pay attention to your job, because you always find yourself on the lookout for the next joke. And horseplay is a safety hazard that can quickly get out of hand and lead to injury or death. If you get hurt as a result of horseplay, don't expect to be covered by workers' compensation; it's not considered a job-related injury. And if someone gets hurt as a result of your horseplay or joke, you may be liable for damages and you'll definitely be at risk of losing your job.



Remember, it's up to everyone to protect each other's safety by keeping horseplay and practical jokes out of the workplace. You don't have to confront the practical joker in front of everyone; you can take him aside and remind him of the possible consequences, or express your concerns to a supervisor.

Working Safely Around Holes and Other Openings

It was a small hole—barely big enough for a man to fit through. Tom was going to cover it in the next hour. He grabbed a sheet of 4-by-8 plywood from the stack, threw it over the hole and went to lunch. Along came Maria and Jay, who needed just such a sheet of plywood. Wondering why someone had left it lying on the ground instead of stacking it, they decided to use it. With the plywood between them, they didn't see the open hole. Suddenly, Jay was standing alone with one end of the plywood. Maria had fallen into the hole.



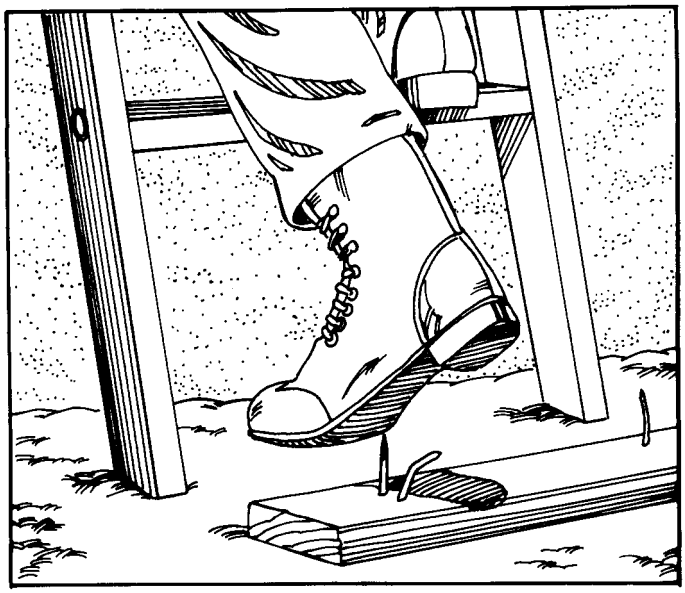
You may think this story is humorous since Maria escaped with only a few bruises, but it could have been more serious. You can bet that Tom will never make this mistake again. Follow the safety guidelines below for safely securing floor openings:

- **Never leave a floor opening uncovered or unguarded, even for a few minutes.**
- **Select a covering that's big enough to overlap the edge of the hole generously.**
- **Make sure the floor covering is thick enough to cover the hole without sagging in the middle. The bigger the opening, the thicker the covering should be.**
- **Nail down the cover, even if it's only going to be there for an hour.**
- **Erect a simple barricade or rope off the area and post warning signs.**
- **If you see an uncovered floor opening, secure it and report it immediately.**

Beware of Puncture Wounds

It's important to protect your hands and feet from the possibility of a puncture wound from a sharp object. Sharp objects such as nails and staples can cause serious injury if stepped on. There are two things you should know about puncture wounds: how to prevent them and what to do if you get one.

PUNCTURE WOUND PREVENTION



- **Remove nails from wood immediately when braces, guards, rails, forms and such are dismantled.**
- **Carefully move scrap lumber that may contain nails to a scrap heap away from pathways in your work area.**
- **Watch out for nails on the ground. They often land point up in mud, weeds, debris or on bare ground if they have wide heads.**
- **Keep your work area clear of dust and other things that might hide nails, so you can spot them more easily.**
- **Be especially careful about areas at the base of ladders or other places where you or others might step backward.**
- **Be extra careful using power tools that drive nails, staples or punches, and follow recommended precautions when using them.**
- **Wear appropriate footwear with sturdy soles.**

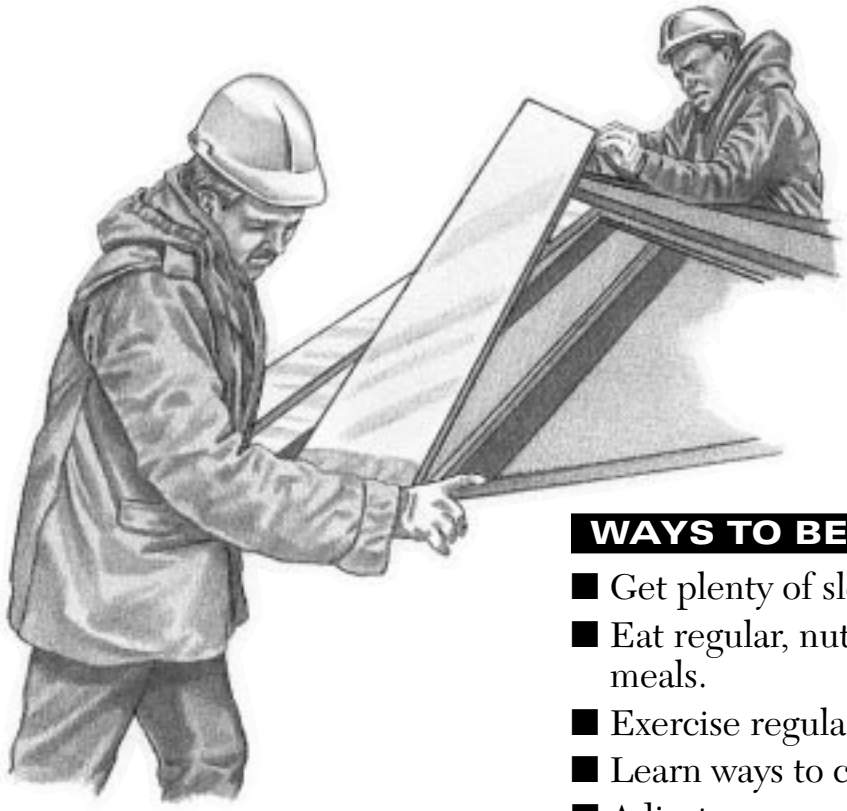
PUNCTURE WOUND TREATMENT

Always treat a puncture wound with special care, even if it doesn't seem to hurt very much. The point of a sharp object carries bacteria deep into your flesh where antiseptics can't reach. The surface wound may heal while an infection is developing underneath the skin.

Clean the wound with soap and water, report it and keep an eye on it. If the wound doesn't seem to be healing, or if there's reddening, swelling or increased pain, you may be developing an infection and you must see a doctor. If you work around sharp objects, have a tetanus booster shot every five to 10 years to prevent serious complications from puncture wounds.

Watch Out for Fatigue

Almost everyone experiences fatigue at one time or another. But on the job, it can endanger you and others by causing you to be inattentive and careless.



CAUSES OF FATIGUE

- ✓ **illness**
- ✓ **stress**
- ✓ **lack of sleep**
- ✓ **overwork**
- ✓ **poor sleeping habits**
- ✓ **poor nutrition**
- ✓ **lack of exercise**
- ✓ **depression**
- ✓ **worry or anxiety**
- ✓ **drugs such as alcohol, caffeine, tranquilizers, nicotine, and allergy or cold medications**

WAYS TO BEAT FATIGUE

- Get plenty of sleep.
- Eat regular, nutritious, well-balanced meals.
- Exercise regularly.
- Learn ways to cope with stress.
- Adjust your workload if possible.
- Stay away from caffeine, alcohol, nicotine, tranquilizers and allergy and cold medications.
- Find time to relax and do something you enjoy each day.
- If you experience depression, seek help.

SEE YOUR DOCTOR IF YOU:

- have unexplained muscle weakness.
- experience sudden, unplanned weight loss.
- are too tired to do your daily activities.
- don't feel better after several weeks of self-treatment.

Strains and Sprains: What You Should Know

Construction work is a physically demanding job, and there may be times when you accidentally overexert yourself and suffer a strain or sprain. It's important for you to recognize your injury and know how to treat it.

A strain is an injury caused by overstretching a muscle. A sprain is an injury to the tissue surrounding a joint. These injuries can cause pain and swelling. You can have both injuries at the same time.

How to Treat Your Injury

Just remember R.I.C.E. when you have a strain or sprain.

R=Rest: Avoid putting weight on the injured joint for 24 to 48 hours. Support a sprained wrist, elbow or shoulder with a sling. Tape a sprained finger or toe to a healthy one.

I=Ice: Immediately apply ice or cold packs to the injured area to reduce swelling. Place a cloth between your skin and the ice or cold pack. Use for 10 minutes every hour.

C=Compression: Wrap the injury with a flexible cloth bandage or compression sleeve to further reduce swelling.

E=Elevation: Try to keep the injured area raised above your heart.

More Tips

- Relieve pain and inflammation with aspirin, ibuprofen or naproxen.
- When pain and swelling have subsided, begin gently moving and stretching the injured joint and gradually phase in strengthening exercises.
- Report all injuries to your supervisor.
- Seek medical attention if there are any signs that your injury is serious

SIGNS IT MAY BE MORE THAN A STRAIN OR SPRAIN

- ✓ **intense pain and swelling (indicating a possible fracture)**
- ✓ **a cold, blue or numb area beyond the injury**
- ✓ **a misshapen or very unstable joint that won't support your weight or wobbles from side to side**
- ✓ **severe pain after two days of home treatment**
- ✓ **no improvement after four days**

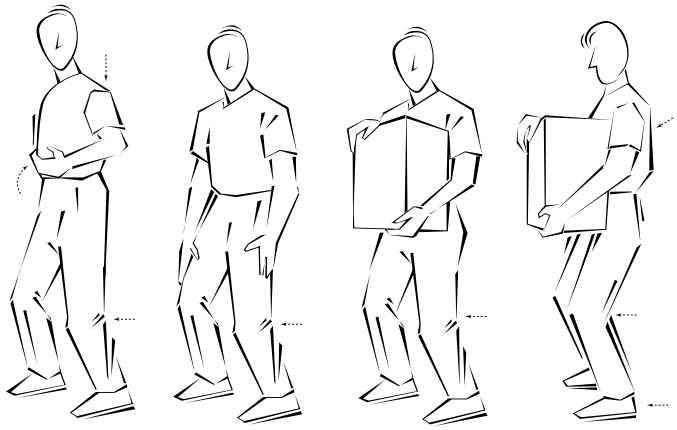
Lifting Basics

The construction industry has the second highest rate of back injuries. Twenty-five percent of injuries in construction are back injuries. Not only is a back injury painful, but it can be permanent and it can end your career. Know and use the following guidelines for correct lifting and avoid unnecessary injury.

BEFORE YOU LIFT

Size up the load and ask yourself:

- **Is this object too heavy or too awkward for me to lift and carry alone?**
- **How high do I have to lift it?**
- **How far do I have to carry it?**
- **Is this lifting a regular part of my job?**
- **Am I trying to impress someone by not using a mechanical lifting device?**
- **Is the path clear?**



WHEN LIFTING

- ✓ Position your feet correctly: one foot next to the load and one foot behind it.
- ✓ Center yourself over the load, squat at the knees with your back straight and your head forward.
- ✓ Grip and hug the load using your full palms and keeping your elbows and arms near you.
- ✓ Lift straight up, thrusting down with your legs.
- ✓ Never twist your body. If you must turn, point your feet in the direction you need to turn.
- ✓ Set the load down by slowly bending your knees, letting your legs do most of the work. Don't let go of the load until it's on the ground.

KNOW YOUR OWN STRENGTH

- Most women should lift no more than 28 pounds. Only 10 percent can lift as much as 47 pounds.
- Most men should lift no more than 37 pounds. Only 10 percent can lift 70 pounds safely.

IF YOU GET HURT

- Report any injury to your supervisor immediately so he or she can help you set up a work plan and you can protect your workers' compensation rights.
- Give your injury time to heal.
- If pain persists, see your doctor.
- Get into a physical conditioning program that includes stretching and strength exercises.

How Much Do You Know About Back Safety?

Back injuries are a frequent cause of lost work and income, not to mention severe pain. Knowledge is your most powerful back safety tool. Take these quizzes to test your knowledge of back safety.

1. TRUE OR FALSE: If an object weighs more than 50 pounds, you should not lift or carry it by yourself.

2. Name five common causes of back injury:

_____ _____

_____ _____

_____

3. TRUE OR FALSE: When you lift properly, you use the strength of your back, not your arms.

4. TRUE OR FALSE: You should do warm-up exercises before work to help prevent muscular injury.

5. Name four of the most common lifting injuries:

_____ _____

_____ _____

6. What are the five rules of safe lifting?

_____

_____

_____

_____

_____

ANSWERS: 1. True. Most people should not lift anything weighing more than 40 pounds by themselves. **2.** lifting with straight legs; bending at the waist; tripping while carrying an object; trying to lift something too quickly; leaning or stretching to pick up an object; lifting when tired; lifting awkwardly-shaped objects; lifting something that's too heavy. **3. False.** When you lift, you should use the strength of your legs, not your back. **4. True. 5.** back strains and sprains, slipped discs, muscle spasms, hernias **6.** Tuck your pelvis; bend your knees; hug the load close; avoid twisting; if it's too heavy, don't lift it.

HOW OFTEN DO YOU DO THE FOLLOWING?

	ALWAYS	SOMETIMES	SELDOM
back exercises to keep in shape			
ask for help when a load is too heavy			
practice good posture			
stretch before lifting			
use mechanical aids, such as dollies and forklifts			
get regular exercise			
avoid overdoing it			

Give yourself two points for each "Always," and one point for each "Sometimes" answer. A score of 12 to 14 means your doing everything right. A score of 8 to 11 means you're aware of back safety, but you could be doing better. A score below 8 means you better start taking better care of your back.

MARK EACH OF THE FOLLOWING AS "SAFE" OR "AT RISK."

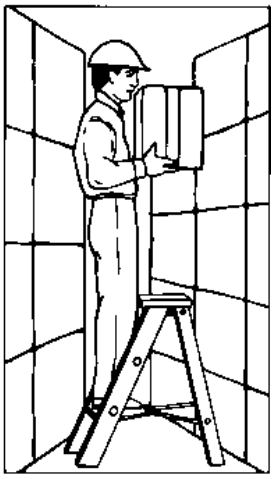
	SAFE	AT RISK
1. bending at the waist to pick up a heavy object		
2. bending your knees instead of your back		
3. holding the load close to you		
4. lifting straight up		
5. lifting with your hands only		
6. tucking your pelvis in as you lift		
7. turning the upper half of your body		
8. twisting as you lift or put down an object		

Answers: Safe: 2, 3, 4, 6; At Risk: 1, 5, 7, 8

Tips for Lifting and Moving Awkward Loads

The safest way to lift an object is to tuck your pelvis, bend your knees, hug the load close to you and lift straight up without twisting, while maintaining the natural curves of your back. But what if the object is overhead, below you in a bin or just too awkward for standard lifting techniques? Here are some suggestions for handling awkwardly shaped or awkwardly located loads.

OVERHEAD LOADS



- Use a ladder, stool or platform to avoid overreaching.
- Test the weight, then slide the object toward you and hug it close as you descend.
- If possible, lower the object to a coworker before descending.

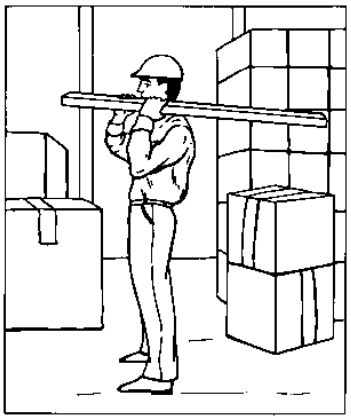
CAN'T SEE WHERE YOU'RE GOING?

- Get mechanical help or ask a coworker to help you, even if the load is light.

LONG, HEAVY LOADS

- Get a coworker to help you. Walk in step, carrying the load on your shoulders.

LONG, LIGHT LOADS



- Carry them on your shoulder, with the front end higher than the rear.

REACHING INTO A BIN

- Stand with your feet shoulder-width apart.
- Bend your knees slightly.
- Squat as far down as comfortable, using your hips and knees, not your waist.
- Slide the load as close to you as possible.
- Tighten your abdominal muscles.
- Brace your knees against the sides of the container for support.
- Raise yourself, using your leg and hip muscles, not your back.

What awkward lifting tasks do you encounter in your work area? How do you handle them?

_____

_____

_____

Are there ways to store or package your awkward materials to make them safer?

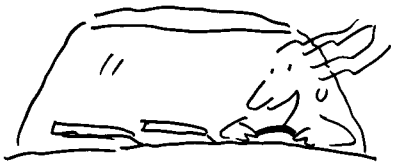
_____

_____

_____

Know Your Driving Personality

What type of driver are you? Many people reveal their personalities in the way they drive. Others take on an entirely different personality when driving. Knowing what personality is at work when you hit the road helps make you a better driver. Which of the following driving styles most closely matches your driving personality?



The Speeder

Some speeders just like to drive fast. Others drive that way because they're behind schedule. They'd like to drive more carefully, but they just don't have time. If you speed because of poor time management, get into the habit of giving yourself an extra 10 to 15 minutes to get to your destination. Don't forget to leave time for finding parking or an unfamiliar address.

The Automatic Driver

These drivers are the picture of calm: eyes fixed on the road ahead. But in reality, their minds are a million miles away. Nothing ruffles them because they don't notice anything expect the narrow focus of the road ahead. They're totally unprepared for the unexpected. If you find yourself driving "on automatic," make yourself look around and observe what's going on around you. Check conditions in every direction.

The Aggressive Driver

These people are easy to spot. They're habitual tailgaters and they don't hesitate to cut in front of other drivers. Their message is clear: Get out of my way if you know what's good for you. Unconsciously, they may think of driving as a contest to be won at all costs. If you find yourself slipping into this personality when you drive, take a minute to think of the other drivers on the road as real people with needs just as important as yours. By cooperating, we can all get where we're going safely and without unnecessary stress.

The Distracted Driver

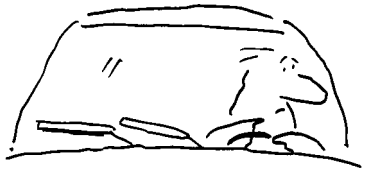
Distracted drivers spend their driving time planning their day, rehashing yesterday's meeting, talking on their cellular phones, applying makeup or worrying that they forgot something at the store. Distracted drivers may think of the daily commute as a time to shave, read the newspaper, eat breakfast or catch up on business. They're so busy with these activities, they may not always be alert to road and traffic conditions. Try setting aside distracting chores. You'll arrive at your destination more refreshed.

The Timid Driver

Timid drivers often drive so slowly that they tie up traffic and cause other drivers to have to brake suddenly. Speed and traffic makes them nervous and causes them to make poor and unexpected driving decisions. If you're a timid driver, or you come across one of them on the road, learning defensive driving techniques might be the answer.

The Sleepy Driver

Some people are lulled into a drowsy state by the sound of the car engine and the monotony of the road. It's difficult to be alert when you're sleepy. If you get drowsy when driving, stop, get out of the car and take a breath of fresh air. Take a coffee break or stop for a nap on long trips. Stopping to rest won't delay your trip nearly as long as falling asleep at the wheel will.



The Indecisive Driver

Should I change lanes? Do I want to turn here? Should I speed up? Slow down? Indecisive drivers never quite seem to know what they're going to do next. Unfortunately, neither do the other drivers around them. If you're indecisive, try mapping out your trip in advance and deciding what you're going to do before you get in the car. Pull over if you get confused. Signal your intentions to other drivers by using your turn signals. Learning defensive driving techniques can also help you make better driving decisions.

The Good Driver

The good driver tries to be aware of negative driving personality traits and to balance them with extra caution and common sense. Though good drivers often would prefer to be somewhere else other than on the road, they maintain their focus in the present, pay attention to what's going on around them and practice courteous, defensive driving.

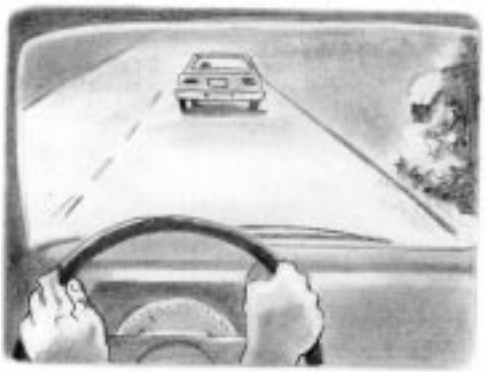
Keep Your Distance

If the car in front of you stops suddenly, you need to be far enough behind it so you can stop in time to avoid a collision. But how far is that? Your safe following distance depends on how fast you're going and what the road conditions are. The two-second rule is a convenient way to figure out your safe following distance at various speeds without having to do calculations.

What Is the Two-Second Rule?

According to the two-second rule, your following distance should be at least two seconds travel time behind the vehicle in front of you. To measure your following distance, choose a landmark such as a telephone pole or a tree that the

vehicle in front of you has not yet passed. When the vehicle's rear bumper passes that landmark, start counting seconds ("one thousand and one, one thousand and two"). Your front bumper should not reach the landmark before you count for two seconds. If it does, you're following too closely.



The Two-Second-Plus Rule

Two seconds is the minimum following distance you should maintain. It applies to daytime driving in good weather conditions and at speeds less than 40 mph. Use the two-second-plus rule when traveling at higher speeds, when visibility is low or when weather or road conditions are unfavorable.

Under the two-second-plus rule, you should maintain a following distance of two seconds, plus additional seconds for each additional driving condition.

If...	*Add…*
you're traveling at more than 40 mph	**two seconds**
you're driving at night	**one second**
the vehicle in front of you is a motorcycle	**one second**
there's fog or poor visibility	**one second**
the pavement is wet	**one second**
you're being tailgated	**two seconds**
you're being tailgated by a tractor-trailer or bus	**four seconds**
you're towing a trailer	**two seconds**

If several of these conditions apply, add up the extra seconds for all of them. For example, if you're driving behind a motorcycle in the fog, that's two additional seconds you'll add to the two-second rule, for a total of four seconds following distance.

Surviving the Storm:
Tips for Driving in Bad Weather

Prepare for driving in bad weather before it happens—your life may depend on it. If you can, avoid driving in bad weather and wait until the roads are safe. If you must drive, use the following tips to help you prepare.

PREPARE YOUR VEHICLE

- Check fluid levels: brakes, battery, anti-freeze, window washer, oil and transmission.
- Make sure your heater and defroster are in good working order and doors and windows are sealed properly.
- Replace your windshield wiper blades.
- Inspect your tires for tread wear, punctures or embedded debris such as nails.
- Carry emergency supplies in your vehicle: flashlight, flares, booster cables, ice/snow scraper, first aid kit, shovel, sand, salt, snow chains, blanket and water.

BAD WEATHER DRIVING TIPS

- Slow down: Give yourself more time to arrive at your destination.
- Be extra cautious when driving during the first rain after a dry spell. Oil and grease come to the road's surface, making it very slippery when wet.
- When braking in bad weather conditions, allow yourself three times as much distance as normal to reach a full stop and avoid skidding.
- Use low gears on slick surfaces, especially on hills and around curves.
- If your car skids, don't brake, unless you have an anti-lock braking system (ABS). Take your foot off the gas and gently turn your car in the direction you want it to go.
- Keep your headlights on during bad weather even if you can see; they help other motorists see you.
- Avoid using your high beams in fog.
- Clean your windshield and headlights often.
- If weather conditions worsen, pull over before you get stranded.
- If you get stuck in snow, avoid spinning your wheels—you'll only dig in deeper. Instead, shovel snow away from the wheel paths and place salt or sand around the drive wheel to improve traction.
- Always be aware of the other vehicles around you and be ready to react.

Vehicle Safety on the Site

Vehicles account for a large share of accidental injuries and deaths on construction sites. Like highway accidents, most of these accidents can be avoided by simply paying attention and knowing the rules for using vehicles on a worksite. The traffic rules and speed limits at the site are in place to make your job safer. All drivers and operators are expected to follow them.

OPERATING VEHICLES

- Only workers with documented training should operate vehicles and equipment on site.
- On a sloping surface or hill, always drive up and down rather than across. If you must drive across a steep hill, you can reduce your chances of rolling by attaching the vehicle with a wire rope to another vehicle that's stabilized at the top of the hill.
- When traveling downhill, keep the speed under control with low gears and brakes so you can stop at any time.
- Back up only when you're certain that no one's behind you. If you're not sure, get out and check or use a guide.

TRANSPORTING WORKERS

- The passenger load limit for flatbed trucks, dump trucks, pickup trucks and the like is no more than two workers outside the cab, unless the truck has rails or sides.
- Passengers outside the cab must stay immediately behind it and have suitable grab irons on the cab for handholds.
- Workers may not ride on top of side rails, running boards or fenders, or with legs hanging over the sides.
- Any vehicle that regularly transports workers once a day or more must have secure seats with safety belts, railings and steps for getting on and off.
- Never climb onto a vehicle while it's in motion or ride on heavy equipment anywhere but in a seat.

MAINTAINING AND REPAIRING VEHICLES

- Vehicles must be maintained on a regular, documented schedule kept on file.
- Before you take a vehicle from the storage area, always check the brakes, steering and warning signal, and use the vehicle only if everything checks out.
- Report loose bolts, fluid and air leaks, broken steps, handholds and windows and so forth.
- Clean windshields and mirrors and keep the cab and running boards free of loose items, debris and grease.
- Follow safety procedures when repairing a vehicle.
- Use tire cages for inflating truck and equipment tires in the repair shop. If you must inflate a tire in the field, make sure you're in the clear and watching the rim during inflation.
- Always shut down vehicles for repairs, adjustments and lubrication, and set the parking brake.
- Always place chocks around the wheels when parking on sloping surfaces.
- All equipment such as bulldozers, forklifts, backhoes and tractors should have all blades, hoists, buckets, scoops, etc. lowered to the ground before you work on them.
- If you must work under a raised dump truck body, make sure it is locked in the raised position. The same goes for working under bulldozer blades and carryall closing gates.
- When you refuel, do so away from welding operations or machinery that creates sparks. Stop all engines in the area and don't smoke.
- Whenever you're not sure about safety procedures for operating or maintaining your vehicle, ask your supervisor.

Vehicle Safety Inspection Checklist

Vehicles account for a large share of the accidental injuries and deaths on construction sites. But most of these accidents can be avoided by obeying traffic rules and speed limits and by performing frequent and thorough safety inspections of all work vehicles. Use the following checklist as a starting point for your own vehicle safety inspection program. Be sure to add to the list any special vehicle equipment that you feel should be inspected. Remember to inspect all vehicles, including heavy equipment such as bulldozers and backhoes.

ITEMS TO BE INSPECTED:

- ☐ **lights** (head, tail, side, warning, interior)
- ☐ **windshields and other windows**
- ☐ **windshield wipers**
- ☐ **mirrors** (side and rearview)
- ☐ **tires** (air pressure, wear and damage, lug bolts)
- ☐ **bumpers** (front and back)
- ☐ **running boards, steps**
- ☐ **seats**
- ☐ **turn signals** (front and back)
- ☐ **hazard signals**
- ☐ **horn**
- ☐ **warning siren**
- ☐ **reverse alarm** (for backing up)
- ☐ **brakes** (including parking brake)
- ☐ **steering**
- ☐ **clutch**
- ☐ **gear shift**
- ☐ **rails, handholds**
- ☐ **safety belts, harnesses**
- ☐ **heater, defroster**
- ☐ **air conditioning**
- ☐ **fluid levels** (brake, steering, oil, water, windshield, hydraulic, etc.)
- ☐ **radiator leaks**
- ☐ **hoses**
- ☐ **cables**
- ☐ **connectors**
- ☐ **bolts**
- ☐ **hooks**
- ☐ **chains**
- ☐ **booms**
- ☐ **buckets, scoops**
- ☐ **blades**
- ☐ **hoists**
- ☐ **forks**
- ☐ **guards**
- ☐ **gates**
- ☐ **straps**
- ☐ **braces**
- ☐ **blocks**
- ☐ _____
- ☐ _____
- ☐ _____
- ☐ _____
- ☐ _____

Prevent Collisions: Drive Defensively

A preventable collision, according to the National Safety Council, is "a collision in which the driver failed to do everything reasonable to avoid it." The National Safety Council advises drivers to follow three simple rules for preventing collisions.

1. Recognize the hazard.

Scan the road ahead—to the next intersection in cities, or to the next hill or curve on the highway. Check the traffic to your side and behind you by looking in the rearview and side mirrors every five seconds. Recognizing a hazard in advance gives you time to avoid it.

2. Understand defensive driving techniques.

Once you recognize a possible hazard, use your knowledge of defensive driving principles to choose the best way to avoid a collision in each situation.

3. Act correctly and in time.

After you've chosen the best defense against the hazard, take correct action in time to avoid a collision. This is where your alertness and driving skills pay off.

Driving Defensively

The National Safety Council defines defensive driving as "driving to save lives, time and money in spite of the conditions around you and the actions of others."

Defensive driving saves lives.
Drivers can learn the necessary skills to avoid collisions. Approximately two-thirds of all collisions are considered to have been preventable. By driving defensively, collisions and deaths can be prevented.

Defensive driving saves time.
Avoiding collisions saves you time lost due to injury and car damage.

Defensive driving saves money.
You'll save money that could be lost due to injury, missed work and car or other property damage.

Be a Safe Driver

- Be aware of the five characteristics of defensive driving: knowledge, foresight, alertness, judgment and skill.
- Check the road for hazards and learn how to react to them.
- Keep a safe distance between you and the next driver.
- Use the proper signals.
- Be alert and ready to react.
- Obey speed limits, traffic rules and signs.
- Give yourself plenty of time to get to your destination.
- Be patient and courteous to other motorists.
- Never tailgate.
- Never drive while intoxicated.
- Never drive when sleepy, ill or angry.
- Adjust your driving to the road conditions.

Take It Easy Behind the Wheel

Aggressive behavior can be a prescription for disaster when you're behind the wheel. Take this quiz to find out if you're an aggressive driver.

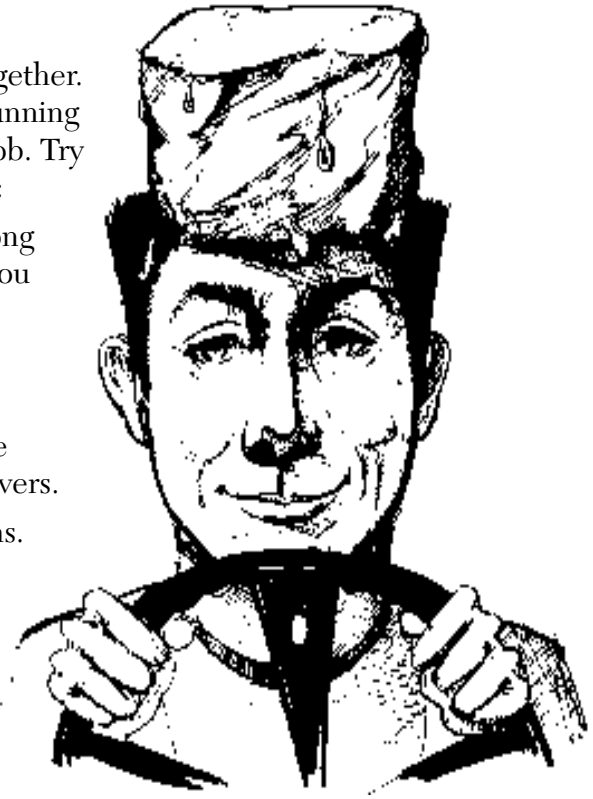
YES	NO	
☐	☐	***Do you try to get where you're going in the shortest possible time?***
☐	☐	***Do you fight the traffic, getting annoyed when other drivers move too slowly or block your way?***
☐	☐	***Do you often speed up at yellow lights?***
☐	☐	***Do you try to maximize your use of time by solving work problems, eating, reading or talking on the phone while driving?***
☐	☐	***Do you cut people off at intersections and exits?***
☐	☐	***Do people ever tell you that you seem upset when driving?***
☐	☐	***Do you arrive at your destination feeling keyed up, tense or drained?***

If you answered yes to any of these questions, maybe it's time for an attitude check. Behaviors like these are dangerous to you and to other drivers around you.

Modify Your Driving Attitude

It would be nice if you could just skip driving altogether. But in addition to driving to and from work and running errands, you may also have to drive while on the job. Try these approaches to make driving easier and safer:

- Give yourself permission to just drive. In the long run, you'll be happier and more productive if you just relax.
- Listen to relaxing music instead of the daily disaster news.
- Make a conscious effort to avoid tailgating, lane changes, making gestures or insulting other drivers.
- Settle down by taking several slow, deep breaths.
- Remember that you only have control of your own behavior, not the behavior of others.
- Give yourself a little extra time to get where you're going, so you'll have one less reason to be aggressive on the road.

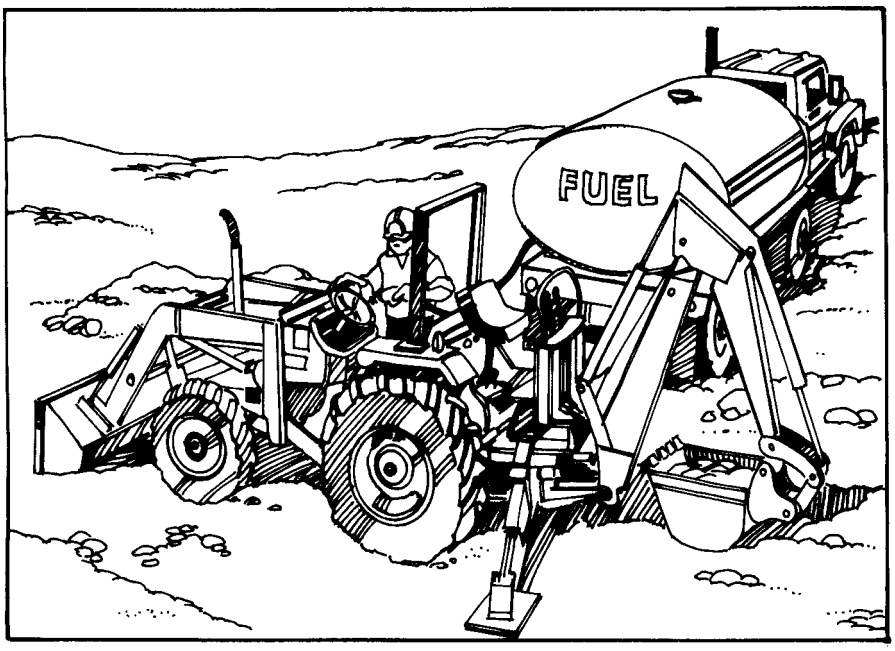


Fill 'er Up—Safely

On a construction site, it's usually not practical to bring the equipment to the gas station. So, you bring the fuel to the equipment. Because gasoline is one of the most explosive of all flammable liquids, you need to take special precautions in transporting and using it.

When Fueling Up...

- **Shut down the equipment before you fuel it.**
- **Wipe up or report spills immediately.**
- **Never smoke while fueling.**
- **Fuel up in well-ventilated areas and away from flammables or ignition sources, such as sparks, heat, static electricity and faulty wiring.**



When large quantities of fuel are needed:

- A self-propelled tank vehicle is the safest way to transport fuel.
- Portable tanks with hand-operated pumps can be used in some cases, if the terrain permits.
- Position tanks on stable ground and block and protect them from rolling when fueling.
- The tanks don't need to be bonded or grounded as long as the metal nozzle is in contact with the fuel tank while it's being filled.
- Take special care to avoid spilling.
- Drain the hose after fueling so fuel won't be spilled in the next fueling operation.
- Never position the fueling tank so that the gas must travel through more than 15 feet of unsupported hose, or where the hose must be pulled tight to reach the tank being filled.
- When they're not in use, park portable tanks out of the way of moving equipment, with wheels blocked if the ground isn't level.

For smaller fueling operations:

- Be sure the container has a sturdy carrying handle with a flexible metal spout small enough to fit in the tank opening.
- Only use a container made for carrying fuel.

The Importance of Hazard and Job Safety Analysis

The key to planning any job is to be completely prepared for it. This includes having the right equipment, parts and personnel to do the job. There's one more key thing that you need: a hazard and job safety analysis.

When you do this type of analysis you look at each step of the job in detail and ask yourself: What exactly needs to be done? How much will it cost? What are the safety risks associated with each step of the job? For example, do you need to prepare for hot work or work in a confined space? Is there any special equipment or training that this job requires?

By thoroughly planning ahead, you're reducing the possibility of risks and surprise costs. Use the following list of questions as a starting point for your own hazard and job safety analysis to help you plan for a safe and profitable job. You can add some of your own questions at the bottom.

- **What will the job entail?**
- **What are the possible hazards that may be encountered?**
- **Is there a planned escape route in case of emergency?**
- **What support will I need from others to perform this job safely?**
- **Do I have all the proper personal protective equipment (PPE) required for the job?**
- **Do I know where the nearest first aid kit, eye wash station and fire extinguisher are located?**
- **Will this job involve repetitive motion? If so, have I prepared myself for this?**
- **Do I know my personal limitations?**
- **Am I physically and mentally prepared to perform this job safely?**
- **What are my means of communication?**
- **Am I taking medications that may hinder my abilities to perform this work safely?**
- **Are there any dangers I need to make myself aware of around my job site?**
- **What parts of my body will be at most risk during the job?**
- _____
- _____
- _____

JOB TOPICS TO CONSIDER

When you analyze a job, break it down into areas, and ask yourself the important questions for each topic. The following are some areas of a job to analyze and some questions to consider:

- **working with chemicals:** Is it toxic? PPE required? Where's the eye wash station?
- **confined spaces:** permit posted? respiratory protection needed? adequate lighting?
- **clearances:** barricade? anyone working nearby? grounding required?
- **work in elevated areas:** safety harness required? ladder secured? staging required?
- **grinding/chipping:** all combustibles, flammables removed? barricades? PPE?
- **hot work:** permit required? fire extinguisher available? flash shields needed?
- **housekeeping:** spills? tripping hazards? swept and washed down?
- **respiratory protection:** test for proper fit? correct cartridge? air line required?
- **staging:** cross-bracing needed? toe boards? ladder secured? area barricaded?
- **material/equipment handling:** lifting required? stretching? need forklift? need help?
- **hazardous waste:** Are containers labeled? read MSDS? emergency contact for spills?
- **tools/equipment:** clean and free of defects? right tool for the job? safeguards in place?
- **working below grade level:** barricade tape? information tags? PPE? shoring?
- **rigging:** proper sling? shackles secured? personnel clear of area?

Knowing Your Job

Good housekeeping, taking responsibility for safety and using protective clothing and equipment are all important aspects of job safety. But one of the most important things you can do is to know what you're doing. You may take your job skills for granted, but they're essential for your safety and the safety of others.

You're trained in many areas of your work. You know the right way to use equipment and how to operate a piece of machinery safely. And you would never use equipment you weren't trained to use. Yet, accidents often happen because people don't know what they're doing. No matter how careful you are, if you overload a crane because you don't know what its load limit is, you're headed for a worksite disaster. And if you use dangerous materials, such as flammable liquids, without knowing their properties, you could put the whole crew in danger.

Knowing your job means knowing what you can and can't do with the equipment and material you use. It means knowing when to wear protective equipment and exactly what protection is right for the operation you're doing. You wouldn't think of using ordinary safety goggles for welding, any more than you would use welding goggles when grinding or sawing.

The first rule of safety is: Know your job. When you know your job, you also know that no matter how skilled you are, you still need to guard against the dangers that are part of it. You won't be tempted to cut corners on safety.

The second rule of safety is: When you don't know, ask. No one is so skilled that he or she knows everything there is to know. And skills and techniques change all the time. Or you may have done an operation hundreds of times and realized that you've forgotten some detail that you need to know to be safe. Refresh your memory by rereading safety procedures from time to time. And if you can't find what you need to know, ask your suprvisor, especially when it comes to safety.

Know Your Emergency Action Plan

Before you start any job, there is always a certain amount of vital information which must be covered with every employee. Most of the information you'll need to know in case of an emergency can be obtained from your site safety manager or the manager where you work. The following emergency information must be posted in your work area. You'll need to know this information if an emergency occurs.

- ☐ **evacuation routes**
- ☐ **what to do in any disaster, including storms, floods, gas leaks, explosions, fires, tornadoes, hurricanes and earthquakes**
- ☐ **the location of the nearest telephone**
- ☐ **the location of and map to the nearest hospital or medical facility**
- ☐ **who to contact in case of fire or any emergency**

Fire Extinguishers:
They're Not All Alike

Fire extinguishers are an invaluable tool for putting out fires—but only if you use the right one. Because each fire is different, using the wrong type of extinguisher can make a fire worse. There are five types of fire extinguishers:

Class A

(green label)—for fires involving:

- wood
- paper
- cloth
- rubbish

Class B

(red label)—for fires involving:

- gasoline
- solvents
- vapors
- gas leaks

Class C

(blue label)—for:

- electrical fires

Class D

(yellow label)—for fires involving combustible metals such as:

- magnesium
- sodium
- potassium
- sodium potassium alloys

Class ABC

—for

- combination fires

Which fire extinguisher would you use for the following situations?

1. a pile of oily rags that has spontaneously combusted
2. an electrical fire, caused by worn insulation, that has spread to papers on a shelf
3. solvent ignited by a hot surface
4. gasoline burning on a wooden floor
5. trash in a metal container

Answers: 1. A; 2. ABC; 3. B; 4. B; 5. A

Be prepared. Don't wait for a fire to start before you find out:

- which types of fire extinguishers you have and where they are located.
- which type of fire extinguisher is right for each material you work with.
- how to use a fire extinguisher.

USING A FIRE EXTINGUISHER

- Pull the safety pin.
- Stand about 8 feet from the fire.
- Aim at the base of the fire.
- Squeeze the trigger.
- Use back and forth sweeping motions.
- Aim accurately—fire extinguishers may only last from about three to 20 seconds.
- Use a fire extinguisher only if the fire is small and easily contained.

Safety Is Everyone's Responsibility

You may have to depend on supervisors and safety engineers to provide you with safe, well-maintained and appropriate equipment for your job. But it's important to remember that as a user of equipment, you have a very active role in your safety and the safety of those who work with you.

For instance, management ensures that materials you use are clearly labeled for hazards and proper use. But it's up to you to read the label, use the material according to the guidelines and ask questions when you're not sure about what you've read or must do. You must also be alert to what's going on around you. Are others following safety procedures? It's up to you to practice safety procedures for using your tools and machinery. If you injure yourself because you didn't use guards properly or didn't protect your face, hands and eyes, or injure someone else because you were careless, who can you blame for the accident? The responsibility is yours.

What if oil is spilled on the floor? Someone could slip and fall. You may think that it's not your job to clean it up; after all, your job is construction, not maintenance. You know it's there, so you're careful to walk around it. But what about those you work with every day? Someone could be injured unless you make things happen. It may not be your job to clean up the spill yourself, but you can make sure the cleanup gets done. Not only do you protect those you work with, you also make a big impression on your boss. And that can't hurt.

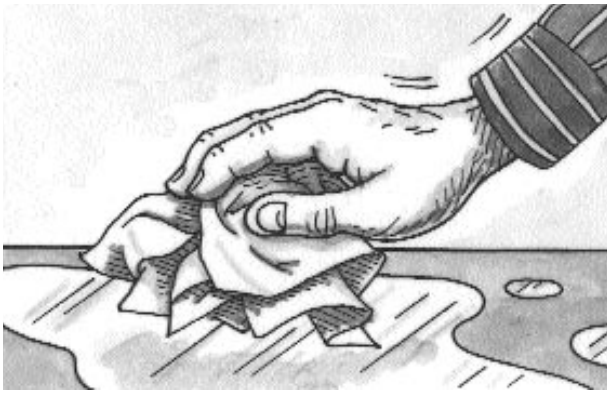
It's a good feeling to take charge of your own safety. And others appreciate knowing they can depend on you.

It's Up to You

- ✓ **Read the on-site OSHA poster.**
- ✓ **Comply with all applicable OSHA standards.**
- ✓ **Follow all employer safety and health rules and regulations.**
- ✓ **Wear or use the right protective equipment.**
- ✓ **Report hazardous conditions.**
- ✓ **Report any job-related injury or illness to your employer and seek treatment promptly.**

A Clean Job Site Is a Safe Job Site

Your safety, how much work you get done and whether the job gets finished on schedule can all depend on good housekeeping.



- Working in messy conditions is distracting, unsafe, unsanitary and against OSHA regulations.
- Good housekeeping boosts worker morale, promotes safety and encourages professional work habits.
- Clean, well-maintained job sites are more pleasant, safer places to work.
- Trying to find tools and materials in a disorderly work area wastes time.
- Unneeded materials take up available work space and cause workers to get in each other's way.
- Keeping your work area clean gives you more room to spread out and do a good job.
- A cluttered work area can cause workers to trip, slip or step on sharp objects.
- Rags, scrap paper, old rope and dust are fire hazards.
- Tools stored in their proper places are easier to find.

USE THE FOLLOWING GUIDELINES FOR KEEPING YOUR JOB SITE CLEAN:

- Clean up as you go, rather than waiting until the end of the day or week.
- Separate scrap from usable material and store it in scrap piles.
- Assign one or two people to be in charge of removing litter before it has a chance to get in the way.
- Stack materials efficiently to make more space.
- Take care of any housekeeping problems you see.
- Send unneeded supplies back to the supply yard immediately.
- Put things where they belong, rather than piling everything in one place to get it out of the way.
- Keep work areas, passageways and stairs in and around your site free from scrap lumber, protruding nails, wire, buckets, extension cords, tools and other hazards.
- Remove garbage, combustible scrap and debris frequently throughout the day.
- Collect and separate waste, garbage and flammable rags in the appropriate containers.
- Make sure containers for garbage and other oily, flammable or hazardous wastes have covers.
- Report unsafe conditions to your supervisor immediately.

Alcohol and Other Drugs Spell Trouble On and Off the Job

You already know that using alcohol and other drugs on the job affects your ability to successfully and safely do your job. Not only do you risk personal injury or death, you endanger others, do shoddy work and will likely be fired if your supervisor finds out that you're under the influence of alcohol or drugs.

What you may not know is that alcohol and other drugs when used off the job can also cause the same serious consequences. Drinking alcohol or using drugs after work can leave you impaired the next day by causing tiredness, shakiness, forgetfulness, carelessness, dehydration, irritability, headaches and sensitivity to noise and light. Drug or alcohol use the night before, can affect your attention span, judgment and reflexes. It can disturb your sleep rhythms so that you are not rested the following day.

How would you like to work on a scaffold that was put up by someone with bad judgment and a short attention span?

If you suspect that someone at work is being affected by alcohol or other drugs, you're not doing anyone a favor by ignoring the problem. Let your supervisor know.

Remember, you can feel sober or straight and still have enough alcohol or chemicals in your body to affect your job performance and put you and others at risk.

Protect Your Skin

Many construction workers spend long periods of time exposed to the elements, especially the sun and wind. Too much exposure to the sun without protection can lead not only to painfully dry, chapped and itchy skin, but also to skin cancer. Use the following tips to help protect yourself from the elements:

- **Wear a sweatproof, waterproof sunscreen lotion or cream with a sun protection factor (SPF) of 15 or higher whenever you're outdoors.**
- **Wear protective clothing such as a hat with a broad brim, a long-sleeved shirt, gloves and long pants.**
- **If you can avoid working in direct sunlight between 10 a.m. and 3 p.m., do so.**
- **Wear lip protection that contains a sunscreen.**
- **Moisturize your skin daily.**
- **Check your skin once a month for suspicious sores, moles and growths. Look for sores that don't heal, growths or moles that are irregularly shaped, large (the size of a pencil eraser or larger) or have jagged, notched or indistinct borders.**
- **If you have a suspicious sore, mole or growth, see a doctor.**

Avoid Hazards in Nature

Construction workers who work outdoors are exposed to a number of natural hazards from bites and stings from ticks, ants, spiders, bees, wasps or other insects, to contact dermatitis from poisonous plants such as poison ivy, oak and sumac. Use the following tips to help protect yourself from these painful natural hazards:

- Wear long pants and long-sleeved shirts.
- Tuck your pants into your work boots—this will help keep ticks, ants and spiders out.
- Wear light-colored shirts: They make it easier to see ticks, ants and spiders.
- Use a tick repellent and spray it near the openings on your clothes, such as the waistband, sleeves, neck and pant cuffs.
- On your skin, use an insect repellent that contains DEET (N-diethyl-metatoluamide).
- Avoid wearing strong-smelling after-shaves, colognes and lotions—they can attract insects.
- Check your body for ticks every day. Deer ticks can carry Lyme disease, a serious disease that can permanently damage your nervous system and joints. If you notice a red "bull's eye" rash, fever, joint pain or flu-like symptoms after a tick bite, see your doctor immediately.
- If you come into contact with poison oak, poison ivy, or poison sumac, clean your skin with alcohol within 10 minutes if possible. After 10 minutes, it may not be possible to avoid a rash, but cleansing with alcohol followed by soap may lessen the rash. Use alcohol and water to clean all clothing and equipment which have come in contact with poisonous plants. The oil which causes a rash may stay active on such items for years. If you develop an itchy rash after exposure to a poisonous plant, apply a 1-percent hydrocortisone cream to it and take an antihistamine to relieve the symptoms of the rash.
- If you suspect you've been bitten by a poisonous spider, see a doctor immediately.

First Aid and Bloodborne Pathogens

One day you may be called upon to administer first aid to someone, so it is important that you know about bloodborne pathogens and how you can protect yourself.

WHAT ARE BLOODBORNE PATHOGENS?

Bloodborne pathogens are microorganisms in human blood that can cause diseases. These include, but are not limited to, hepatitis B virus (HBV) and human immunodeficiency virus (HIV). The diseases caused by these viruses can be fatal. You can be exposed to these microorganisms through unprotected contact with a person's blood, vomit, urine or other bodily fluids.

HOW CAN I PROTECT MYSELF?

- If you're going to give a person first aid, make sure you're wearing the appropriate personal protective equipment such as latex gloves, a plastic visor and a pocket mask.

- Consult your company's policy on first aid and bloodborne pathogens or talk to your safety manager about what type of personal protective gear you should wear.
- Your employer must provide you with the proper protective equipment.
- If you must administer artificial respiration (mouth-to-mouth) to a victim, be sure to use a pocket mask or other protective device between your mouth and the victim's mouth.
- After administering any type of first aid, remove any contaminated equipment and dispose of it according to your company's safety policy.
- Thoroughly wash your hands and arms with a disinfectant soap and very warm water after administering first aid.
- If you administer first aid frequently, you should be vaccinated for hepatitis B.
- Talk to your employer about receiving first aid and bloodborne pathogen training.

Shift Work Dangers

In construction work, there may be times when you must work odd hours, such as during the night. It can be difficult to adjust to shift work and it can be dangerous if you don't. Here are some tips to help you adjust:

WATCH SLEEPING HABITS

- Stick to a routine that works for you. (Go to bed at the same time; read before falling asleep; etc.)
- Make your bedroom as dark as possible to help you sleep (Use heavy shades, curtains or an eye mask.), and try to wake up to light (Use a timer on a beside light, etc.).

- Make sure your room is quiet. If this isn't possible, use a fan, soft music or white-noise device to drown out the noise.
- Keep your bedroom cool.
- Create a comfortable sleeping environment. Invest in a top-quality mattress, warm blankets and firm pillows.
- Practice relaxation techniques such as deep breathing, visualization and meditation.
- Avoid drinking alcohol or using sleeping pills; they can adversely affect the quality of your sleep.

WATCH EATING HABITS

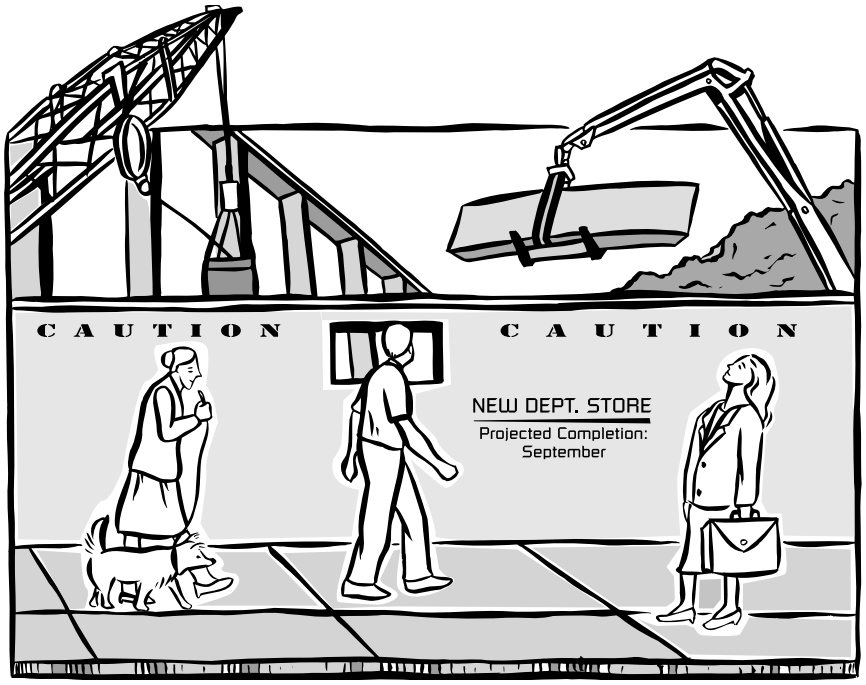
- Try to keep a regular eating schedule.
- Have a routine that you follow for the shift you're on. By sticking to a routine you can control your body clock.
- After you wake up, eat a nutritious meal balanced with both protein (nuts, meats, beans, soy) and complex carbohydrates (grains, breads, pastas, fruits, vegetables).
- Eat your highest protein meal midway through your shift or at least four hours before going to bed.
- The last meal of your "awake period" should consist mainly of complex carbohydrates such as pasta and vegetables. This type of meal will help you sleep.
- Avoid a high-protein, high-fat meal just before going to bed—your body will be unprepared to digest it and the protein may keep you awake.
- Try to have at least one meal with your family during your daily routine.
- Avoid caffeine if possible, especially during the last half of a night shift.
- Eat 20 to 30 grams of fiber a day. This can help you avoid digestive disorders frequently experienced by shift workers.
- Drink plenty of fluid, especially water. (Avoid drinking lots of liquids right before going to bed.)
- Control your sugar intake. Sugar acts as a mild stimulant and can affect sleep patterns.

MAINTAIN YOUR HEALTH

- **Establish a regular exercise routine.**
- **Limit your intake of caffeine and alcohol.**
- **Avoid using nicotine.**
- **Get plenty of sleep.**
- **Eat nutritious, balanced meals.**
- **Make time to socialize and enjoy recreational activities.**

Safe Sidewalks, the Public and You

On a construction site, you expect to walk across broken rock or climb over ditches. You automatically keep a lookout for crane counterweights, things falling from scaffolds, and equipment and materials in your path. But what about people who are just walking past your worksite and don't expect safety hazards?



WATCH OUT FOR THE PUBLIC

- ✓ Keep the sidewalk clean.
- ✓ Be sure not to leave anything, from a loose nail to a load of bricks, on a sidewalk used by pedestrians.
- ✓ Use barricades to keep the public away from damaged or hazardous sidewalks.
- ✓ Pedestrians may not be on the lookout for a new crack in the sidewalk caused by construction work.
- ✓ Mend or report cracks immediately.
- ✓ Ask yourself if the sidewalk is safe for a person who may have impaired eyesight, hearing, reflexes or mobility.

AVOIDING LAWSUITS

Pedestrian accidents are not covered by worker's compensation. Pedestrians can and do sue construction companies for injuries they sustain in work areas. These lawsuits mean higher insurance rates for your employer, which can affect your paycheck in the long run.

Fire Prevention at the Site

When it comes to fire, a construction site can be a disaster waiting to happen.

- **Fire protection systems and fire walls are not yet in place.**
- **Dust, flammable fuels and other liquids and combustible materials are common.**
- **Welding operations, electrical systems and power tools create sparks that can start fires.**

MAKE YOUR SITE FIRE-SAFE

- Before using a torch, remove combustible materials from the area or cover them with flameproof tarpaulins.
- Store acetylene and oxygen cylinders safely: away from high temperatures and separated from each other.
- Know your flammable liquids: heating and equipment fuels, solvents, paints and adhesives.
- When dispensing these materials, use approved safety cans and always ground and bond containers.
- Make sure you use materials in a well-ventilated area—their vapors can be explosive.
- If you smoke, light up in designated areas only—never where there may be flammable vapors.
- When you're finished using flammable materials, store them immediately, away from your work area if possible.
- Use dust-collecting devices on power equipment where possible.
- Regularly clean up dust and scraps in the wood-working area.
- Know which plastics, trim and roofing materials are flammable and keep them a safe distance from spark hazards.
- Know where fire extinguishers are located and how to use them.
- Know the type of fire extinguisher to use for the type of fire.

IN CASE OF FIRE:

- **Act quickly and with caution.**
- **Warn others and make them get out of the area.**
- **Use the correct fire extinguisher.**