

# SPECIAL REPORT

A supplement to BLR Publications

## TEN WAYS TO KEEP YOUR EMPLOYEES SAFE

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# SPECIAL REPORT

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## **T**EN WAYS TO KEEP YOUR EMPLOYEES SAFE

**Executive Publisher:** Robert L. Brady, J.D.  
**Editor-in-Chief:** Margaret A. Carter-Ward  
**Editor:** Carolyn Leese  
**Production Supervisor:** Carole Guzman  
**Graphic Design:** Rebecca MacLachlan

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Business & Legal Reports, Inc.  
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(860) 510-0100



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## **DON'T BYPASS MACHINE SAFETY**

Guarding techniques have improved dramatically in recent years and most modern machines come equipped with guards. Does that mean we don't have to worry about machine safety any more? Before you answer, take a look at these actual incidents:

- As worker was rotating a part on a set of rollers, his hand was caught between the part and roller, causing serious injury.
- A worker reached into a machine while it was running to pull out a piece of metal, and his arm was caught between the part being machined and the cutter. His arm was amputated.
- A trim press operator was trying to free a part from a die when the press recycled and caught a finger between the dies. The finger was crushed.

Despite advances in technology, machine-related injuries persist. Perhaps that is why OSHA has taken a renewed interest in citing employers for machine-guarding violations. In one recent case, an employer removed the factory installed guard on a 36-foot shear for the convenience of allowing continual use of the machine. Describing it as a "significant hazard to employees," OSHA fined the company \$67,000.

Within a month, OSHA was on the case again, citing another employer for over \$65,000 in penalties after an employee suffered a severe hand injury on a crimping machine. Investigation revealed that the machine had many unguarded parts, including chains, sprocket wheels, in-running nip points, and rotating parts.

### **Be an OSHA inspector**

If you're worried about OSHA showing up at your doorstep, you should be. Amputation hazards are on the agency's "hit list"—a special program that


targets certain hazards and industries for inspection. Anyone with machinery should take prudent precautions now. The best way to approach machine safety is to conduct regular inspections. Put yourself in the shoes of the OSHA inspector and take a walk-through of your facility. Check each machine and look for exposed moving parts, including meshing gears, in-running rollers, reciprocating parts, chain and sprocket drives, cams and rollers, belts and pulleys, rotating couplings, and shafts, flywheels, cutting or abrasive surfaces, cooling fans, and conveyors. Check the guards on the machines. Some common methods of safeguarding machinery are barrier guards, electronic-eye shutdown devices, beam scanners, interlocks, and enclosures. If you notice any guards that are broken or missing, tag the machine out of order and get it fixed.

If the machine guard is missing or you are unhappy with the design of the current system, you might consider fabricating your own guard. For instance, you may want to use transparent polycarbonate so that the operator can see the process through the guard. Your operators will be less likely to bypass the guard if you make the work process easier for them. Before making any modifications, however, get written approval from the equipment manufacturer and keep the documentation for your records.

### **Dangerous times**

The most hazardous situation is when the operator is adjusting the machine or removing jammed work or broken parts. This is the time when most injuries occur. Make sure your workers know the specific steps for powering down and locking out the machine before attempting to service or adjust it. If they have not received special training, they are not considered "authorized personnel" under OSHA's

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lockout/tagout rule. Instead, your operators should know not to attempt to service the machine themselves, but to call an authorized employee. Make sure that all of the switches and valves that control the machines are clearly marked. Check to see if there are emergency stop switches that should be located on or near the machine so that it can be turned off quickly if a malfunction should occur.

## Dress for the job

Common sense tells you that loose clothing worn around rotating machinery can get caught and pull the operator into the machine. Don't let your workers wear long, loose sleeves, hanging drawstrings or tassels, ties, scarves, and open jackets. The same restrictions should apply to long hair, jewelry, and gloves. Have a dress code and put it in writing. There are, however, certain types of personal protective equipment that your operators should wear. These include safety glasses and face shields or goggles if particles could fly through the air or hazardous or hot liquids are being handled. Use safety shoes if heavy materials are being placed in and out of the machine.

## Train and explain

No matter how well-designed your guards might be, they are totally useless if your workers try to bypass them. Emphasize at your training sessions that removing guards or disengaging interlocking devices to make the work easier or faster is just too risky. Here are some other safety precautions to pass on to your workforce:

- Read the instruction manual and know exactly how your machine operates. Follow the instructions carefully and never leave the machine running unattended.
- Clamp work securely to the machine as needed. Make sure to remove chuck keys

before turning on the machine.

- Keep clear of the moving machine parts by using a push stick or push block to guide the material.
- Look for unsafe conditions and report them. If a guard is missing or cracked, don't operate the machine.
- Keep the floor and work area around the machine clean. Clear away spills, chips and debris. You don't want to slip and fall into the machine.
- Use approved lockout/tagout procedures for all maintenance operations.
- Don't use the machine if you are sleepy or have taken any medications that may affect your judgment.

Tell your employees that in the final analysis, we are the masters of the machines. Let's keep it that way!

## Machine Safety Training Tips


- Take a walk through the shop and point out the safety features and guards of each machine.
- Find out if any safety features are impractical and discuss options.
- Hand out copies of lockout/tagout procedures and operating instructions and review them.

## OSHA Required Training for Machine Guarding 1910.211 to 1910.222

**1910.217(e)(3) Training of maintenance personnel.** It shall be the responsibility of the employer to insure the original and continuing competence of personnel caring for, inspecting, and maintaining power presses.

**1910.217(f)(2) Instruction to operators.** The employer shall train and instruct the operator in

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the safe method of work before starting work on any operation covered by this section. The employer shall insure by adequate supervision that correct operating procedures are being followed.

**1910.217(13)(i)(A) through (E) and (ii) (i).**

The operator training required by paragraph (f)(2) of this section shall be provided to the employee before the employee initially operates the press and as needed to maintain competence, but not less than annually thereafter. It shall include instruction relative to the following items for presses used in the PSDI (presence sensing device initiation) mode.

**(A)** The manufacturer's recommended test procedures for checking operation of the presence-sensing device. This shall include the use of the test rod required by paragraph (h)(10)(i) of this section.

**(B)** The safety distance required.

**(C)** The operation, the function and performance of the PSDI mode.

**(D)** The requirements for hand tools that may be used in the PSDI mode.

**(E)** The severe consequences that can result if he or she attempts to circumvent or bypass any of the safeguard or operating functions of the PSDI system.

**(ii)** The employer shall certify that employees have been trained by preparing a certification record which includes the identity of the person trained, the signature of the employer or the person who conducted the training, and the date the training was completed. The certification record shall be prepared at the completion of training and shall be maintained on file for the duration of the employee's employment. The certification record shall be made available upon request to the Assistant Secretary for Occupational Safety and Health.

**1910.218(a)(2)(iii) (2) Inspection and maintenance.** It shall be the responsibility of the employer to maintain all forge shop equipment in a condition which will ensure continued safe operation. This responsibility includes:

**(iii)** Training personnel for the proper inspection and maintenance of forging machinery and equipment.

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## RESPECT THE POWER OF COMPRESSED GAS CYLINDERS

**Riddle:** What can fly through the air for a half mile or more, smash its way through brick walls, yet release its power through an opening no bigger than the diameter of a pencil?

**Answer:** A compressed gas cylinder!

Cylinders may look hardy, but they are pressurized to thousands of pounds per square inch, which makes them extremely hazardous when exposed to motion or vibration. How's this for sheer raw power? A carbon dioxide cylinder with a missing cap was carelessly pulled across an airplane hangar floor. When the cylinder fell, the valve broke off, and the bottle took off at high speed. It crashed through several aircraft wings; broke off sprinkler heads, which started a flood; destroyed expensive equipment; and tore through a concrete wall before finally coming to rest outside. Fortunately, no one was hurt, but the total damage was more than half a million dollars!

You wouldn't want your employees to get in the path of that runaway cylinder. The best way to prevent such a catastrophe from occurring is to train your workers to follow prescribed safe handling procedures when using compressed gas cylinders.

### Understanding the hazards

While each type of compressed gas has its own hazards, most are flammable, explosive, toxic, or a combination of these types. Some common kinds of compressed gas include acetylene, ammonia, carbon dioxide, chlorine, fluorine, hydrogen and oxygen. Remind your employees to read the label on the cylinder and the material safety data sheet (MSDS) for safety information.

### Safety Rules

Here are recommended safe practices when handling most compressed gas cylinders:

#### *How to store them:*

- Cylinders should be stored in a dry, well-ventilated area at least 20 feet from combustible materials. Don't keep the cylinders in lockers or cupboards.
- Oxygen cylinders must be separated by 20 feet from fuel-gas cylinders, such as acetylene, or by a noncombustible barrier at least 5 feet high with a fire-resistance rating of at least one-half hour.
- They should be stored upright and secured with a chain or cable.
- Valves and caps should be securely closed.
- Room temperature should remain constant.

#### *How to transport them:*

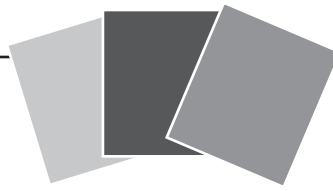
- Secure the cylinders upright.
- Don't drag them—use a hand truck.
- Handle carefully—avoid dropping or banging them.

#### *How to use them:*

- Open valves by hand, rather than with a tool (unless a specific tool is recommended by the supplier).
- Release the valves slowly.
- If a special wrench is required to open the valve, leave it in position while in use so that the flow of gas can be stopped quickly in an emergency.
- Don't tamper with safety devices.
- Keep cylinders upright and away from heat, sparks, fire, or electrical circuits.
- Avoid getting any oil or grease on the cylinders, particularly those containing oxygen.

#### *How to maintain them:*

- All cylinders should be properly marked to identify the contents.



- Make sure valve protection caps are in place.
- If cylinders are leaking, take them outdoors away from sparks or heat and slowly empty them.
- Make sure to mark all empty cylinders (some companies use “MT”).
- Put a warning tag on cylinders that leak and notify the supplier.

*Other precautions:*

- Never mix gases in a cylinder or try to refill a cylinder (contact the supplier).
- If a cylinder leaks or a valve is broken, tag the cylinder and contact a trained maintenance person or the supplier.
- NEVER smoke around a compressed gas cylinder.
- Don't use the recessed top of the cylinder as a storage area for tools or material.

## **Training Tips**

When conducting your training session, have a compressed gas cylinder available and demonstrate proper handling and operating procedures. Show what a damaged or leaking cylinder looks like and explain how to report these conditions. Review relevant MSDSs and discuss health hazards and safety precautions. Ask about any problems with transporting or storing cylinders at your facility. In particular, warn your employees not to become complacent around compressed gas cylinders. If your workers are at all skeptical about the need to use caution, remind them of the story of the runaway cylinder that wreaked havoc.

## **OSHA Required Training for Compressed Gases 1910.253(a)(4)**

**Personnel.** Workmen in charge of the oxygen or fuel-gas supply equipment, including generators, and oxygen or fuel-gas distribution piping

systems shall be instructed and judged competent by their employers for this important work before being left in charge. Rules and instructions covering operations and maintenance of oxygen or fuel-gas supply equipment, including generators, and oxygen or fuel-gas distribution piping systems shall be readily available.

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## **THE DOMINO EFFECT IN CONFINED SPACE TRAGEDIES**

When an oil well service company employee was told to check the fluid level in an oil storage tank, he climbed right in without a confined space permit, a monitor, or any protective equipment. At the time, liquid nitrogen was being inserted under pressure into the well to force the oil into the tank. Unknown to the worker, the liquid nitrogen had turned into a deadly vapor in the tank. He suddenly became dizzy and passed out, falling off the ladder to the bottom of the tank, where he drowned. His supervisor, noticing the employee was missing, climbed right into the tank to look for him, succumbed to the same poisonous vapors, and also died.

This is the problem with confined spaces—they can take the lives of not only the original entrants, but the rescuers as well. The cause of these tragedies is that employees, and sometimes their supervisors, too, do not understand the hazards involved. Using chemicals in an open room is not the same thing as working with these substances in a confined space, where they become lethal when there is little ventilation.

Other hazards that might be found in a confined space include:

- Moving parts and vibration.
- Getting trapped or stuck.
- Extreme temperatures.
- Liquids or granulated substances that can engulf the worker and cause strangulation, suffocation, constriction, or crushing.
- Objects falling in from the opening.

### **Permission to enter**

A highly trained response crew is the essential element of a safe entry into a confined space. Everyone should know which confined spaces

have been identified in their workplace. OSHA defines a confined space as an enclosed area not designed for continuous occupancy, large enough for a worker to perform his or her duties, but with a restricted means of entering and exiting. There may be little or limited ventilation. Examples include storage tanks, boilers, tank cars, pipelines, sewers, workpits, and crawl spaces.

If the confined space contains potential hazards, such as toxic vapors, OSHA regulations require that a permit be issued before anyone enters that tank. The permit lists the hazards found in the space, the measures used to eliminate or control them, and the rescue services and communication systems to be used. The designated supervisor signs off on the permit, and it is posted outside of the space.


### **Something in the air**

One of the most important steps in preparing to enter a confined space is to conduct atmospheric testing. There may not be enough oxygen to breathe (if it is less than 19.5 percent of the air), producing symptoms such as rapid breathing and heartbeat, drowsiness, and nausea.

Another cause for concern is a combustible atmosphere. When vapors from flammable chemicals such as solvents build up, they can become explosive. Something as minor as static electricity can cause ignition. Toxic chemicals, such as hydrogen sulfide, carbon monoxide, carbon dioxide, or sulfur dioxide may be present and are deadly at certain levels.

You and your employees should be thoroughly familiar with the testing monitors and know how to properly maintain and calibrate them. Before entering the space, cut off any steam, water, heat, or power lines that are connected to it. Test for oxygen, combustibility, and toxicity inside the entry; if there is a problem, ventilate the area.

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When your employees enter the space, test the air again from top to bottom, checking corners and small spaces as well. If the atmosphere is hazardous, get out them out immediately!

## Knowing what to do

Your workers must take these other precautions:

- Alert the rescue team and set up rescue equipment.
- Make sure a co-worker—who cannot leave this post—is immediately outside the space and in direct communication with the employee. The co-worker should have a lifeline or harness to pull the employee out in case of trouble.
- Lockout or tagout any equipment that may affect the space.
- Ventilate the area continuously and constantly test the atmosphere.
- Use only grounded, explosion-proof tools and equipment in the space.
- Provide good lighting safe for use in hazardous atmospheres.
- Leave the space immediately if they feel weak, dizzy, or nauseous.

## Dress for success

Everyone should wear appropriate personal protective equipment (body harnesses, hard hats, face and eye protection, gloves, safety shoes, coveralls, and hearing protectors) depending on the type of confined space and the hazards anticipated. When toxic gases are present or there is a lack of oxygen, entrants should use a respirator appropriate for that atmosphere. If the employees are entering the confined space from above, they should be equipped with a body harness and a lifeline.

## Prepared for emergencies

To prevent the “domino effect” of having a rescuer face the same dangers as the employee in peril, there should be an emergency plan in place so that rescuers know their roles and are well rehearsed on what to do.

Have equipment on hand, such as tripods and winches, that can pull an employee out of danger without putting a rescuer in harm’s way. If a nonentry rescue is impossible, the rescuer must have the proper equipment ready to enter the space. Also, good communication systems are essential in conducting a successful rescue mission.

## Paperwork trail

Make sure you’ve posted your entry permit outside the space, as well as danger signs warning others to stay out. OSHA requires that once the job is over, the cancelled permit be kept on file for at least one year. Cancelled permits should be reviewed annually to make sure the program is working properly. You will also need to keep a written certification that your employees have been trained in confined space safety procedures.

The goal of the regulation is to make sure that every hazard is considered and planned for and necessary training conducted to prevent confined space tragedies.

## OSHA Required Training for Permit-Required Confined Spaces 1910.146(g)(1)-(4)

(1) The employer shall provide training so that all employees whose work is regulated by this section acquire the understanding, knowledge, and skills necessary for the safe performance of the duties assigned under this section.

(2) Training shall be provided to each affected employee:

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**(i)** Before the employee is first assigned duties under this section;

**(ii)** Before there is a change in assigned duties;

**(iii)** Whenever there is a change in permit space operations that presents a hazard about which an employee has not previously been trained;

**(iv)** Whenever the employer has reason to believe either that there are deviations from the permit space entry procedures required by paragraph (d)(3) of this section or that there are inadequacies in the employee's knowledge or use of these procedures.

**(3)** The training shall establish employee proficiency in the duties required by this section and shall introduce new or revised procedures, as necessary, for compliance with this section.

**(4)** The employer shall certify that the training required by paragraphs (g)(1) through (g)(3) of this section has been accomplished. The certification shall contain each employee's name, the signatures or initials of the trainers, and the dates of training. The certification shall be available for inspection by employees and their authorized representatives.

*Note:* There are also training requirements for employees who perform rescue services.

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## WHEN DISASTER STRIKES—WILL YOU BE READY?

The 1999 devastating earthquake in Turkey that killed over 40,000 people led to an outcry at the lack of preparedness of the Turkish authorities and the uncoordinated rescue effort that contributed to the loss of life. The lesson learned from such a tragedy is that everyone, including employers, needs to be well-prepared for unforeseen emergencies. The terrorist attack in New York City portrays an entirely different type of horrendous disaster.

### Planning pays off

Even if there is little chance of an earthquake occurring in your area of the country, other catastrophic events—hurricanes, floods, tornadoes, fires, toxic chemical spills, or explosions—are possible.

That's why OSHA regulations (Employee Emergency Plans and Fire Prevention Plans Sec. 1910.38) require you to predict what types of emergencies could potentially occur at the worksite and to explain how you would address them. This information should be contained in a written emergency action plan that is reviewed and updated frequently. Employers with 10 or fewer employees may communicate the plan to employees verbally.

Your emergency action plan should include at least the following:

- Emergency escape procedures and escape route assignments (include floor plans or workplace maps that clearly show the escape routes and safe areas).
- Procedures to be followed by employees who remain to perform (or shut down) critical plant operations before they evacuate.
- Procedures to account for all employees after an emergency evacuation has been completed.
- Rescue and medical duties for those employees who are to perform them.

- The preferred means for reporting fires and other emergencies.


OSHA recommends that your company have a pre-determined chain of command so that during the confusion of an emergency, everyone will know who has the authority to make decisions. These designated people should be located at a safe location that can be used as an alternate headquarters and should have access to emergency communications equipment, such as portable radios, telephones, and public address systems.

### Volunteers, anyone?

Some companies divide up the responsibilities for handling a disaster among emergency response teams made up of employee volunteers. Here is a typical team approach that is used at one large pharmaceutical company:

- **Incident command center.** These are the leaders or the team of personnel who coordinate all of the other groups and events. It is composed of members of the company's full-time security guard force and is commanded by the security sergeant. Someone is on call 24 hours a day, seven days a week to act as commander of the center.
- **Fire brigade.** This group is made up of volunteers from among the workers and a few supervisors. Often, these volunteers are also members of the community volunteer fire-fighting force.
- **Chemical emergency response team.** This group's primary function during an emergency is responding to a chemical spill with containment and initial cleanup procedures.
- **Medical emergency response team.** These volunteers are trained as first responders and are capable of providing first aid and CPR. Staff nurses provide some of the training for this group.

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■ **Management center.** Controlled by management and located within the facility, this team's function is to account for all staff, provide notification to appropriate parties including all neighbors within a two mile radius if needed, answer phones and questions, and deal with the press.

## Practice makes perfect

As with any emergency plan, it may look good on paper, but it doesn't mean anything until you have a practice drill and evaluate the results. OSHA doesn't require a specific number of drills, but leaves it up to the employer's discretion. Most safety experts recommend at least two unannounced evacuations each year. Your company should also arrange to coordinate the drill with outside agencies, such as the local fire and police departments.

Besides teaching your employees how to evacuate the premises, you need to teach them about your alarm system. Your employees should be able to hear or see the alarms throughout the facility. The system should have an auxiliary power supply in the event that electricity is not working. If you have different types of alarms, make sure your employees know what they mean and what they are supposed to do.

Your workers should also be trained on how to report emergencies. Reporting a fire may require activating a manual pull-box alarm. Chemical spills may need to be reported to a special spill control team leader. Post emergency phone numbers near telephones, on bulletin boards, and at other conspicuous locations.

Employees who are assigned to shut down critical plant operations will require additional extensive training. You will also need to train any employees you designate as fire wardens to assist in evacuating everyone quickly and safely.

## Give it a little oomph

OSHA requires you to conduct your training at least annually. However, conducting a boring fire drill that interrupts everyone's work may not make an impression that will stick with your workers.

Instead, make your drills and training a fun event. Sponsor an emergency safety poster contest for the children of employees at the same time. Hold a carnival or fair on a weekend for employees and their families and have the local fire and police departments make safety presentations. Award a safety-related prize for the person who guesses the day and time the surprise drill will be held. The excitement you generate just may help save a life in the future.

## OSHA Required Training for Employee Emergency Plans 29 CFR 1910.38(a)(5)(i), (ii)(a) through (c) and (iii)

**(i)** Before implementing the emergency action plan, the employer shall designate and train a sufficient number of persons to assist in the safe and orderly emergency evacuation of employees.

**(ii)** The employer shall review the plan with each employee covered by the plan at the following times:

**(a)** Initially when the plan is developed,

**(b)** Whenever the employee's responsibilities or designated actions under the plan change, and

**(c)** Whenever the plan is changed.

**(iii)** The employer shall review with each employee upon initial assignment those parts of the plan which the employee must know to protect the employee in the event of an emergency. The written plan shall be kept at the workplace and made available for employee review. For those employers with 10 or fewer employees, the plan may be communicated orally to employees and the employer need not maintain a written plan.

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## **COMBATting LEAD— THE INSIDIOUS KILLER**

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Lead poisoning is one of the oldest known occupational diseases in the world, yet it continues to affect workers today. Unfortunately, employers may not even be aware that lead is present in their workplace.

Such was the case at Bloomsbury Court, a ceramics manufacturer located in California. When an employee was diagnosed with a high blood lead level [53 µg/100 g (microgram/100 gram)], owner Linda de Sapio was surprised. “To be honest, at the time I didn’t realize there was a problem. We were using a ‘food-safe’ glaze that did contain lead, but I assumed it was safe for workers, too,” she told state health authorities.

After some investigation, it turned out that the liquid glaze was splashing on the worker’s uniform, drying into a powder. When the employee wore the uniform in the lunchroom, the lead-contaminated dust most likely got on to her hands and food, and she may have ingested it. Once de Sapio found out how the worker was exposed to lead, she provided the employee with medical treatment and replaced the glaze with a lead-free substitute.

### **Signs of Poisoning**

Fortunately, Linda de Sapio was aware of just how dangerous lead exposure can be and took immediate corrective action. In fact, lead is highly toxic, and damage to the human body can be permanent and deadly.

Lead enters the body when a person breathes or swallows lead dust, fumes, or mist. It is then absorbed into the bloodstream where it circulates to all parts of the body. Lead accumulates in the bone, kidneys, nerves, and red blood cells and may stay there for years.

Symptoms of lead poisoning vary greatly among individuals. Low levels of lead in the blood (40-60

µg/100 ml) may cause weakness in the arms and legs, poor concentration, forgetfulness, and anemia (low blood count). Other signs of poisoning include tiredness, insomnia, stomach problems, constipation, headaches, and moodiness. Higher levels can lead to kidney damage, brain dysfunction, and death. Even more frightening, lead can damage the body without any obvious symptoms at all.

Chronic overexposure to lead can also cause problems with the reproductive capabilities of both women and men. Impotence, sterility, miscarriages, stillbirths, and birth defects have been well documented. Children of workers who bring home lead dust on their bodies and clothing may be affected at very low levels of exposure, exhibiting behavioral disorders and even mental retardation.

### **Get the Lead Out**

Since lead is so highly toxic, the ideal situation would be to eliminate all lead from the work environment, as Bloomsbury Court did. Look for ways to substitute materials not containing lead or eliminate high-exposure tasks where possible. Of course, these solutions are not always practical for many employers.


If you can’t eliminate lead, OSHA does require that you bring the levels of lead in the air below the permissible exposure limit (PEL) of 50 µg/m<sup>3</sup> (microgram/cubic meter) through engineering means, such as ventilation and work-practice changes.

### **Step-by-Step Program**

If you have any amount of lead in your workplace, OSHA requires you to follow some of the provisions of the lead regulation, with additional responsibilities triggered by higher levels of exposure.

How do you know if any of your raw materials or products contain lead? Check the material safety data sheets and chemical labels. Also, if any

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employees complain about symptoms, it's time to check for lead. You need to get an industrial hygienist in to conduct air monitoring to determine exactly how much lead is in the work environment. You will also need to notify your employees within five days of the results of the air monitoring procedure.

If the results indicate that your employees are exposed to lead above the action level of 30  $\mu\text{g}/\text{m}^3$  over an eight-hour period, you need to take the following steps:

- Repeat air monitoring (the frequency is determined by the level of exposure) and notify employees of each result.
- Conduct medical surveillance of your employees—including blood sampling, medical exams (including requested fertility or pregnancy tests), medical consultations, and possibly medical treatments. Any blood lead level result above 40  $\mu\text{g}/\text{dl}$  is considered high.
- Remove employees temporarily from exposure to lead if their blood lead levels are too high (check the regulations for specific requirements).

In addition to the above steps, if air monitoring indicates levels above the permissible exposure limit (PEL) of 50  $\mu\text{g}/\text{m}^3$  averaged over eight hours, you need to do the following:

- Try all feasible methods of bringing the exposure levels below the PEL, including ventilation and job rotation.
- Provide respirators for employees and follow a complete, written respirator program.
- Provide clean protective clothing for employees.
- Make showers available to employees to use at the end of their shift and provide a clean change room with separate storage facilities for work clothes, street clothes, and shoes.
- Have a separate area for breaks and lunch.

- Develop and follow a detailed, written lead-safety program, which should be revised and updated every six months.

## Training Essentials

Start off your training sessions by describing the health effects of lead and emphasizing how dangerous it can be. Employees must understand that proper hygiene is crucial in preventing exposure to lead. Explain how to keep the work area as free as possible from lead contamination through regular cleaning by safe methods, such as wet mopping or vacuuming with a toxic-dust HEPA vacuum.

Employees exposed to high levels of lead should be trained to wash their hands and faces thoroughly before lunch breaks and to take showers at the end of their shifts. They must change into clean clothing and prevent cross-contamination with their work clothes. Stress the importance of preventing lead from entering their homes and possibly poisoning family members, particularly children, who are more susceptible to the effects of lead.

Explain how to safely handle lead in the workplace and how to use protective equipment and clothing. The more your employees understand about the dangers of lead, the better they will be at protecting themselves—and that will put your mind at ease as well. As Linda de Sapio put it, “You can go to sleep at night knowing that you’re not making your employees sick.”

## OSHA Required Training for Lead 1910.1025

**1910.1025(I)(1)(v)** The employer shall assure that each employee is informed of the following:

- (A) The content of this standard and its appendices;
- (B) The specific nature of the operations which



could result in exposure to lead above the action level;

**(C)** The purpose, proper selection, fitting, use, and limitations of respirators;

**(D)** The purpose and a description of the medical surveillance program, and the medical removal protection program including information concerning the adverse health effects associated with excessive exposure to lead (with particular attention to the adverse reproductive effects on both males and females).

**(E)** The engineering controls and work practices associated with the employee's job assignment;

**(F)** The contents of any compliance plan in effect; and

**(G)** Instructions to employees that chelating agents should not routinely be used to remove lead from their bodies and should not be used at all except under the direction of a licensed physician.

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## MINIMIZING THE RISK OF CANCER IN THE WORKPLACE

When your employees think about exposure to chemicals at work, do they assume it will automatically cause cancer? Actually, less than 0.1 percent of the more than 600,000 chemicals in use have the potential to cause cancer, even at very high doses. Another misconception is that most cancer deaths are caused by workplace or environmental exposures. It's believed that these sources account for only 5 percent to 7 percent of all annual cancer deaths.

Does that mean that we can be complacent about carcinogenic substances at work? Of course not. The U.S. Department of Health and Human Services National Toxicology Program names about 40 chemicals that are known to cause cancer in humans and about 200 other chemicals are known to cause cancer in lab animals and are reasonably anticipated to be human carcinogens. However, by following strict safety protocols when manufacturing or handling these substances, we can reduce the risks to near zero.

### What's a carcinogen?

Carcinogens are agents that can cause cancer. OSHA regulates 13 known carcinogens at certain levels of exposure in one standard (Section 1910.1003). Other well-known carcinogens, such as asbestos, have their own regulations.

Determining if a substance is a carcinogen for humans is difficult because it can take as long as 40 years from the time a human is exposed to the onset of cancer.

Another consideration is the form of the toxic material. As a solid, it may not be carcinogenic, but when it turns into a liquid, dust, or fume, it can be easily inhaled or absorbed, making it a deadly substance. Be certain that you and your

employees read and understand the material safety data sheets for all known carcinogens.

### Contain it

As with all toxic substances, you must first try to reduce the amount of exposure to the carcinogens through engineering means or substitution. If there still remains enough of an exposure that it is covered by OSHA, the next step is to create a "regulated area" to conduct all work involving these substances. Only highly trained, authorized personnel should be allowed to enter this area. Signs at entrances to these areas should state:

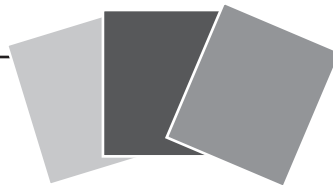
#### **CANCER-SUSPECT AGENT AUTHORIZED PERSONNEL ONLY**

*Note:* Other signs are required for high exposure areas.

Proper ventilation is required in these areas including negative pressure to prevent contamination of other parts of the building. At Lawrence Livermore Laboratory in Livermore, California, all of the following containment methods are used in regulated areas:

- Negative pressure
- Filters and traps on air, vacuum, and ventilation piping when feasible
- Chemical fume hoods, glove boxes, closed systems and other isolation devices
- Nonpermeable work surfaces
- Exhaust discharge located to prevent reentry to the building

The lab also makes sure that carcinogens are packaged to withstand shocks, pressure changes, or any other conditions that could cause leakage of contents. The chemicals are stored in designated areas, cabinets, or refrigerators. Highly potent carcinogens are sometimes stored in double containers.



## Tread carefully

Your authorized employees should be supplied with the proper personal protective equipment, which will usually include full-body protective clothing, shoe covers, gloves, and some type of respirator depending on exposure. A clean dressing room should be used where employees can change into and out of their work clothes. Other strict safety procedures that should be followed include:

- No eating, drinking, smoking, chewing, applying cosmetics, or touching contact lenses should be allowed.
- Toilets should be located in a separate room.
- Employees should shower or wash, depending on the type of exposure, before leaving the area.
- Leave work clothing in designated containers for decontamination or disposal.
- Dry sweeping or mopping is prohibited for certain carcinogens.
- Decontamination procedures must be followed to remove carcinogens from the surfaces of materials and equipment.
- All containers of carcinogens should be labeled with the warning “Cancer Suspect Agent.”

Signs posted at the exits to the regulated areas should list what steps the employee needs to take before leaving.

## In an emergency

Your facility should be ready in case there is an emergency, such as a large-scale spill. Here is what OSHA requires in an emergency:

- Evacuate the area.
- Eliminate hazardous conditions that caused the incident.
- Follow decontamination procedures to clean up the area.

- Have employees shower as soon as possible after the incident.
- Have employees examined by a physician within 24 hours.
- Report the incident to OSHA within 24 hours.

Post your emergency procedures and practice them often. Make sure that all employees are thoroughly familiar with these procedures.


## Medical exams

Whether there is an emergency or not, your employees must be examined by a physician prior to being assigned to work with carcinogens. They must also be examined at least once a year after that. Retain all medical records throughout the employee's term of employment.

## Training is essential

When working with carcinogens, it is vital that your employees receive detailed training in understanding and handling them. Training should occur initially and at least annually after that. Throughout the training, make sure your employees understand why certain procedures are in place. Here are the basic topics to cover:

- How the carcinogen can harm the employee physically (review material safety data sheets)
- What types of work procedures could cause exposure to the carcinogen.
- Why the employee needs a physical exam and how the employee can look for his or her own signs and symptoms.
- How and why you use decontamination procedures.
- What types of emergency procedures will be used and why.
- The employee's role in the emergency procedures.

- 
- 
- How to recognize when a release of a carcinogen occurs.
  - Understanding first-aid procedures.
  - A review of the OSHA regulation.

### **Bright future**

Fear of carcinogens is a natural reaction, but with advanced technology, use of personal protective equipment, and extensive training, it is now believed that gross exposure to carcinogens in the workplace is rare.

### **OSHA Required Training for Carcinogens (Sec. 1910.1003(e)(5))**

(i) Each employee prior to being authorized to enter a regulated area shall receive a training and indoctrination program including, but not necessarily limited to:

- (A) The nature of the carcinogenic hazards of a carcinogen addressed by this section, including local and systemic toxicity;
- (B) The specific nature of the operation involving a carcinogen addressed by this section that could result in exposure;
- (C) The purpose for and application of the medical surveillance program, including, as appropriate, methods of self-examination;
- (D) The purpose for and application of decontamination practices and purposes;
- (E) The purpose for and application of emergency practices and procedures;
- (F) The employee's specific role in emergency procedures;
- (G) Specific information to aid the employee in recognition and evaluation of conditions and

situations which may result in the release of a carcinogen addressed in this section;

(H) The purpose for and application of specific first-aid procedures and practices;

(I) A review of the section at the employee's first training and indoctrination program and annually thereafter.

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## **ASBESTOS— A SUBSTANCE TO BE AVOIDED**

When a well-known manufacturer of bakery snacks tried to get away with using untrained workers to remove asbestos from a boiler, OSHA came down heavy on the company, piling on proposed fines of almost \$1 million. Why was the agency so concerned? “Exposure to asbestos can cause serious illnesses, such as lung cancer and asbestosis,” warned the secretary of labor. “There is no excuse for any employer exposing unprotected and unknowing workers to this hazardous substance.”

In fact, when the general public thinks of job safety, asbestos may be the first hazard that comes to mind. That’s because asbestos has a long and nefarious reputation as a particularly toxic substance that can kill. Its hazards are so well-known that employees in class action lawsuits are often successful in winning large compensation awards from asbestos manufacturers and employers.

### **A Slow-Moving Killer**

Just what makes this useful insulation so dangerous to humans? Asbestos can break up easily into tiny airborne fibers that may even be too small to see with the naked eye. These fibers can be inhaled and tend to lodge in the lungs, chest, and stomach, where they cause disabling respiratory diseases and cancer. Often, the symptoms don’t show up for more than 20 years after the first exposure.

What makes asbestos even more dangerous is its combined effect with smoking. If your workers are smokers, they are at a much greater risk for developing lung cancer from exposure to asbestos than nonsmokers. That’s one of the reasons OSHA recommends that you help your employees quit smoking.

### **Who’s at Risk?**

Asbestos has been found in a variety of applications, including the manufacture of heat-resistant clothing, automotive brake and clutch linings, and many building materials, such as floor tiles, roofing felts, ceiling tiles, asbestos pipe and sheet, and fire-resistant drywall. It has also been used in pipe and boiler insulation materials, and in sprayed-on materials located on beams, in crawlspaces, and between walls.


The highest level of exposure occurs in the construction industry, particularly during the removal of asbestos during renovation or demolition. Other workers likely to be exposed are those involved in the manufacture of asbestos products and doing automotive brake and clutch repair work.

### **Follow the Program**

In 1994 OSHA strengthened the requirements of the asbestos standard by lowering the exposure limits to 0.1 fiber per cubic centimeter (f/cc) of air over an average 8-hour day or 1 f/cc over 30 minutes. If you determine from monitoring the work environment that these levels have been exceeded, you first need to lower the amount of asbestos in the air through engineering controls, such as local exhaust ventilation, and work practices, such as wetting down the materials to keep the fibers from becoming airborne.

If you still can’t bring the asbestos levels down below the OSHA limits, then you must provide extensive personal protective equipment for your employees, including respirators, coveralls, gloves, head coverings, and foot coverings, and face shields or vented goggles. A chart is provided in the regs (Sec. 1910.1001 Table 1) to help you determine the appropriate respirator to use for different exposure levels. Then continue to monitor your employees’ exposure at least every six months and inform them of the results.

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A comprehensive program will also include written procedures, annual medical exams, and recordkeeping. Also, as with any hazardous material, you must have appropriate labels, material safety data sheets, and signs posted outside of regulated areas that contain asbestos. But the most crucial part of your program will involve training your employees before they start their jobs and each year after that to avoid any contact with asbestos.

## Training Essentials

Start off your training session by explaining the health effects of exposure to asbestos as well as the additional dangers of smoking. Review the locations and job operations at your worksite that could expose workers to asbestos. Tell them how you are reducing that exposure and thoroughly train them on the use of respirators and personal protective equipment.

Then review the specific safe work practices that must be followed, including the following:

- **Wet methods**—Wet down the asbestos as much as possible to avoid releasing fibers in the air.
- **Compressed air**—Do not use compressed air to remove asbestos unless there is an adequate ventilation system that can capture the dust.
- **Flooring**—Never sand asbestos-containing floor material.
- **Regulated areas**—Only authorized personnel are allowed to enter areas containing asbestos and they must be equipped with the appropriate clothing and respirator.
- **Spills**—Clean up spills and sudden releases of asbestos immediately.
- **Waste disposal**—Use HEPA-filtered vacuuming equipment for cleaning waste and debris. Dispose of waste in sealed bags or other closed containers.

- **Hygiene**—Use a separate locker for clean clothing and one for work clothes in a separate change room. Contaminated clothing must be stored in closed containers and cleaned at least weekly. Employees must shower at the end of each shift.

- **Lunchrooms**—Workers should only eat or drink in a specific lunchroom that has a clean air supply. Before entering, they must wash up and remove protective clothing if it is contaminated.

- **Smoking**—No-smoking rules at work should be strictly enforced.

There are additional, more extensive requirements for construction (Sec. 1926.1101), shipbuilding (Sec. 1915.1001), and automotive brake and clutch repair work (Sec. 1910.1001 App. F). In addition, state-specific requirements may be even more comprehensive.

## Do Your Homework

If you're not sure whether particular building materials contain asbestos, OSHA suggests that you speak to the building owner, who is the best source of information on this subject and is required by law to inform you and your employees about the presence of asbestos. In general, you can expect to find some asbestos in buildings constructed in 1980 or earlier.

An excellent compliance tool for determining your obligations under this standard is a software program offered by OSHA entitled *The Asbestos Advisor 2.0*. It will ask you questions about your specific work environment and then provide guidance on how to apply the standard. It can be downloaded free of charge from OSHA's website ([www.osha.gov](http://www.osha.gov)).

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## **OSHA Required Training for Asbestos 1910.1001 (j)(7) Employee information and training**

**(i)** The employer shall institute a training program for all employees who are exposed to airborne concentrations of asbestos at or above the PEL and/or excursion limit and ensure their participation in the program.

**(ii)** Training shall be provided prior to or at the time of initial assignment and at least annually thereafter.

**(iii)** The training program shall be conducted in a manner which the employee is able to understand. The employer shall ensure that each employee is informed of the following:

**(A)** The health effects associated with asbestos exposure;

**(B)** The relationship between smoking and exposure to asbestos in producing lung cancer;

**(C)** The quantity, location, manner of use, release, and storage of asbestos and the specific nature of operations which could result in exposure to asbestos;

**(D)** The engineering controls and work practices associated with the employee's job assignment;

**(E)** The specific procedures implemented to protect employees from exposure to asbestos such as appropriate work practices, emergency and clean-up procedures, and personal protective equipment to be used;

**(F)** The purpose, proper use, and limitation of respirators and protective clothing, if appropriate;

**(G)** The purpose of a description of the medical surveillance program required by paragraph (1) of this section;

**(H)** The content of this standard, including appendices;

**(I)** The names, addresses, and phone numbers of public health organizations which provide information, materials, and/or conduct programs concerning smoking cessation. The employer may distribute the list of such organizations contained in Appendix I to this section, to comply with this requirement;

**(J)** The requirements for posting signs and affixing labels and the meaning of the required legends for such signs and labels.

**(iv)** The employer shall also provide, at no cost to employees who perform housekeeping operations in an area which contains ACM or PACM, an asbestos awareness training course, which shall at minimum contain the following elements: health effects of asbestos, locations of ACM and PACM in the building/facility, recognition of ACM and PACM damage and deterioration requirements in this standard relating to housekeeping, and proper response to fiber release episodes, to all employees who perform housekeeping work in areas where ACM and/or PACM is present. Each such employee shall be so trained at least once a year.

**(v)** Access to information and training materials

**(A)** The employer shall make a copy of this standard and its appendices readily available without cost to all affected employees.

**(B)** The employer shall provide, upon request, all materials relating to the employee information and training program to the Assistant Secretary and the training program to the Assistant Secretary and the Director.

**(C)** The employer shall inform all employees concerning the availability of self-help smoking cessation program material. Upon employee request, the employer shall distribute such material, consisting of NIH Publication No. 89-1647, or equivalent self-help material, which is approved or published by a public health organization listed in Appendix I to this section.

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## **HEAR YE! HEAR YE! PROTECT YOUR WORKERS' HEARING**

Do you and your workers have to shout to be heard at work? Audiologists will tell you that you probably have a noise problem at your worksite. Unfortunately, you are not alone. Hearing loss is one of the biggest occupational health problems in the United States today.

It is estimated that 9 million American workers are continually exposed to hazardous noise on the job and about 1 million currently have a hearing loss as a result. Because the loss is gradual, some workers ignore the problem until hearing damage has occurred.

### **Do you need a hearing-conservation program?**

Industries where employees are most at risk are metal forming, textile and furniture manufacturing, oil-well rigging and servicing, and construction. Not all companies, however, need a hearing conservation program (HCP). Only if an employee's noise exposure is 85 decibels or higher averaged over an eight-hour period should you be concerned with developing a program. This noise level is known as the "action level," at which point the employer must follow the requirements of the standard.

There are six basic elements to an effective program:

1. Noise monitoring—determining the noise levels in problem work areas.
2. Engineering and administrative controls—methods of reducing noise levels.
3. Audiometric testing and evaluation—performing hearing tests on affected employees.
4. Personal protective equipment—providing appropriate hearing protectors and enforcing their use.

5. Training—teaching employees about noise and how to protect themselves.
6. Recordkeeping—maintaining accurate records of noise exposures and audiograms.

### **Noise monitoring**

The first step is to perform a noise survey in work areas that may have problems. It is a good idea to bring in an expert, such as an industrial hygienist, to conduct this survey. A sound-level meter is used to measure noise in certain areas. Measurements are taken at different times during the day to estimate noise exposure over the work shift.

If employees enter and leave noisy areas throughout the day, or if noise levels fluctuate greatly, it may be necessary to conduct "personal monitoring" with a dosimeter, a device that attaches to an employee's clothing and provides an exposure measurement over a particular time period.

### **Reduce noise levels first**

If your monitoring shows that your workers are exposed to high noise levels, first try to reduce the noise through engineering or administrative controls. Engineering controls can include enclosing machines behind soundproof barriers, dampening vibration of components, maintaining or replacing worn parts, substituting quieter machines or processes, or even isolating the operator in a soundproof booth.

Administrative controls involve rotating employees from high-noise-level areas to low-noise-level sites throughout the workshift.

### **Protecting your workforce**

If you still have areas with noise levels over 85 decibels, you need to provide appropriate hearing protection for your workers and conduct audiometric (hearing) tests. A baseline audio-



metric test must be completed within six months of an employee's first exposure to noise levels above the action level. Testing should be repeated every year.

Audiometric monitoring can be conducted by trained in-house personnel, but many companies find it more convenient to hire an outside consultant to conduct testing in a mobile van. A technician who performs audiometric tests is required by the regulation to report to an audiologist or other specialist.

The employee must be informed of the results, provided with appropriate hearing protection, and referred for a clinical audiological evaluation if hearing loss has occurred.

Ear protection is required for all employees who are exposed to noise over the action level. Look for protectors with a noise reduction rating (NRR) of at least 20 decibels. Since an employee won't wear protectors that are uncomfortable, choose the highest NRR that is compatible with a worker's comfort and fit.

In fact, the OSHA standard requires employers to offer workers a choice of suitable hearing protectors: ear plugs, canal caps, and earmuffs (see below for the pros and cons of each type). Reusable protectors should be cleaned daily with warm water and soap and left to dry.

## Keys to compliance

Don't just hand out hearing protectors and expect employees to know what to do with them. Train your workers every year in the following three areas:

- The effects of noise on hearing
- The purpose of hearing protectors and how to use and maintain them
- The purpose of audiometric testing and an explanation of test procedures

The standard requires that employers maintain accurate records of all exposure measurements and audiograms. Noise-exposure records must be kept for two years, while audiometric testing results should be kept throughout the worker's employment. Also, certain hearing losses should be recorded on OSHA Form 200 under "Illnesses."

## Overcoming hurdles

Hearing conservation will be the challenge for today's supervisors. If you help your workers to understand the dangers of noise exposure and take the necessary steps to prevent hearing loss, you will be taking a major step in stopping an irreversible process

## Pros and Cons of Hearing Protection Methods

### Earmuffs: (Pros)

- Easy to fit (just adjust headband)
- For very loud noises; can be used together with earplugs for better protection
- Provides warmth in wintertime
- Good for intermittent use
- Easy to detect for compliance

### (Cons)

- Not appropriate for use in tight quarters
- Uncomfortable over long periods of time
- Eyeglass temples reduce effectiveness and can be uncomfortable

### Earplugs: (Pros)

- Most comfortable and popular device, particularly for full-shift wear
- A variety of shapes, sizes, and materials
- Better protection against low-frequency sounds

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**(Cons)**

- Not appropriate if the device needs to be repeatedly removed; may become contaminated by dirty hands
- More difficult to fit or insert
- Manual dexterity required to roll down a foam earplug before insertion
- Difficult to detect for compliance

**Semi-aural devices  
(canal caps attached to a headband)**

**(Pros)**

- Good for intermittent use
- Can be carried conveniently when not in use
- Glass temples won't interfere with device
- Good for work in tight quarters
- Easy to detect for compliance

**(Cons)**

- Less comfortable over extended periods of time
- User's own voice sounds distorted

**OSHA Required Training for  
Hearing Protection**

**Hearing protection 29 CFR 1910.95(i)(4)**

The employer shall provide training in the use and care of all hearing protectors provided to employees.

**Training program 1910.95(k)(1) through  
(3)(i) through (iii)**

**(1)** The employer shall institute a training program for all employees who are exposed to noise at or above an 8-hour time weighted average of 85 decibels, and shall ensure employee participation in the program.

**(2)** The training program shall be repeated annually for each employee included in the hearing conservation program. Information provided in the training program shall be updated to be consistent with changes in protective equipment and work processes.

**(3)** The employer shall ensure that each employee is informed of the following:

- (i) The effects of noise on hearing;
- (ii) The purpose of hearing protectors; the advantages, disadvantages, and attenuation of various types; and instructions on selection, fitting, use, and care; and
- (iii) The purpose of audiometric testing, and an explanation of the test procedures.



## KEEP BOTH EYES ON SAFETY

The swashbuckling pirate with a patch on one eye has always remained a romantic figure in our imaginations. But in reality, there is nothing adventurous or noteworthy about losing an eye at work. Yet every day an estimated 1,000 eye injuries occur in the workplace and cost business more than \$300 million per year in lost production time, medical expenses, and workers' compensation.

Then there is the emotional toll of an eye accident for which no amount of money can compensate.

Why do these accidents continue to occur? Employees just aren't using their safety eyewear. The Bureau of Labor Statistics reports that three out of every five workers who received eye injuries were not wearing eye protection at the time of the accident. Others were harmed when they wore the wrong kind of eye protection for the job, such as glasses with no side shields.

### Check out the hazards

OSHA requires employers to provide the proper eye protection for the job. But, you must first determine where the eye hazards are located and what kind of equipment will best protect your workers' eyesight. Look for these typical eye hazards at your worksite:

- Flying particles
- Molten metal
- Liquid chemicals
- Acids or caustic liquids
- Chemical gases or vapors
- Harmful light radiation

Next, look at the types of jobs that may expose your workers to eye hazards. Eye injuries occur over a wide range of occupations. Craft workers, such as mechanics, repairers, carpenters, and

plumbers, have suffered the most eye injuries, with assemblers, sanders, and grinding machine operators a close second. However, eye injuries can occur in all jobs, from the warehouse person to the lab technician.

Once you have evaluated the eye hazards, you will need to find the best protection available for your workers. Safety eyewear comes in many different types and styles, from glasses with side shields to goggles and helmets. Whatever kind of protection is chosen, it must comply with ANSI standards.

All of this information you have now gathered on eye hazards and protection is known as a "workplace hazard assessment," which must be put in writing and signed by a responsible person.

### Making it fit

Set aside time for fitting protective eyewear and teaching your employees how to use and care for the equipment. It is very important that the eyewear fit properly. There have been too many cases of injuries caused by objects or chemicals going around or under the protector when it is loose. When fitting, though, make sure that air is allowed to circulate between the eye and the lens.

If any of your workers have prescription lenses, they should have either prescription safety eyewear or equipment that can be worn over the lenses. Since uncorrected vision problems can contribute to accidents, many employers take the extra step of conducting regular eye exams for their workers.

Provide a good selection of colors and styles to help motivate your workers to use the eyewear. You may wish to have your safety eyewear supplier or eyecare professional help you conduct the fitting and selection process.

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## An eye on training

You can't just hand out safety eyewear and expect everyone to know what to do with it. OSHA requires you to train your employees on all aspects of using the equipment.

Start off the training session by relating a recent eye accident or near miss. Or, try this experiment with your employees—have them close one eye and ask them to imagine how they would do everything they do now with both eyes. Now tell them to think about coming to work with only one good eye and how scared they would be about losing the other one. Now have them close both eyes and imagine being completely blind.

Once you've caught their attention, you can pass on the following important safety information:

- Always wear the proper eye protection and make sure it fits. Many accidents have occurred when objects or chemicals went around or under the protector.
- Wear goggles under face shields. Shields and welding helmets alone do not provide complete eye protection.
- Make sure you understand when to wear the eye protection and how to properly use it and adjust it. If you are confused, ask your supervisor.
- Keep your safety glasses or other eye protectors clean and in good condition.
- Don't use eye protection only at work. Buy an extra set of safety glasses for home for those do-it-yourself projects that involve eye hazards.

## Should an accident occur ...

If, despite all your precautions, an eye accident should occur, your workers should be ready with some basic first-aid training behind them. Everyone should know where the nearest eyewash station is located, and they must be taught how to use it. Make sure the eyewash

stations are checked frequently and that there is plenty of clean water at a comfortable temperature. Teach employees to continuously wash out their eyes with clean water or to help a co-worker who might be injured.

## Set an example

Post eye-protection policies and other eye safety reminders around the workplace to encourage compliance. Of course, supervisors should set an example by wearing safety eye gear at all times.

As for that nifty eye patch, keep it where it belongs—with the Halloween costumes!

## OSHA Required Training for Personal Protective Equipment (PPE) 1910.132(f)

- (1) The employer shall provide training to each employee who is required by this section to use PPE. Each such employee shall be trained to know at least the following:
- (i) When PPE is necessary;
  - (ii) What PPE is necessary;
  - (iii) How to properly don, doff, adjust, and wear PPE;
  - (iv) The limitations of the PPE; and
  - (v) The proper care, maintenance, useful life, and disposal of the PPE.

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## MAKE THE CASE FOR HAND AND FOOT PROTECTION

You know that one of the biggest challenges facing any supervisor is getting your employees to wear their protective equipment consistently. This is particularly true if they just don't believe that the equipment, such as safety shoes or work gloves, are truly necessary to protect them. For instance, one supervisor told the story of how his warehouse employees couldn't understand why they needed to wear safety shoes. "If my foot gets run over by a forklift, the shoe won't do any good," said one worker. The supervisor explained that the shoes were being used to protect against other hazards, such as heavy boxes falling off of storage racks. "Actually, OSHA says that the typical foot injury is caused by objects falling less than four feet," the supervisor told his crew. The confusion among some workers about the need for personal protective equipment (PPE) is why OSHA beefed up its PPE regulation (Sec. 1910.132) in 1994 to make sure that employers were providing the necessary information and training to their employees. For foot and hand protection, the regulation requires you to determine what jobs and hazards can harm the extremities and to find the appropriate equipment that will protect your workers. You also need to document your research in a written certification.

### If the shoe fits ...

Take a walkthrough of your work facility and look for foot injury exposures. Here are some typical types of foot hazards:

- Falling or rolling objects (boxes, heavy pipes, barrels)
- Sharp objects (chain saw, drills)
- Wet, slippery surfaces (water or oil spills)
- Extreme hot surfaces (roofing, paving, and hot metal)
- Chemical spills
- Electric shock
- Extremely cold surfaces (working in snow and ice)

The next step is the "matching game"—finding the correct safety shoe that will protect against the hazard. There are a number of categories of protection:


- **Steel safety toe**—protects against falling, rolling or sharp objects.
- **Add-on foot guards**—can be attached to regular shoes as protection from mechanical hazards; drawback: may catch on something, causing the worker to trip.
- **Rubber-heeled boots**—used to protect against electrical hazards.
- **Metatarsal shoes**—guard running from the ankle to the toes distributes the force of a falling object over the entire surface of the shoe.
- **Neoprene or nitrile boots**—use in oily or wet conditions; use nitrile for chemical exposures.
- **Reinforced soles**—for uneven or sharp surfaces.
- **Fire-resistant boots**—for extreme heat conditions.

Narrow down your choices with information from your safety equipment distributor and independent organizations such as the American National Standards Institute (ANSI) and the American Society for Testing and Materials (ASTM).

### Safety goes hand in hand

The same process applies to the selection of gloves or some other type of hand protection, such as barrier creams. Look for these kinds of potential injuries:

- Amputations or cuts
- Burns from heat, electricity, or chemicals

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- 
- Punctures, including needlesticks
  - Dermatitis
  - Vibration-related problems

Determining the appropriate type of glove for each job category can get complicated and you may need to consult with a safety professional or industrial hygienist. These experts will look at the performance characteristics of the gloves, which include chemical, puncture, tear and abrasion resistance.

Of particular concern in the health care industry is hand protection against bloodborne pathogens, such as HIV and hepatitis B. Although latex gloves are standard equipment, some health care workers (and patients) are severely allergic to the latex. If you face that problem, you should consider switching to either powder-free gloves, which keep the latex from becoming airborne, or nonlatex gloves.

### **Offer a choice**

Once you have picked the type of hand and foot equipment that best suits your needs, it is now time to call together a committee of employees to make the final choices. Offer them a selection of styles and have them try the equipment for a week or two. Let them judge which safety shoes or gloves are comfortable and provide adequate protection. Their opinions will help narrow down the choices. Also, your employees will feel better about wearing equipment if they are asked to participate in the decision making.

### **Train and certify**

Once the choices are made, don't just hand out the equipment without providing adequate training. Teach your employees how to use the shoes or gloves and what their limits are. Show them how to properly care for the equipment. For instance, gloves should be checked before they are

worn for holes or wear and tear. Make sure your employees ask for replacements whenever the equipment is worn out. Finally, OSHA requires that you or some other member of management fill out a written certificate that verifies that your employees have received and understood the training. Make sure it is signed. You can use a single certificate for all employees or for a group of employees. By taking the time to systematically determine your needs and train your employees, you will go a long way toward protecting those important human tools: hands and feet.

### **OSHA Required Training for PPE 1910.132(f)**

**(1)** The employer shall provide training to each employee who is required by this section to use PPE. Each such employee shall be trained to know at least the following:

- (i)** When PPE is necessary;
- (ii)** What PPE is necessary;
- (iii)** How to properly don, doff, adjust, and wear PPE;
- (iv)** The limitations of PPE; and
- (v)** The proper care, maintenance, useful life and disposal of PPE.

**(2)** Each affected employee shall demonstrate an understanding of the training specified in paragraph (f)(1) of this section, and the ability to use PPE properly, before being allowed to perform work requiring the use of PPE.



