

SAFETY AND HEALTH PROGRAM GUIDELINES FOR THE STATE OF IOWA



**Prepared By
Denis Zeimet, Ph.D., CIH. and David Ballard, WSO-CST**

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ABOUT THE AUTHORS

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Dedicated to the Memory of Marty Sandve

Introduction

This safety program has been edited and customized from *A Safety Program For Small Businesses* by Denis Zeimet and David Ballard for the State of Iowa. The purpose of the program is to assist state agencies in reducing occupational injuries and illness through the establishment of effective safety and health programs.

We have tried to make the manual user friendly. The manual is written in an outline format that is designed to be informational, *not* procedural. In addition, the use of regulatory and other technical language has been held to a minimum.

The manual provides basic information only and is *not* all-inclusive. Furthermore, the manual should *not* be used in issues relating to regulatory compliance. In such situations employers are directed to the appropriate policy/procedure and/or regulation of the Occupational Safety and Health Administration (OSHA).

Acknowledgments

Information contained in this manual has been compiled from Parts 1910 and 1926 of Title 29 of the Code of Federal Regulations and public domain documents available from the:

- Occupational Safety and Health Administration, United States Department of Labor.
- United States Mine Safety and Health Administration.
- Chemical Manufacturers Association.
- United States Office of Consumer Affairs.
- National Institute for Occupational Safety and Health.
- United States Department of Transportation.
- United States Federal Emergency Management Agency.

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This model safety program has been carefully reviewed and customized in accordance with the instructions provided, and adopted as the following employer's own safety program.

(Insert name of employer)

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Introduction

This primer provides an overview of the Occupational Safety and Health Act of 1970 and Occupational Safety and Health Administration (OSHA). It is by no means all-inclusive and should *not* be used in issues pertaining to regulatory compliance. Employers should refer to the Occupational Safety and Health Act of 1970 and/or the appropriate Code of Federal Regulations in all matters that pertain to regulatory compliance.

Occupational Safety and Health Administration

Today, a safe and healthy workplace is a basic right that American workers expect and demand. However, comprehensive and uniform laws requiring employers to provide their employees with a safe and healthy workplace did *not* exist in the United States until 1970. Laws that did exist were generally at the state level, and the existing national consensus standards were *not* enforceable by law. It is difficult for workers under the age of fifty to fully appreciate the hazards faced by their parents and grandparents. In the late 1960's, the human cost was staggering:

- Job-related accidents accounted for more than 14,500 worker deaths annually.
- More than 2.2 million workers were disabled annually.
- There were an estimated 390,000 new cases of occupational diseases annually.

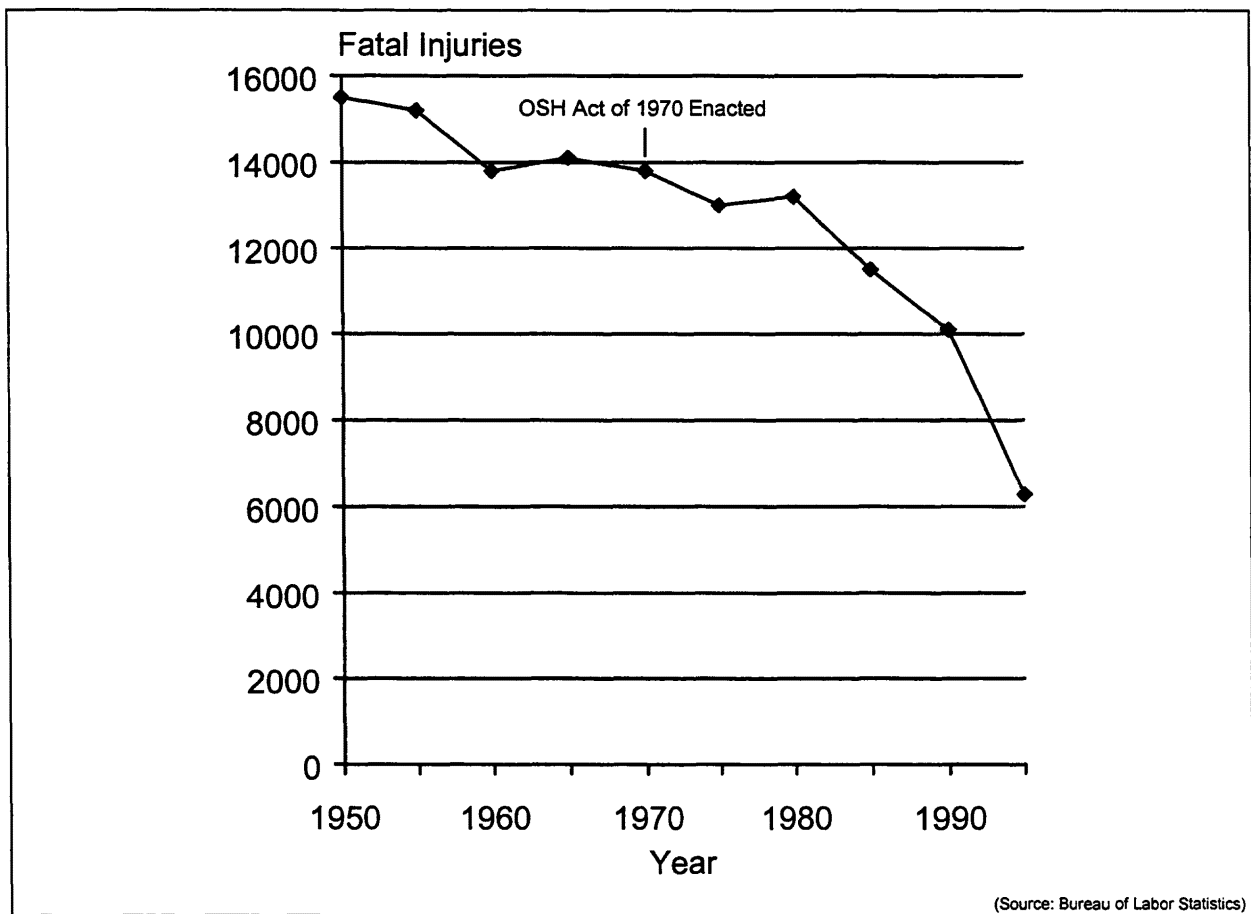
The Occupational Safety and Health Act of 1970

In response to such alarming statistics, the Occupational Safety and Health Act was passed by Congress in 1970 to assure safe and healthy working conditions for all American workers. Under the Act, the Occupational Safety and Health Administration (OSHA) was created within the Department of Labor to:

- Encourage employers and employees to reduce workplace hazards and to implement new, or improve existing, safety and health programs.
- Provide for research in occupational safety and health to develop innovative ways of dealing with occupational safety and health problems.
- Establish separate but dependent responsibilities and rights for employers and employees for the achievement of better safety and health conditions.
- Maintain a reporting and record-keeping system to monitor job-related injuries and illnesses.

- Establish training programs to increase the number and competence of occupational safety and health personnel.
- Develop mandatory job safety and health standards and enforce them effectively, with monetary penalties as deemed appropriate.
- Provide for the development, analysis, evaluation and approval of state occupational safety and health programs.

Since 1970, fatality rates have been declining. The overall death rate has been cut in half. That equates to more than 100,000 workers whose lives were spared due to improved safety and health on the job. The figure below illustrates the overall decline in job related deaths since 1950.



Impact of the Occupational Safety and Health Act on Fatal Injuries Rates

The Act's Coverage

In general, coverage of the Occupational Safety and Health Act extends to all employers and their employees in the 50 states, the District of Columbia, Puerto Rico and all other territories under Federal Government jurisdiction. Coverage is provided either directly by federal OSHA or through an OSHA-approved state program. However, coverage does *not* extend to:

- Self-employed persons.
- Farms at which only immediate members of the farm employer's family are employed.
- Employees in workplaces under the jurisdiction of other federal agencies (e.g., mine safety is regulated by the Mine Safety and Health Administration).

Provisions for Federal Employees

Under the Occupational Safety and Health Act, federal agency heads are responsible for providing safe and healthful working conditions for their employees. By Executive Order federal agencies must comply with standards consistent with OSHA regulations for private sector employers. In addition, federal agency heads are required to operate comprehensive occupational safety and health programs that include:

- Recording and analyzing injury and illness data.
- Providing training to all levels of personnel.
- Conducting self-inspections to ensure compliance with OSHA standards.

OSHA conducts comprehensive evaluations of these programs to assess their effectiveness.

OSHA's federal sector authority is different from that in the private sector in several ways:

- OSHA cannot propose monetary penalties against another federal agency for failure to comply with OSHA standards. Instead, compliance issues unresolved at the local level are raised to higher organizational levels until resolved.
- OSHA does *not* have the authority to protect federal employee "whistleblowers."

Provisions for State and Local Governments

OSHA provisions do *not* apply to state and local governments in their role as employers. The Occupational Safety and Health Act does provide that any state desiring to gain OSHA approval for its private sector occupational safety and health program must provide a program that covers its state and local government workers that is at least as effective as its program for private employees.

Employer Duties Under The Occupational Safety and Health Act

General employer duties for a safe and healthy workplace are defined in the Occupational Safety and Health Act. It states: “. . . Each employer shall furnish to each of his employees employment and a place of employment which are free from recognized hazards that are causing or are likely to cause death or serious physical harm to his employees and shall comply with occupational safety and health standards promulgated under this Act.”

In addition, employers have specific duties to:

- Establish appropriate policies, procedures, practices and controls as required by workplace hazards and applicable OSHA regulations.
- Provide employees with information and instruction on workplace safety and health hazards, safe work practices and other precautions, and procedures that are to be followed if an employee is involved in an accident or is exposed to a toxic substance.
- Make safety and health-related information such as material safety data sheets, applicable safety and health standards, and policies, procedures and practices available to employees in the workplace.
- Provide for employee access to relevant exposure and medical records.
- Record OSHA recordable injuries and illness on the *OSHA 200 Log and Summary of Occupational Injuries and Illnesses* (or on an equivalent form).
- Post the annual summary portion of the *Summary of Occupational Injuries and Illnesses* form by February 1 and leave it posted until March 1.
- Post the *OSHA Job Safety and Health Protection Poster* (or the state equivalent) in a prominent location in the workplace.
- Post copies of all OSHA citations for violations of standards. These must remain posted at or near the location of the alleged violations for three days, or until the violations are corrected, whichever comes first.
- Inform employees of variance applications and post them in the workplace.

Employer Rights

OSHA's policy on public service states that employers can expect OSHA to:

- Help them identify and control workplace hazards by offering a choice between partnership and traditional enforcement.
- Focus OSHA inspections on the most serious hazards in the most dangerous workplaces.
- Be respectful and professional.

Employers should refer to OSHA publication 3000, *Employers Rights and Responsibilities Following An OSHA Inspection*, for specific information on employer rights and responsibilities during and following an OSHA inspection.

Employee Duties and Rights Under The Occupational Safety and Health Act

General employee duties for a safe and healthful workplace are defined in the Occupational Safety and Health Act. It states: ". . . Each employee shall comply with occupational safety and health standards and all rules, regulations, and orders issued pursuant to this Act which are applicable to his own actions and conduct."

OSHA also states that employees are responsible for:

- Reading the *OSHA Job Safety and Health Protection Poster* at the jobsite.
- Complying with all applicable OSHA standards.
- Following all employer safety and health regulations, and wearing or using prescribed protective equipment while working.
- Reporting hazardous conditions to their supervisor.
- Reporting any job-related injury or illness to their employer, and seeking prompt treatment.
- Cooperating with the OSHA compliance officer conducting an inspection if he or she inquires about safety and health conditions in the workplace.
- Exercising their rights under the Act in a responsible manner.

OSHA considers employee compliance with the Occupational Safety and Health Act to be an employer duty and does *not* issue citations to individual employees.

Employee Rights

The Occupational Safety and Health Act gives employees many rights. Employees have the right to:

- Review copies of appropriate standards, rules, regulations, and requirements that the employer should have available at the workplace.
- Request information from the employer on safety and health hazards in the workplace, precautions that may be taken, and procedures to be followed if an employee is involved in an accident or is exposed to a toxic substance.
- Have access to relevant employee exposure and medical records.
- Request that the OSHA area director conduct an inspection if they believe hazardous conditions or violations of standards exist in the workplace.
- Have an authorized employee representative accompany the OSHA compliance officer during the inspection tour.
- Respond to questions from the OSHA compliance officer, particularly if there is no authorized employee representative accompanying the compliance officer on the inspection "walkaround."
- Observe any monitoring or measuring of hazardous materials and see the resulting records as specified under the Act and as required by OSHA standards.
- Review or have an authorized representative review the *Log and Summary of Occupational Injuries and Illnesses* (OSHA No. 200) at a reasonable time and in a reasonable manner.
- Be informed by posting of any citation issued by OSHA as part of an inspection.
- Object to the abatement period set by OSHA for correcting any violation in the citation issued to the employer by writing to the OSHA area director within 15 working days from the date the employer receives the citation.
- Submit a written request to the National Institute for Occupational Safety and Health (NIOSH) for information on whether any substance in the workplace has potentially toxic effects in the concentration being used, and have their names withheld from the employer, if that is requested.
- Be notified by the employer if the employer applies for a variance from an OSHA standard, testify at a variance hearing, and appeal the final decision.
- Have their names withheld from the employer, upon request to OSHA, if a written and signed complaint is filed.

- Be advised of OSHA actions regarding a complaint and request an informal review of any decision *not* to inspect or to issue a citation.
- File a discrimination complaint under Section 11(c) of the Act if punished for exercising the above rights or for refusing to work when faced with an imminent danger of death or serious injury and there is insufficient time for OSHA to inspect; or file a Section 405 reprisal complaint (under the Surface Transportation Assistance Act [STAA]); or file a complaint within 90 days under Section 211 of the Asbestos Hazard Emergency Response Act, which protects employees of primary and secondary schools who complain of exposure to asbestos in their work area; or file a complaint within 60 days under Section 7 of the International Safe Container Act, which protects employees who report safety hazards associated with cargo containers transported on sea and land carriers.

Access to Exposure and Medical Records

The existence, location, and availability of medical records and records of employees' exposure to toxic substances and harmful physical agents must be provided by the employer to affected employees upon their first entering into employment and at least annually thereafter. Whenever an employer plans to stop doing business and there is no successor employer to receive and maintain these records, the employer must notify employees of their right of access to records at least three months before the employer ceases to do business.

When OSHA standards require the employer to measure exposure to harmful substances, the employee (or representative) has the right to observe the testing and to examine the records of the results. If the exposure levels are above the limit set by the standard, the employer must tell employees what will be done to bring the exposure down.

Safety and Health Standards

OSHA standards are legally enforceable regulations that establish conditions, practices and operations necessary to protect employee health and safety.

OSHA safety and health standards represent *minimal* requirements for protecting employee health and safety that all employers must meet or exceed.

Development and Adoption of Standards

When OSHA was created in 1970, most of its standards came from existing federal laws and national consensus standards. In more recent years, OSHA Standards have been adopted through notice-and-comment rulemaking, which involves at a minimum:

- Publishing a proposed standard in the Federal Register for public comment.
- Holding an informal hearing if requested by affected parties (e.g., labor unions and employer associations).
- Publishing a final standard in the Federal Register based on a review of comments made by affected parties (e.g., labor unions and employer associations) during the rulemaking.

OSHA can begin standards-setting procedures on its own initiative, or in response to petitions from other parties, such as:

- The Secretary of Health and Human Services.
- The National Institute for Occupational Safety and Health (NIOSH).
- State and local governments.
- Nationally-recognized standards-producing organizations, including American National Standards Institute (ANSI) and the National Fire Protection Association (NFPA).
- Employer and labor representatives.

Specification and Performance Standards

OSHA promulgates two different types of standards: specification and performance.

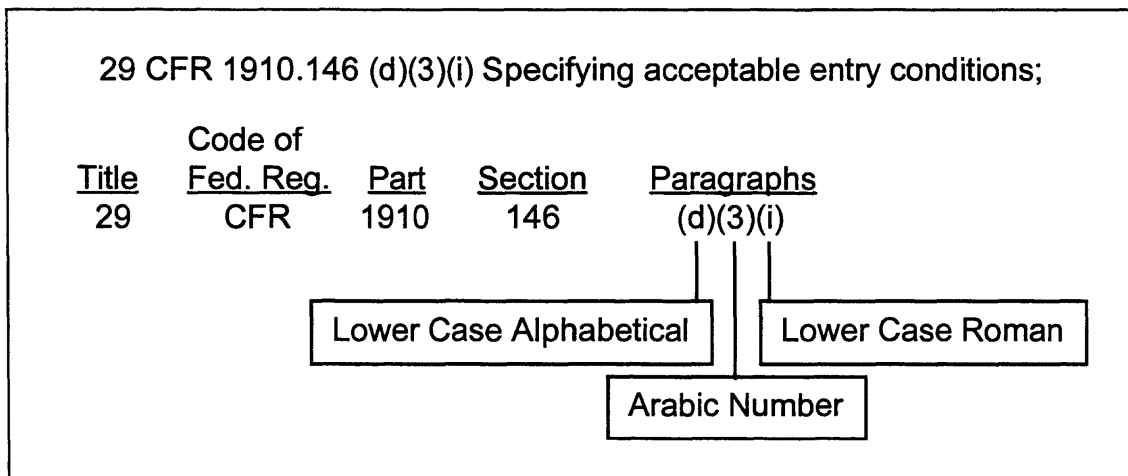
Specification standards communicate specific conditions or actions. For example in 29 CFR 1910.2159(a)(4) OSHA states, “. . . Work rests shall be kept adjusted closely to the wheel with a maximum opening of one-eighth inch to prevent the work from being jammed between the wheel and the rest, which may cause wheel breakage.”

Performance standards communicate a desired outcome but do *not* specify specific method compliance. For example in 29 CFR 1910.147 (c)(4) OSHA states, “. . . Procedures shall be developed, documented and utilized for the control of potentially hazardous energy when employees are engaged in the activities covered by this section.”

OSHA standards are published in Title 29 of the Code of Federal Regulations and are divided into four main categories:

- General Industry (Part 1910).
- Maritime (Parts 1915 through 1918).
- Construction (Part 1926).
- Agriculture (Part 1928).

OSHA Safety and health standards are referenced as shown below.



OSHA standards are available from:

- The US Government Printing Office.
- Federal and state OSHA offices.
- The OSHA website (<http://www.osha.gov>).

Variances from OSHA Standards

Under certain conditions, OSHA may grant employers variances from safety and health standards.

In some instances, employers may not be able to comply fully with a new safety or health standard in the time provided due to a shortage of personnel, materials or equipment. In such situations, employers may apply to OSHA for a temporary variance from the standard.

In other cases, employers may be using methods, equipment or facilities that differ from those prescribed by OSHA, but provide equal or better protection than the standard specifies.

When such conditions exist employers may apply for a permanent variance. In applying for a permanent variance, the employer must be able to demonstrate that his or her facility or method of operation provides employee protection "at least as effective as" that required by OSHA's standard.

Employers must apply to OSHA (or, if in a state with a state plan, to their state's occupational safety and health agency) when seeking a variance. OSHA will review the application and grant a variance as determined by existing conditions.

Workplace Inspections

To enforce its standards, OSHA is authorized to conduct workplace inspections. Every establishment covered by the Occupational Safety and Health Act is subject to inspection by OSHA. Under the Act, upon presenting appropriate credentials to the owner, operator or agent in charge of a place of employment, an OSHA compliance officer is authorized to:

- "Enter without delay and at reasonable times any factory, plant, establishment, construction site or other areas, workplace, or establishment where work is performed by an employee; and to
- Inspect and investigate during regular working hours, and at other reasonable times, and within reasonable time limits and in a reasonable manner, any such place of employment and all pertinent conditions, structures, machines, apparatus, devices, equipment and materials therein, and to question privately any such employer, owner, operator, agent or employee."

OSHA inspections are conducted without advance notice.

Inspection Priorities

OSHA priorities for conducting workplace inspections are as follows:

- *Imminent Danger.* Imminent danger situations have top priority. An imminent danger is a hazard that could cause death or serious physical harm immediately, or before the danger could be eliminated through normal enforcement procedures. When compliance officers find imminent danger conditions, they will ask for immediate voluntary correction of the hazard by the employer or removal of endangered employees from the area. If an employer fails to comply, OSHA can go to the nearest federal district court for appropriate legal action.
- *Catastrophes and Fatal Accidents.* High priority is also given to investigation of job fatalities and accidents hospitalizing five or more employees.

- *Complaints.* OSHA investigates written and signed complaints by current employees or their representatives of hazards that threaten serious physical harm to workers. Complaints, other than imminent danger, received from anyone, other than a current employee or employee representative, or unsigned by a current employee, or received anonymously, may result in a letter from the agency to the employer describing the allegation(s) and requesting a response. OSHA will *not* reveal the name of the person filing a complaint, if so requested.
- *Programmed Inspections.* OSHA routinely conducts safety and health inspections in high-hazard industries like manufacturing or construction. The agency develops its general schedule for inspecting the most hazardous industries based on various statistical data, such as job injury or illness rates, worker's compensation claims, and other information.

Inspection Process

There are four phases to an OSHA inspection.

- *Presentation of Credentials.* When an OSHA inspector arrives, he or she displays official credentials and asks to see the employer. Employers should always insist upon seeing the compliance officer's credentials. Employers have the right to require that OSHA obtain a warrant before permitting entry. Requiring a warrant is *not* a recommended course of action because the inspector will secure a warrant and gain access to the facility anyway, and will probably perform a more comprehensive inspection because he/she believes the employer has something to hide.
- *Opening Conference.* The compliance officer will explain the nature of the visit, the scope of the inspection, and the applicable standards. Information on how to obtain copies of OSHA regulations will be furnished. A copy of any employee complaint (edited, if requested, to conceal the employee's identity) will be provided. The employer will be asked to select an employer representative to accompany the compliance officer during the inspection. An authorized representative of the employees also has the right to observe the inspection. The compliance officer will consult with a reasonable number of employees.
- *Walk-around Inspection.* After the opening conference, the compliance officer and the representatives go through the workplace, inspecting for workplace hazards. When talking with workers, compliance officers will try to minimize work interruptions. The Act prohibits discrimination in any form by employers against workers because of anything they say or show the compliance officer during the inspection or for any other OSHA-protected safety-related activity. The compliance officer will discuss any apparent violations noted during the walk-around, and if asked, will suggest possible corrective actions.

- **Closing Conference.** The compliance officer reviews any apparent violations with the employer and discusses possible methods and time periods necessary for their correction. The compliance officer explains that these violations may result in a citation and a proposed financial penalty, describes the employer's rights and responsibilities, and answers all questions.

Citations

OSHA is required by law to issue citations for violations of safety and health standards. The agency is *not* permitted to issue warnings. In most cases, citations are prepared at the OSHA area office and are mailed to employers. Citations include the following information:

- Description of the violation.
- Proposed penalty, if any.
- Date by which the hazard must be corrected.

Upon receipt of a citation, employers must:

- Post a copy of the citation at or near the location where the violation occurred.
- Correct each violation by the date given on the citation.
- File an intention to contest form within 15 working days if they intend to contest the citation.

Penalties

Under the Occupational Safety and Health Act, there are five categories of citations.

- **Other-Than-Serious Violation.** A violation that has a direct relationship to job safety and health, but would probably *not* cause death or serious physical harm. A proposed penalty of up to \$7,000 for each violation is discretionary. A penalty for an other-than-serious violation may be adjusted downward by as much as 80 percent, depending on the employer's good faith (demonstrated efforts to comply with the Occupational Safety and Health Act), history of previous violations, and size of the business.
- **Serious Violation.** A violation where there is substantial probability that death or serious physical harm could result and where the employer knew, or should have known, of the hazard. A mandatory penalty of up to \$7,000 for each violation is proposed.

A penalty for a serious violation may be adjusted downward, based on the employer's good faith, history of previous violations, gravity of the alleged violation, and size of the business.

- ***Willful Violation.*** A violation that the employer intentionally and knowingly commits. The employer either knows that what he or she is doing constitutes a violation, or is aware that a hazardous condition exists and has made no reasonable effort to eliminate it. Penalties up to \$70,000 may be proposed for each willful violation with a minimum penalty of \$5,000 for each violation. A proposed penalty for a willful violation may be adjusted downward, depending on the size of the business and its previous history of violations. Usually, no credit is given for good faith.
- If an employer is convicted of a willful violation of a standard that has resulted in the death of an employee, the offense is punishable by a court-imposed fine or by imprisonment for up to six months or both. A fine of up to \$250,000 for an individual, or \$500,000 for a corporation, may be imposed for a criminal conviction.
- ***Repeat Violations.*** A violation of any standard, regulation, rule, or order where, upon reinspection, a substantially similar violation is found. Repeat violations can bring a fine of up to \$70,000 for each instance. To be the basis of a repeat violation, the original citation must be final; a citation under contest may *not* serve as the basis for a subsequent repeat citation.
- ***Failure to Correct Prior Violation.*** Failure to correct a prior violation may bring a civil penalty of up to \$7,000 for each day the violation continues beyond the prescribed abatement date.

Additional violations for which citations and proposed penalties may be issued are as follows:

- Falsifying records, reports, or applications can bring a fine of \$10,000 or up to six months in jail, or both.
- Violations of posting requirements can bring a civil penalty of up to \$7,000.
- Assaulting a compliance officer, or otherwise resisting, opposing, intimidating, or interfering with a compliance officer in the performance of his or her duties is a criminal offense, subject to a fine of not more than \$5,000 and imprisonment for not more than three years.

Appeals Process

If an employer believes that OSHA's citations and proposed penalties are unreasonable or excessive, he or she may:

- Request an informal conference with the area director to discuss any citations issued. The area director is authorized to enter into settlement agreements that revise the citations and penalties to avoid prolonged legal disputes.
- Petition to modify the abatement period if additional time is needed to achieve complete compliance.
- Formally contest the citations. In such cases, the OSHA area director forwards the case to the Occupational Safety and Health Review Commission, which assigns the case to an administrative law judge.

State Programs

The Occupational Safety and Health Act encourages states to develop and operate their own programs. States and territories that operate their own occupational safety and health programs include Alaska, Arizona, California, Hawaii, Indiana, Iowa, Kentucky, Maryland, Michigan, Minnesota, Nevada, New Mexico, North Carolina, Oregon, Puerto Rico, South Carolina, Tennessee, Utah, Vermont, Virginia, Virgin Islands, Washington, and Wyoming. Connecticut and New York have programs that cover state and local government employees only.

State programs must contain requirements and limitations that are equal to or exceed those required by federal OSHA.

OSHA Consultation Services

OSHA provides free consultation services to assist employers in recognizing and correcting workplace safety and health hazards. Under the program, OSHA consultants will:

- Assist in the recognition of workplace hazards.
- Suggest approaches or options for solving safety and health problems.
- Identify additional sources of assistance that may be available.
- Provide a written report and summary of findings.
- Assist in developing or maintaining an effective safety and health program.

- Assist in providing information and instruction to employees.
- Under certain circumstances, recommend an employer for recognition by OSHA and a one-year exemption from general, scheduled, enforcement inspections.

Consultants will *not*:

- Issue citations or propose penalties for violations of OSHA standards.
- Report possible violations to OSHA enforcement staff.
- Guarantee that any workplace will pass an OSHA inspection.

Training and Education Resources

A variety of training resources are available from federal and state OSHA offices. Available resources often include:

- Free copies of OSHA standards and publications.
- Video-tapes that are available for loan at no cost.
- Training packages that are either available for loan or furnished no cost.

The OSHA website contains a number of publications, training packages, and fact sheets that can be downloaded and printed.

The OSHA Training Institute at Des Plaines, Illinois, offers a variety of basic and advanced courses. Many of the courses are open to private and public sector employees.

Voluntary Protection Programs

Voluntary Protection Programs (VPPs) are cooperative efforts by OSHA and participating employers to extend worker protection beyond the minimum required by OSHA standards. The programs are designed to:

- Recognize the outstanding achievements of employers who have successfully incorporated comprehensive safety and health programs into their total management system.
- Motivate other employers to achieve excellent safety and health results in the same way.
- Enable employers to establish a cooperative relationship with OSHA.

Benefits of Voluntary Protection Programs participation include:

- Improved employee motivation to work safely and productively.
- Reduction of on-the-job injuries (injury rates of 60 to 80 percent of the industry average are not uncommon).
- Reduction in workers' compensation claims.
- Community recognition.
- A partner relationship with OSHA.

There are three Voluntary Protection Programs: Star, Merit and Demonstration.

Star Program

The Star program is designed for companies with comprehensive, successful safety and health programs. Companies that are in the forefront of employee protection, as indicated by three-year average incident and lost workday case rates at or below the national average for their industry, may participate. They must also meet requirements for extensive management systems. Because of the changing nature of the worksite, construction firms must maintain strong employee participation in their programs. Star participants are evaluated every three years, although their incident rates are reviewed annually.

Merit Program

Merit is an effective stepping stone to Star. Merit sites may have more general safety and health management systems but must set goals for meeting Star requirements. While there are less stringent rate requirements for Merit, applicants must agree to specific goals for reducing rates to below the average for their industry. Merit participants are evaluated onsite annually.

Demonstration Program

The Demonstration program provides a basis for promising alternative safety and health program approaches that are not currently available under the VPP as well as to allow for special industry operations such as logging, maritime, etc. Alternative approaches that are successful will be considered for inclusion in the Star program.

Additional Information on VPP Programs

Employers interested in participating in VPP programs should refer to the OSHA publication, *So You Want to Apply to VPP: Here's How to Do It*, for additional information.

Record Keeping and Reporting

The Occupational Safety and Health Act of 1970 requires most private sector employers to prepare and maintain records of work-related injuries and illnesses. These records include the OSHA form no. 200, *Log and Summary of Occupational Injuries and Illnesses*, and the OSHA form no. 101, *Supplementary Record of Occupational Injuries and Illnesses*.

Employers Required To Keep Records

All employers with 11 or more employees in the following industries, as determined by their Standard Industrial Classification (SIC), must keep injury and illness records: Agriculture, Forestry, and Fishing (SICs 01–02 and 07–09); Oil and Gas Extraction (SIC 13); Construction (SICs 15–17); Manufacturing (SICs 20–39); Transportation, Communications, and Public Utilities (SIC's 41–42 and 44–49); Wholesale Trade (SICs 50–51); Building Materials, Hardware, Garden Supply and Mobile Home Dealers (SIC 52); General Merchandise Stores (SIC 53); Food Stores (SIC 54); Hotels, Rooming Houses, Camps, and Other Lodging Places (SIC 70); Repair Services (SICs 75 and 76); Amusement and Recreation Services (SIC 79); and Health Services (SIC 80).

Normally Exempt Employers

The following employers are normally exempt from record-keeping requirements unless notified in advance by the Bureau of Labor Statistics (BLS) that they have been selected to participate in the mandatory Annual Survey of Occupational Injuries and Illnesses.

- Employers who had no more than ten employees (full- and part-time) at any time during the previous calendar year; or
- Employers in retail trade, finance, insurance, real estate, and service industries (SICs 52–89); except for building materials and garden supplies (SIC 52); general merchandise and food stores (SIC 53 and 54), hotels and other lodging places (SIC 70), repair services (SIC 75 and 76), amusement and recreational services (SIC 79), and health services (SIC 80).

These exemptions do *not* excuse any employer from coverage by OSHA or from compliance with all applicable safety and health standards which may include other types of record keeping requirements. Normally exempt employers will be required to maintain records if they are selected to participate in the Annual Survey of Occupational Injuries and Illnesses. Selected employers will be notified in advance and supplied with the necessary forms and instructions.

The record-keeping exemptions apply to all eligible workplaces under the jurisdiction of federal OSHA. However, as noted on page xiv, 25 states operate their own OSHA's. Employers in the states listed on page xiv, should contact the state agency to determine if it has adopted or intends to adopt the exemptions.

OSHA 200 Log

OSHA requires the use of OSHA form no. 200, *Log and Summary of Occupational Injuries and Illnesses*, or an equivalent form. On the log employers provide brief descriptive information, then use a simple check-off procedure to maintain a running total of occupational injuries and illnesses for the year. Authorized Federal and State government officials, employees, and their representatives are guaranteed access, upon request, to the injury and illness log for the establishment.

Employers are required to post an annual summary of occupational injuries and illnesses for the previous calendar year. The summary must be posted no later than February 1 and must remain in place until March 1.

OSHA form no. 101 is used to supply supplementary information regarding each injury and illness entered on the log. This form names the person and describes the circumstances of his or her injury or illness. Substitute forms such as workers' compensation reports may be used if they contain all the specified information. Authorized government officials shall be provided access to these records as well.

Injury and illness records shall be maintained at each workplace. In the absence of a regular workplace, records shall be maintained at some central location. The records must be retained and updated for five years following the calendar year they cover.

Employers should refer to the OSHA publication, *Record-Keeping Guidelines for Occupational Injuries and Illnesses*, for additional information on reporting occupational injuries and illnesses. Employers should be aware that OSHA published a Notice of Proposed Rule-Making for revising the current record-keeping system in the Federal Register in February of 1996.

Reporting Catastrophic Events and Fatal Accidents

Employers must report by telephone to the nearest OSHA office within 8 hours all accidents which result in a work-related fatality or the hospitalization of three or more employees. The report must provide the following information: establishment name, location of incident, time of the incident, number of fatalities or hospitalized employees, contact person, phone number, and a brief description of the incident.

Some states may have more stringent requirements for the reporting of catastrophic events and fatalities than federal OSHA.

Other Record Keeping Requirements

Other records that must be maintained include:

- Results of employee medical monitoring.
- Results of exposure monitoring.
- Employee training records.
- Confined space entry permits.

Elements of an Effective Safety and Health Program

The Occupational Safety and Health Administration has concluded that an effective safety and health program establishes a culture of workplace safety and is the decisive factor in reducing the extent and the severity of work-related injuries and illnesses. OSHA has further concluded that an effective safety and health program must include the following elements.

- Management commitment and employee involvement.
- Worksite analysis.
- Hazard prevention and control.
- Safety and health training.

Management Commitment and Employee Involvement

Management commitment and employee involvement are complementary. Management commitment provides the motivating force and the resources for organizing and controlling activities within an organization. In an effective program, management regards worker safety and health as a fundamental value of the organization and applies its commitment to safety and health protection with as much vigor as it applies to other organizational purposes.

Employee involvement provides the means through which workers develop and/or express their own commitment to safety and health protection, for themselves and for their fellow workers.

To demonstrate management commitment and ensure employee involvement, employers must:

- Establish and communicate a safety and health policy so that all personnel understand the priority of safety and health protection in relation to other organizational values.
- Establish and communicate a clear goal for the safety and health program and objectives for meeting that goal, so that all members of the organization understand the results desired and the measures planned for achieving them.
- Show visible top management involvement in implementing the program, so that all will understand that management's commitment is serious.
- Ensure that first-line supervisors are positive role models and safety advocates within their areas of responsibility.
- Encourage employee involvement in the structure and operation of the program and in decisions that affect their safety and health, so that employees will commit their insight and energy to achieving the safety and health program's goal and objectives.
 - Safety committees are effective vehicles to facilitate employee involvement.
 - Team management strategies can also be used to encourage employee involvement in safety and health issues.

Sample Safety Policy

The personal safety and health of each employee of this organization is of primary importance. The prevention of occupationally induced injuries and illnesses will be given priority over operating productivity whenever necessary. To the greatest degree possible, the employer will provide all mechanical and physical facilities required for personal safety and health keeping with the highest standards.



Photograph by David Ballard

To be effective, safety committees must have clearly-defined goals and objectives and must be empowered to act.

- Assign and communicate responsibility for all aspects of the program so that managers, supervisors, and employees in all parts of the organization know what performance is expected of them.
- Provide adequate authority and resources to responsible parties so that assigned objectives can be met.
- Hold managers, supervisors, and employees accountable for meeting their responsibilities, so that essential tasks will be performed.
- Review program operations at least annually to evaluate their success in meeting the goal and objectives, so that deficiencies can be identified and the program and/or the objectives can be revised when they do *not* meet the goal of effective safety and health protection. (OSHA CPL-2, *Program Evaluation Profile*, can be of assistance in evaluating the overall effectiveness of a safety and health program.)

Worksite Analysis

Worksite analysis involves a variety of worksite examinations, to identify not only existing hazards, but also conditions and operations that give rise to new hazards. Unawareness of a hazard, which stems from failure to examine the worksite is a sure sign that safety and health policies and/or practices are ineffective. Effective management actively analyzes the work and worksite to anticipate and prevent harmful occurrences. So that all hazards are identified, employers must:

- Conduct comprehensive safety and health audits of facilities, processes, materials, equipment, and procedures. Both initial and periodic audits should be conducted. (OSHA publication 2209, *OSHA Handbook for Small Businesses*, contains a variety of self-inspection checklists that can be of assistance in conducting workplace audits.)
- Evaluate the safety and health hazards posed by new facilities, processes, materials, and equipment
- Perform routine job hazard analyses
- Conduct periodic safety and health inspections, so that new or previously missed hazards and failures in hazard controls are identified
- Establish a reliable system for employees to notify management personnel about conditions that appear hazardous (without fear of reprisal) and to receive timely and appropriate responses, and encourage employees to use the system
- Investigate accidents and "near miss" incidents so that their causes and means of prevention are identified

- Analyze injury and illness trends over time, so that patterns with common causes can be identified and prevented.

Hazard Prevention and Control

Hazard prevention and control is triggered by a determination that a hazard or potential hazard exists. Where feasible, hazards should be prevented by effective design of the jobsite or job. Effective controls must be established where it is *not* feasible to eliminate a hazard. Hazards must be eliminated or controlled in a timely manner once they have been recognized. Hazard prevention and control may be accomplished by:

- Engineering techniques where feasible and appropriate.
- Safe work procedures and practices that are understood and followed by all affected parties, as a result of training, positive reinforcement, correction of unsafe performance, and, if necessary, enforcement through a clearly communicated disciplinary system.
- Use of suitable personal protective equipment.
- Administrative controls, such as reducing the duration of exposure.

Employers may also eliminate workplace hazards and/or reduce their adverse affects by:

- Providing for regular facility and equipment maintenance so that hazardous breakdowns are prevented.
- Planning and preparing for emergencies. Employers should prepare for workplace emergencies by:
 - Installing appropriate emergency equipment (e.g., first-aid kits, fire extinguishers and emergency showers).
 - Requesting local emergency agencies to tour their facilities and assisting them in the preparation of a pre-emergency plan.
 - Training employees on emergency procedures.
- Providing basic first-aid/CPR training to employees and ensuring that advance medical care is available within a reasonable time and distance so that harm will be minimized in the event of a injury or illness.

Safety and Health Training

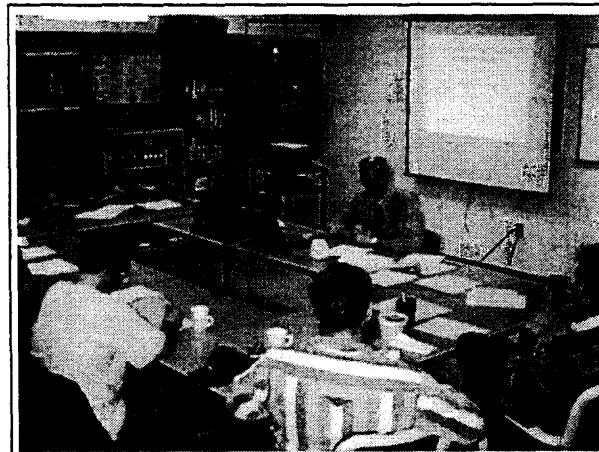
Effective training is an essential component of any safety program and is mandated in more than 100 OSHA regulations. All employees must receive information and instruction that enables them to recognize and protect themselves from workplace hazards in accordance with established policies, procedures, and practices. Supervisor training is also essential. Supervisors must be trained so that they have a complete understanding of safety and health-related policies, procedures, and practices and their role in the safety program.

Providing Effective Training

Training is an ongoing process. New employees must receive information and instruction before they can safely perform their assigned job duties. Existing employees must receive periodic in-service refresher training to reinforce initial instruction and eliminate complacent behaviors that may have developed.

Safety and health-related information and instruction can be provided in safety training sessions, shop meetings, and toolbox safety talks. Effective training requires thorough planning and preparation.

Training needs must be identified in relation to employee job duties, workplace hazards and OSHA requirements. (Employers should consult OSHA publication 2254, *Training Requirements in OSHA Standards and Training Guidelines*, to identify specific employee training requirements.) Once needs have been identified, appropriate learning activities must be prepared and delivered to affected employees.



Photograph by David Ballard

The purpose of training is learning. Learning is the acquisition of new information and skills that results in an observable and measurable change in behavior.

Some states have additional and/or more stringent training requirements than federal OSHA.

Trainers must always bear in mind that the purpose of training is learning. Learning is defined as the acquisition of new information and skills that results in an observable and measurable change in behavior. To ensure that learning takes place, trainers must create an environment where learning can take place and use the four-step instructional method. This method includes:

- Preparing employees to receive new information.
 - Trainers must motivate employees to receive new information by communicating learning objectives and telling them why the information is important and how it can be used.
- Presenting the new information.
 - Trainers must present the new information using methods that are appropriate for the subject matter. An effective presentation includes a variety of instructional methods (e.g., audiovisuals, demonstrations, discussions and activities) and a summation of key points.
- Allowing employees to apply the new information.
 - Trainers must allow participants to practice using the new knowledge or skills in real life situations.
- Evaluating employee learning.
 - Trainers must evaluate employee learning by a method that is appropriate for the subject matter (e.g., testing, demonstration of new skills, feedback and/or workplace inspections).

Special Note: The Publications and Technical Information sections of the OSHA website (<http://www.osha.gov>) contain numerous training resources that can be of assistance to small businesses. OSHA's Small Business Outreach Training Program under the Technical Information Section contains overhead transparencies and instructor notes that can be downloaded and printed, and is particularly useful.

Documenting Employee Training

Many OSHA safety and health standards contain specific requirements for documenting employee training. Employers must therefore document employee training in writing by recording the employee's name, the subject of the training, and the date that it was provided. Training records should be maintained on permanent file.

Implementing a Safety and Health Program: Return on Investment

Large and small companies in a variety of industries have shown over the years that safety and health programs pay. A reduction in lost workdays and workers' compensation costs translates into big savings for employers, not to mention the obvious benefits for employees — safer and more healthful workplaces. The following case studies related in the publication, *OSHA Success Stories*, demonstrate the benefits of a comprehensive safety and health program.

- By participating in OSHA's consultation program, KLN Steel Products in San Antonio, Texas reduced its lost-day injury rate from 14.0 to 1.0. The company estimates that it has **saved \$50,000** in workers' compensation claims.
- After participating in a safety seminar and on-site risk assessment, Horizontal Steel Erectors Inc. established fall protection and supervisor safety accountability programs. These programs resulted in a **96 percent reduction in accident costs** per man-hour — from \$4.25 to \$.18.
- By implementing a comprehensive safety and health program, Carter Manufacturing Company, a metal fabrication business, reduced the total number of injuries from 21 in 1991 to 15 in 1994 — a **29 percent improvement**.
- By participating in OSHA's Maine 200 program, which mandates the establishment of a comprehensive safety and health program, New Balance Athletic Shoe, Inc. reduced its lost-workday injury and illness cases from 55 cases with 11,190 lost workdays in 1990 to 2 cases with 549 lost workdays in 1994. Workers' compensation claims declined from \$1,213,176 in 1990 to \$89,154 in 1994 — a **savings of over one million dollars per year**.
- By participating in OSHA's Voluntary Protection Program, which mandates a comprehensive safety and health program, Mobile Chemical Company reduced its workman's compensation costs by **70 percent, or more than 1.6 million dollars**, during the years it was qualifying its plastics production and chemical plants.

During the same period, Mobil's recordable injuries dropped by **32 percent**, and lost-workday cases declined by 39 percent. In 1994, Mobile **saved \$3,780,000** in lost-day injury costs.
- By participating in OSHA's Maine 200 program Cascade Paper Company of Rumford, Maine reduced its recordable incident rate by **22 percent** from 1992 to 1994.
- Following a comprehensive safety survey by OSHA consultation, Colt Plastics Inc. of Dayville, Connecticut reduced its lost-workday injury rate from **14.0 to 5.0**.

Safety and Health Program Budgeting Practices

As a matter of sound business practice, employers should establish a safety and health program budget that takes into consideration both short- and long term-priorities and goals. Employers should identify the following costs when establishing a safety and health program budget:

- Cost of any required facility and equipment improvements and replacements.
- Cost of any required personal protective equipment.
- Cost of employee training; estimate time and expenses.
- Cost of any technical assistance that may be required.

It is advisable for employers to establish both short-term (e.g., annual operating) budgets and long-term (e.g., five-year plan) budgets.

Safety and health program budgets are dependent on site-specific conditions, but can be estimated by taking into account:

- Nature of the work being performed, associated hazards, training requirements and applicable OSHA regulations.
- Required safety and health improvements as determined by facility age and condition.
- Total number of employees.
- Long- and short-term goals and objectives of the safety and health program.

Customizing the Manual

This manual provides general information only. Employers must therefore carefully review the manual and customize it to include information on workplace-specific hazards, employee job duties, safety and health-related policies, and other procedures and practices. To aid in this process, the manual contains instructions for inserting workplace-specific information into:

- Blank fields.
- Tables.

The manual also contains sample forms and suggestions for additional workplace-specific information.

Employee Training

The occurrence of occupational injuries and illnesses can be significantly reduced by providing both existing and newly hired employees with information and instruction on workplace hazards, as well as safety and health related-policies, procedures, and work practices. The Occupational Safety and Health Administration (OSHA) recognizes this fact and mandates employee training in many workplace regulations.

Using the Manual as a Training Aid

This manual is designed to be used as a training aid. Employers may use the manual:

- As an employee safety manual.
- As a facilitator's guide.
- To prepare overhead transparencies.
- To prepare participant handouts.

When using the manual as a training aid, employers must customize their employee training to include and emphasize workplace-specific hazards, employee job duties, safety and health-related policies, and other procedures and practices. Employers may customize employee training by including:

- Discussions.
- Demonstrations.
- Suitable audio-visual material.

Documenting Employee Training

Each section of the manual contains a *Record of Employee Training* form that employers can use to document employee training. The form contains a training overview that identifies general topics that should be presented in the training session and includes spaces to identify:

- The training site (employer).
- Training date.
- The name of the provider.
- Titles of any video-tapes or other audio-visual material presented.
- Employees in attendance by employee signature.

Employers should maintain *Record of Employee Training* forms on permanent file to document employee training.

Information Available on the Internet

The following list contains Internet sites that are useful to small businesses. The list is *not* all-inclusive. Inclusion on the list does *not* imply an inferred endorsement.

Agency for Toxic Substances and Disease Registry
<http://atsdr1.atsdr.cdc.gov:8080/atsdrhome.html>

American Association of Occupational Health Nurses, Inc.
<http://www.aaohn.org>

American Industrial Hygiene Association
<http://www.aiha.org>

American Society of Safety Engineers

<http://www.asse.org>

American National Standards Institute

<http://web.ansi.org/default.htm>

Army Industrial Hygiene

<http://chppm-www.apgea.army.mil/Armyih>

Bureau of Labor Statistics

<http://stats.bls.gov/blshome.html>

Canadian Center for Occupational Health and Safety

<http://www.ccohs.ca/Resources/hshome.htm>

CDC (Centers For Disease Control And Prevention)

<http://www.cdc.gov>

EPA (Environmental Protection Agency)

<http://www.epa.gov>

Ergo Web

<http://tucker.mech.utah.edu>

FEMA (Federal Emergency Management Agency)

<http://www.fema.gov>

Hazmat Safety Page

Department of Transportation Hazardous Materials

<http://hazmat.dot.gov>

MSHA (Mine Safety and Health Administration)

Mine safety and health regulations.

<http://www.msha.gov>

MSDSs on the Internet

Index of MSDS sites on the Internet.

<http://www.chem.uky.edu/resources/msds.html>

National Ag Safety Database

Extensive collection of agricultural safety and health related information.

<http://agen.ufl.edu/~nasd/nasdhome.html>

National Institutes of Health

<http://www.nih.gov>

NIOSH (National Institute For Occupational Safety And Health)

<http://www.cdc.gov/niosh/homepage.html>

Office of Health and Safety, Centers for Disease Control and Prevention

On-line safety manual for the CDC.

<http://www.cdc.gov/od/ohs/manual/mannav.htm>

OSHA (Occupational Safety and Health Administration)

Contains OSHA regulations and publications.

<http://www.osha.gov>

OSHA Web

Index of occupation safety and health sites on the Internet.

<http://turva.me.tut.fi/~oshweb>

Pesticide Information Profiles

Extensive information on pesticides.

<http://ace.ace.orst.edu/info/extoxnet/pips/ghindex.html>

Small Business Administration

<http://www.sbaonline.sba.gov>

Text-Trieve

Lists new OSHA, DOT and EPA regulations.

<http://www.halcyon.com/ttrieve/welcome.html>

U.S. Department of Health and Human Services

<http://www.os.dhhs.gov>

United States Fire Administration

<http://www.usfa.fema.gov>

Vermont SIRI

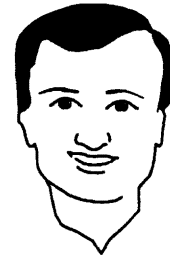
Extensive collection of occupational safety and health related information.

<http://hazard.com>

Section 1

Duties for a Safe and Healthy Workplace

DUTIES FOR A SAFE AND HEALTHY WORKPLACE



Section 1 provides information on duties for maintaining a safe and healthy workplace. Establishing and maintaining a safe and healthy workplace is a shared responsibility and requires a team effort. As a result, it is necessary to establish and communicate safety and health related duties for all persons in the workplace.

Duties Established in the Occupational Safety and Health Act of 1970

Employer and employee duties for a safe and healthy workplace are defined in Section 5 of the Occupational Safety and Health Act of 1970. The duties are as follows:

Each Employer Shall:

- √ Furnish to each of his employees employment and a place of employment which are free from recognized hazards that are causing or are likely to cause death or serious physical harm to his employees.
- √ Comply with occupational safety and health standards promulgated under this Act.

Each Employee Shall:

- √ Comply with occupational safety and health standards and all rules, regulations, and orders issued pursuant to this Act which are applicable to his own actions and conduct.

Employer Duties

All employers have a moral and regulatory duty to provide each of their employees with a safe and healthy workplace through the following:

- √ Providing effective leadership by:
- Developing and communicating a written policy that expresses the employer's commitment to a safe and healthy workplace.
 - Providing human and material resources necessary to establish and maintain a safe and healthy workplace.
 - Designating a person to coordinate the safety and health program.

Instructions: Customize manual by identifying the person (or position) designated to coordinate the safety and health program.	
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- Assigning accountability and enforcing safety and health related policies, programs and procedures.
- Empowering employees to take appropriate and necessary actions to protect their personal safety and health.

√ Empowering employees to take an active role in workplace safety.

√ Identifying and controlling workplace safety and health hazards.

√ Maintaining buildings and facilities in accordance with all applicable codes and regulations.

√ Establishing and communicating safety and health-related policies, programs and procedures as required by workplace hazards and applicable regulations.

Instructions: Customize manual by identifying the location of material safety data sheets (MSDSs) for hazardous chemicals in the workplace.	
Instructions: Customize manual by identifying the location of safety and health-related policies, programs and procedures.	

√ Providing effective employee training as required by workplace hazards and applicable regulations.

- √ Providing for the medical monitoring of employees as required by workplace hazards and applicable regulations.

Instructions: Customize manual by identifying the health care provider designated to perform employee physicals and provide consultation in matters pertaining to occupational health issues.	
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- √ Providing for the safety and health of the employees of outside contractors.

- √ Investigating all accidents and injuries.

- √ Maintaining safety and health-related records and reports as required by workplace hazards and applicable regulations.

Instructions: Customize manual by identifying the location of employee medical records.	
Instructions: Customize manual by identifying the location of employee personal exposure monitoring records.	
Instructions: Customize manual by identifying the location of employee training records.	
Instructions: Customize manual by identifying the location of OSHA-required injury and illness records and reports.	

- √ Preparing for workplace emergencies.

Supervisor Duties

A safe and healthy workplace is a shared responsibility and requires a team effort. As team leaders, supervisors must:

- √ Promote and facilitate workplace safety by being an effective role model, communicator, coach and mentor. This requires supervisors to lead by example and to be knowledgeable of:
 - Workplace safety and health hazards.
 - Safety and health related-regulations, policies, procedures and practices.
- √ Implement, facilitate and enforce safety and health-related policies, procedures and practices.

- √ Ensure that new employees are provided with safety and health related information and instruction as required by workplace hazards and applicable regulations.
- √ Communicate safety and health related information and instruction to employees in shop meetings and pre-job briefings.
- √ Conduct workplace inspections to identify and correct hazardous conditions and ensure employee compliance with established policies, procedures and practices.
- √ Review safety and training issues with each employee on an annual basis.

Employee Duties

A safe and healthy workplace is a shared responsibility and requires a team effort. As team members, each and every employee has a duty to:

- √ Exercise good judgment.
- √ Be knowledgeable of workplace safety and health hazards and safety and health related policies, procedures and practices.
- √ Ask for assistance when unsure how to perform a task.
- √ Perform assigned work in accordance with established policies, procedures and safe work practices while observing all posted warnings.
- √ Properly wear and maintain personal protective equipment.
- √ Inspect tools and equipment for damage and defects before each use.
- √ Maintain work areas so as to be clean and free from recognizable hazards.
- √ Refuse (in a responsible manner) to perform assigned work:
 - When the work exposes the employee to imminent danger
 - Which the employee is not authorized or properly trained to perform
 - Which the employee is physically incapable of performing.
- √ Report all injuries, occupational illnesses (including symptoms of chemical overexposure) and accidents (including close calls). Accidents and injuries are to be reported to your supervisor.

√ Report unsafe conditions.

- Employees have a specific duty to immediately report (and/or control or eliminate) unsafe conditions that result in imminent danger (i.e., a hazard that has the potential to cause death or serious injury if not immediately corrected).

Special Note: Examples of imminent danger hazards are identified throughout the manual.

CUSTOMIZING THE MANUAL

Adding Additional Information

As applicable, employers may customize the manual by adding the following information:

- √ Employer's safety policy.
- √ Employer's compliance (discipline) policy.
- √ Workplace hazard assessment.
- √ Employee training needs assessment.
- √ Contract or letter of agreement with the local health care provider that will be performing employee physicals and consultations.
- √ Policies and procedures that pertain to contractor safety.
- √ Policies and procedures that pertain to accident and injury investigation.

Sample Forms

This section contains the following sample forms:

- √ Employee Training Needs Assessment.
- √ Safety and Health Program Audit.

EMPLOYEE TRAINING NEEDS ASSESSMENT

Training Requirement	Work Position or Job Classification					
1. Hazard Communication						
2. Fire Prevention						
3. Lockout/Tagout						
4. Confined Space Entry						
5. Emergency Action Plan						
6. First Aid/CPR						
7. Fire Extinguishers						
8. Hazardous Materials						
9. Bloodborne Pathogens						
10. Personal Protective Equipment						
11. Fall Protection						
12. Respirator Training/Fit Testing						
13. Noise/Hearing Conservation						
14. Electrical Safety						
15. Hand/Power Tool Safety						
16. Welding/Cutting Safety						
17. Hoist & Sling Safety						
18. Ladder Safety						
19. Scaffold Safety						
20. Industrial Truck Safety						
21. Aerial Lift Truck Safety						
22. Vehicle and Mobile Equipment Safety						
23. Work Site Barricading						
24. Excavation/Trenching Safety						
25. Asbestos Abatement						
26. Asbestos Awareness						
27. Lead Awareness						
28.						
29.						
30.						

Instructions: This form can be used to identify employee safety training requirements on the basis of workplace hazards, job duties and applicable OSHA regulations. The assessment contains training requirements that are common to many small businesses. However, the list is not all-inclusive. Employers must customize the form to include workplace-specific conditions, hazards and regulatory requirements. Customize manual by performing an employee training needs assessment. Insert workplace positions (or job classifications) in the spaces provided at top of columns. Then identify training requirements for each position on the basis of workplace hazards, job duties and applicable regulations. Prepare copies of the form as required.

SAFETY AND HEALTH PROGRAM AUDIT

Workplace Audited:	Audit Date:
Audit Performed By:	

Safety and Health Program

As an employer:	Yes	No	If No, Where Are Improvements Needed?
1. Do you and your managers and supervisors clearly demonstrate by involvement, support and example the overriding importance of employee health and safety?			
2. Have you posted a workplace safety and health policy that clearly communicates the overriding importance of employee health and safety?			
3. Have you implemented policies, procedures and practices to promote and facilitate employee involvement in all issues that pertain to workplace safety and health?			
4. Have you implemented policies, procedures and practices to manage your safety program (e.g., identification of goals and objectives and the assignment of responsibility and accountability)?			
5. Have you established a uniform enforcement policy to which all personnel are held accountable?			
6. Have you established short and long-term budgets necessary to meet the goals and objectives of your safety and health program?			
7. Have you established policies, procedures and practices necessary to protect the safety and health of the employees of outside contractors?			

Instructions: This audit provides general guidance for assessing the overall effectiveness of a workplace safety and health program. The audit includes hazards and regulatory requirements that are common to many small businesses, but is not all-inclusive. Employers must customize the audit to include workplace-specific conditions, hazards and regulatory requirements. Customize manual by auditing your safety and health program. Results of the audit should be used to identify immediate and long-term goals and objectives, set priorities and establish short and long term budgets (refer to page 10). Prepare copies of the audit as required.

As an employer:	Yes	No	If No, Where Are Improvements Needed?
8. Have you implemented policies, procedures and practices to identify and evaluate all workplace safety and health hazards?			
9. Do you perform baseline and periodic personal exposure monitoring to assess employee exposure to noise and toxic substances as required by workplace hazards and applicable OSHA regulations?			
10. Do you (or your managers and supervisors) conduct periodic walk-through inspections to identify new or previously missed safety and health hazards?			
11. Have you implemented a reliable hazard reporting system that enables your employees to report apparent safety and health hazards without fear of reprisal?			
12. Do you (or your managers and supervisors) investigate all accidents and near misses to identify the root cause and means of prevention?			
13. Do you analyze injury and illness records to identify locations and jobs that experience high numbers of injuries?			
14. Do you ensure that all workplace hazards are mitigated on a timely basis by engineering controls (whenever feasible), appropriate work practices, personal protective equipment and/or administrative controls?			
15. Do you ensure that your facility, including all structures, machinery, vehicles and pieces of equipment, is properly maintained to prevent unsafe conditions?			
16. Have you established an occupational medicine program as required by workplace hazards and applicable OSHA regulations?			
17. Have you established procedures to reduce the adverse effects of a fire or other workplace emergency? Have you trained your employees on actions to be taken in the event of a workplace emergency?			
18. Do you ensure that personnel trained in basic first aid and CPR are readily available in your workplace and that advanced medical care is available within reasonable time and distance?			

As an employer:	Yes	No	If No, Where Are Improvements Needed?
19. Have you invited your local fire department to tour your facility and assisted them in the preparation of a pre-incident plan?			
20. Have you performed a training needs assessment to identify training needs on the basis of workplace hazards, employee job duties and applicable OSHA regulations?			
21. Do you ensure that all new employees are provided with information on workplace hazards and instruction on safety and health related policies, procedures and practices?			
22. Do you provide your employees with periodic safety and health re-training?			
23. Do you ensure that your employees have access to safety and health-related information (e.g., applicable safety and health standards, MSDSs, and safety and health-related policies, procedures and practices)?			
24. Do you inform your employees of the location and nature of employee exposure and medical records?			
25. Do you evaluate the overall effectiveness of your safety program on an annual basis?			

Record-keeping and Postings

As an employer:	Yes	No	If No, Where Are Improvements Needed?
1. Have you established procedures and practices to record occupation injuries and illnesses on the OSHA form no. 200, <i>Log and Summary of Occupational Injuries and Illnesses</i> , or an equivalent form?			
2. Have you established procedures and practices to record supplementary information regarding each injury and illness (entered on the OSHA 200 form) on an OSHA form no. 101 or an equivalent form?			

As an employer:	Yes	No	If No, Where Are Improvements Needed?
3. Do you ensure that the annual summary of occupational injuries and illnesses for the previous calendar year is posted in your workplace between February 1 and March 1?			
4. Have you posted the OSHA Job Safety and Health Protection poster (or your state's equivalent) in a prominent location in your workplace?			
5. Have you posted signs to warn your employees of serious workplace hazards where appropriate and prudent?			
6. Have you established policies, procedures and practices for the retention of safety and health related records and reports (e.g., training session attendance rosters and results of exposure monitoring)?			

Written Safety and Health Programs

As required by workplace hazards, employee job duties and applicable OSHA regulations, have you:	Yes	No	If No, Where Are Improvements Needed?
1. Implemented a written Hazard Communication Program?			
2. Implemented a written Hearing Conservation Program?			
3. Implemented a written Hazardous Energy Control (lockout/tagout) Program?			
4. Implemented a written Permit-Required Confined Space Entry program?			
5. Implemented a written Respiratory Protection Program?			

<i>As required by workplace hazards, employee job duties and applicable OSHA regulations, have you:</i>	Yes	No	If No, Where Are Improvements Needed?
6. Performed a written hazard assessment for the selection of personal protective equipment?			
7. Implemented a written Infection Control Program?			
8. Implemented a written Emergency Action Plan?			

Workplace Inspection

<i>Inspect your workplace for the following common safety and health hazards:</i>	Yes	No	Describe Any Needed Corrective Actions
1. Are all chemical containers properly labeled?			
2. Do you have a material safety data sheet (MSDS) for each hazardous chemical in your workplace? Are MSDSs readily available to your employees?			
3. Are chemicals stored properly (e.g., incompatibles separated and flammable liquids stored in appropriate cabinets)?			
4. Are work and storage areas kept clean, orderly and sanitary?			
5. Are all floors clean and dry, and free of slip, trip and fall hazards?			
6. Is flammable waste stored in covered containers? Are flammable waste containers emptied daily?			

Inspect your workplace for the following common safety and health hazards:	Yes	No	Describe Any Needed Corrective Actions
7. Are exits and exit ways free of obstructions that could impede emergency egress?			
8. Are clear working spaces maintained in front of electrical panels and breakers?			
9. Are unused openings in electrical boxes and cabinets closed?			
10. Are electrical boxes, cabinets and outlets equipped with faceplates?			
11. Are light fixtures within seven feet of the floor protected by guards?			
12. Are extension cords used to provide temporary power only, and not used as a substitute for fixed structural wiring?			
13. Is the use of "cheater plugs" that defeat the ground conductor of cord-and-plug connected electrical equipment prohibited?			
14. Are electrical cords free from damage or defects such as missing ground pins or frayed insulation?			
15. Are only heavy-duty extension cords with a ground conductor used? Is the use of flat "appliance type" extension cords prohibited?			
16. Is all mechanical power transmission equipment (e.g., pulleys, belts and shafts) within seven feet of the floor effectively guarded?			
17. Are machines equipped with effective point-of-operation guards?			

Inspect your workplace for the following common safety and health hazards:	Yes	No	Describe Any Needed Corrective Actions
18. Are fans within seven feet of the floor equipped with guards that have openings no larger than 1/2 inch?			
19. Are floor holes covered? Are floor holes protected by guardrails or constantly attended when covers are removed?			
20. Are elevated platforms and stairs equipped with standard guardrails?			
21. Are ladders inspected frequently? Are damaged or defective ladders immediately withdrawn from service?			
22. Do your employees use ladders correctly (e.g., placed on a firm surface and correct 4:1 lean ratio)?			
23. Do your employees use personal fall protection equipment when working on unguarded platforms of six feet or more in height?			
24. Are vehicles and mobile equipment properly inspected, maintained and operated?			
25. Are your employees prohibited from riding in equipment buckets?			
26. Are hand and power tools in safe operating condition (e.g., cords not frayed and guards in place)?			
27. Are hand and power tools stored in a designated location when not in use?			
28. Are bench grinders equipped with wheel shields?			

Inspect your workplace for the following common safety and health hazards:	Yes	No	Describe Any Needed Corrective Actions
29. Are bench grinder work rests adjusted to no more than 1/8" from the wheel?			
30. Do air nozzles used for cleaning reduce air pressure to a maximum of 30 psi?			
31. Are compressed gas cylinders secured in place with a chain or other device?			
32. Are oxygen and fuel gas cylinders stored 20 feet apart or separated by a 5-foot high noncombustible barrier?			
33. Are combustible materials removed from welding areas? Are welding areas well ventilated?			
34. Do your employees wear suitable personal protective equipment when workplace hazards require its use?			
35. Is personal protective equipment frequently inspected, free from damage and defects, and kept clean and sanitary?			
36. Are respirators frequently inspected, free from damage and defects, and kept clean and sanitary? Are used or defective respirators disposed of properly?			
37. Do you prohibit employees with beards from wearing respirators?			
38. Do your employees observe established lockout/tagout procedures and restrictions when servicing or repairing machinery and equipment?			
39. Do your employees observe established procedures and restrictions when entering permit-required confined spaces?			

Inspect your workplace for the following common safety and health hazards:	Yes	No	Describe Any Needed Corrective Actions
40. Do your employees establish work zone protection when working in public roads?			
41. Do your employees observe established procedures and practices when working in trenches and excavations?			
42. Are emergency showers/eye wash stations immediately available and not blocked by supplies and material storage? Are they inspected and flushed on a frequent basis?			
43. Are fire extinguishers immediately available their designated locations, fully charged, and not blocked by supplies and equipment? Are they inspected monthly and serviced annually?			
44. Is a suitable first aid kit available in your workplace? Is it inspected frequently and kept fully stocked?			
45. Are there any indications of indoor air pollution or employee exposure to toxic substances?			
46. Are ergonomic issues addressed in work area design and layout?			
47. Are work areas provided with sufficient illumination?			
48. Other observations.			

Action Plan

Describe Needed Improvement	Priority	Action Plan	Assigned To	Estimated Time/Cost	Start Date	Completion Date

RECORD OF EMPLOYEE TRAINING FORM

SUMMARY OF APPLICABLE REGULATIONS

Applicable OSHA Regulations

Occupational Safety and Health Administration (OSHA) *General Industry Standards* applicable to this section include, but may not be limited to:

- √ Occupational Safety and Health Act of 1970.
- √ OSHA Instruction CPL-2, Program Evaluation Profile, 8/1/96.
- √ 29 CFR 1904 Recording and Reporting Occupational Injuries and Illnesses.
- √ 29 CFR 1910. 20 Access to Employee Exposure and Medical Records.

The following documents summarize additional Occupational Safety and Health Administration (OSHA) *General Industry Standards* applicable to this section:

- √ OSHA publication 2209, *OSHA Handbook for Small Businesses*, Department of Labor, Occupational Safety and Health Administration. This document can be downloaded from the OSHA website.
- √ OSHA publication 2254, *Training Requirements in OSHA Standards and Training Guidelines*, Department of Labor, Occupational Safety and Health Administration.

Section 2

Housekeeping and Material Storage

HOUSEKEEPING AND MATERIAL STORAGE



Section 2 describes actions that must be taken to help maintain a clean and sanitary workplace. Poor housekeeping and material storage practices are a frequent cause of workplace injuries and fires. Consequently, everyone must do their part to maintain a clean and sanitary workplace.

General Housekeeping

✓ Each employee is responsible for keeping their work area clean and free from recognizable hazards.

- Trash and waste material must *not* be allowed to accumulate.
- Tools, extension cords and supplies must be stored in their designated location.
- Floors and stairs must be kept clean, dry and free from slip, trip and fall hazards.



- Identify wet or slippery floors with banner tape or *Caution — Wet Floor* Signs.
- Apply salt to icy exterior steps and sidewalks.



Material Storage

√ Supplies must be stored in assigned areas and stacked so as *not* to create a falling object hazard.

- Aisles in storage areas must be kept clear and passable.

√ Material must *not* be stored in designated walkways or placed so as to impede access to:

- Exits.
- Fire extinguishers, emergency showers and similar equipment.
- Electrical panels and equipment.

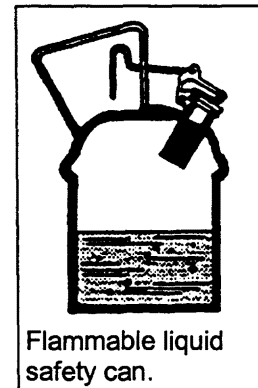


√ Combustible and flammable materials (e.g., aerosol cans, paints, compressed gasses and solvents) must *not* be stored near hot surfaces or electrical equipment.

√ Incompatible chemicals (e.g., oxidizers and flammables, acids and bases) must be separated.

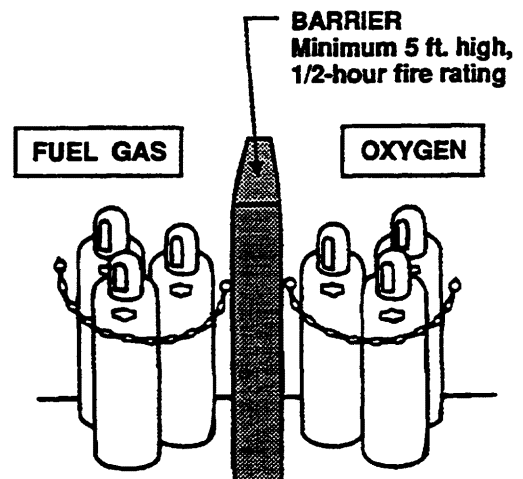
√ Flammable liquids must be stored in original containers or flammable liquid safety cans. When *not* in use:

- Lids must be on containers.
- Containers must be stored in a flammable liquid storage cabinet.



√ Compressed gas cylinders must be stored in the upright position with valve caps in place and secured in place with a chain.

- Unless separated by a 5-foot tall, non-combustible barrier with a fire rating of at least 1/2 hour, oxygen and fuel gas cylinders must be separated by a least 20 feet.



Waste Disposal

- √ Debris and trash material must *not* accumulate in work areas.
- Normal garbage (e.g., paper and food waste) must be placed in an appropriate trash container. The following materials must *not* be placed in normal trash containers:
 - Used oil.
 - Fluorescent light bulbs.
 - Regulated hazardous waste.
 - Flammable materials.
 - Asbestos-containing debris.
 - Regulated biohazardous waste.
 - Compressed gas cylinders.
 - Broken glass and other sharp objects should *not* be placed directly in trash containers with plastic bag liners. Before being placed in trash containers, such items should be placed in a sealed container.
 - Trash containers must be emptied on an appropriate basis.
- √ Flammable waste (e.g., enamel paints and solvent soaked rags) must be placed in approved flammable waste containers.
- Flammable waste containers must be emptied at the end of each shift.
- √ Used oil must be placed in a designated waste oil drum and disposed of in accordance with applicable state and federal regulations.
- √ Regulated biohazardous waste must be disposed of in accordance with applicable state and federal regulations.
- √ Asbestos-containing waste must be disposed of in accordance with applicable state and federal regulations.



Special Note: Employers should contact their waste contractor and/or the United States Environmental Protection Agency (EPA) regarding the disposal of compressed gas cylinders, biohazardous waste, suspected asbestos-containing material and fluorescent light bulbs.

EPA Regulated Hazardous Waste

Some common substances are classified as EPA (Environmental Protection Agency) regulated hazardous waste. Such substances must be sent to an EPA Permitted Hazardous Waste Disposal Facility. EPA-regulated hazardous waste includes, but is *not* limited to:

- √ Lead/acid and cadmium batteries.
- √ Enamel-based paints.
- √ Flammable solvents (e.g., naphtha, mineral spirits and toluene).
- √ Chlorinated solvents (e.g., 1-1-1 trichloroethane and methylene chloride).
- √ Reactive materials (e.g., HTH chlorine).
- √ Corrosive materials (e.g., sulfuric acid and sodium hydroxide).
- √ Polychlorinated byphenyls (PCBs).
- √ Toxic materials (any chemical product that contains lead, mercury, cadmium or any other poisonous substances).



Special Note: Employers should contact the United States Environmental Protection Agency (EPA) for specific information on the disposal of regulated hazardous waste.

CUSTOMIZING THE MANUAL

Adding Additional Information

As applicable, employers may customize the manual by adding the following information:

- √ Employee housekeeping assignments.
- √ Workplace-specific material handling and storage policies and procedures.
- √ Policies and procedures related to the disposal of regulated hazardous waste.

RECORD OF EMPLOYEE TRAINING FORM

SUMMARY OF APPLICABLE REGULATIONS

Applicable OSHA Regulations

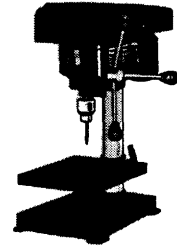
Occupational Safety and Health Administration (OSHA) *General Industry Standards* applicable to this section include, but may not be limited to:

- √ 29 CFR 1910.22 Walking-Working Surfaces — General Requirements.
- √ 29 CFR 1910 Subpart E Means of Egress.
- √ 29 CFR 1910 Subpart H Hazardous Materials.
- √ 29 CFR 1910.14 Sanitation.
- √ 29 CFR 1910.176 Handling Materials — General.

Section 3

Safe Use of Hand and Power Tools

SAFE USE OF HAND AND POWER TOOLS



Section 3 provides information on the safe use of hand and power tools, including powered grounds care equipment. Hand and power tools can cause serious injuries when *not* properly used and maintained. It is therefore important for all employees to know and use the basic principles of hand and power tool safety.

General Requirements

√ Hand and power tools must be inspected, maintained and used in accordance with the manufacturer's instructions and applicable safety standards. (Refer to the appropriate instruction manual and/or safety standard for additional information.)

√ Personal protective equipment that is suitable for workplace hazards and the work being performed must be worn when using hand and power tools.

(Refer to Section 8 for specific information on the selection, care and use of personal protective equipment.)

√ Loose-fitting clothing and jewelry that can become entangled in moving parts must *not* be worn when operating power tools.



Illustration by the United States Mine Safety and Health Administration

Recreation of a fatal accident that resulted from the overloading of a "come along". Improperly used and maintained hand and power tools can cause serious injury or death.

Safe use of Hand Tools

- √ Hand tools must be used only for the purpose for which they are designed (e.g., a screwdriver must *not* be used as a chisel).
- √ Before each day's use, employees must inspect hand tools for damage and defects.
 - Wooden handles on hammers must *not* be loose, splintered, or cracked.
 - Wrenches must *not* have loose or sprung jaws.
 - Impact tools such as chisels, wedges, or drift pins must *not* have mushroomed heads.
 - Cutting tools must *not* be dull. Dull tools can be more hazardous than sharp ones.
- √ Damaged or defective hand tools must be immediately tagged out (e.g., *Unsafe — Do Not Use*) and withdrawn from service for repair or replacement.
- √ Employees must *not* carry sharp tools in pockets unless the tools are sheathed.
- √ When using cutting tools, employees must cut in the direction away from their body.

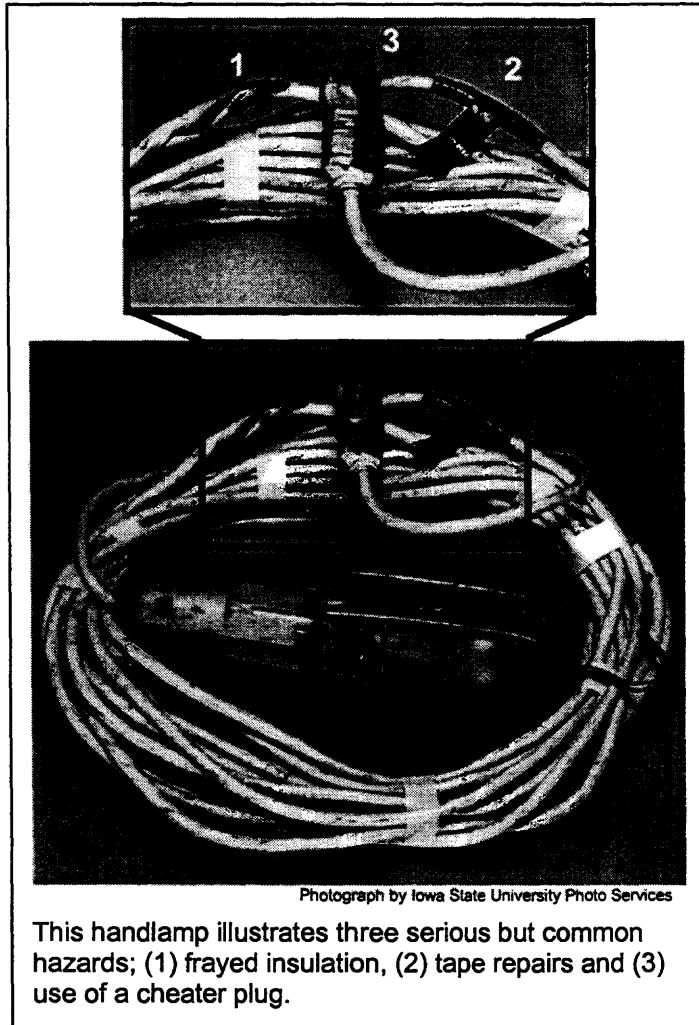


Safe Use of Power Tools

- √ Portable cord-and-plug-connected power tools must be either grounded or double-insulated.
- √ Employees must shut off and disconnect tools when *not* in use, before servicing, and when changing accessories such as blades, bits and cutters.
- √ Guards and other safety devices must *not* be removed or defeated.

√ Employees must inspect portable cord-and-plug-connected power tools and extension cords before each day's use for:

- Loose parts.
- Deformed and missing pins.
- Damaged insulation.
- Evidence of possible internal damage (e.g., pinched or crushed insulation).
- Broken or cracked cases.



√ Damaged or defective portable cord-and-plug-connected equipment must be immediately tagged out (e.g., *Unsafe — Do Not Use*) and withdrawn from service for repair or replacement.

Photograph by Iowa State University Photo Services

This handlamp illustrates three serious but common hazards; (1) frayed insulation, (2) tape repairs and (3) use of a cheater plug.

DAMAGED OR DEFECTIVE POWER TOOLS ARE AN IMMINENT DANGER HAZARD AND MUST BE REMOVED FROM SERVICE IMMEDIATELY.

Repair of Cord-and-Plug-Connected Equipment

√ Repairs to cord-and-plug-connected equipment must be performed by a qualified person and must provide the same insulation and sheath qualities as originally manufactured. Tape repairs are *not* acceptable.

Use of Extension Cords

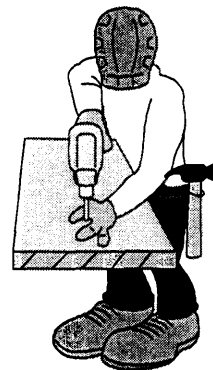
- √ Only heavy-duty “SO” rated extension cords with a ground conductor may be used. Flat appliance-type extension cords are unsafe for workplace applications and must *not* be used.
- √ Extension cords must be approved and suitable for conditions of use.
- √ Extension cords must *not* be used as substitute for the fixed wiring of a structure or be:
 - Run through holes in walls, ceilings, or floors.
 - Run through doorways, windows, or similar openings except for short-term work where the extension cord is *not* subject to damage.
 - Attached to building surfaces or fastened with staples or otherwise hung in such a fashion that could damage the outer jacket or insulation.
 - Concealed behind building walls, ceilings, or floors.
- √ Flexible cords and cables must be protected from accidental damage.
- √ Flexible cords must be equipped with an attachment plug and must be energized from an approved receptacle outlet.

Continuity of Ground Conductor and Ground-Fault Circuit Interrupters (GFCIs)

- √ Employees must *not* use adapters (e.g., “cheater plugs”) that interrupt the continuity of the ground connection.
- √ Employees must connect power tools and similar equipment to a ground-fault circuit interrupter when working in wet or conductive environments.

Use of Power Tools

- √ When using a power tool, the operator:
 - Must *not* exceed the tool’s design capacity.
 - Must ensure that all observers are at a safe distance.
 - Must keep cords and hoses away from heat, oil, and sharp edges.
 - Must secure work with clamps or a vise, freeing both hands to operate the tool.



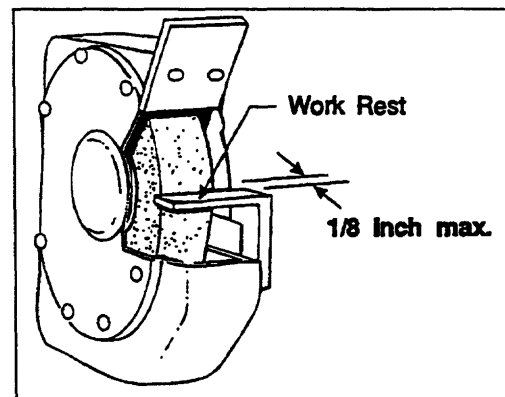
- Must be sure to keep good footing and maintain good balance. *Never* stand in water when using a power tool.
- Must be sure hands are clear before starting the tool.

Safe Use of Bench Grinders

- √ Employees must shut off and disconnect bench grinders when changing a wheel or adjusting the work rest.
- √ Guards and other safety devices must *not* be removed or defeated.

UNGUARDED BENCH GRINDERS ARE AN IMMINENT DANGER HAZARD AND MUST BE REMOVED FROM THE WORK AREA IMMEDIATELY.

- √ Employees must inspect bench grinders before each day's use. Employees should:
 - Check the condition of the wheel.
 - Be sure that shields and guards are in place and properly adjusted.
 - Ensure that the work rest is adjusted to within 1/8 inch of the wheel.



- √ Damaged or defective bench grinders must be immediately tagged out (e.g., *Unsafe — Do Not Use*) and withdrawn from service for repair.
- √ When using a bench grinder, employees must perform work from the wheel's circumference.

Use of Compressed Air for Cleaning

- √ Employees must use approved nozzles that reduce air pressure to 30 psi or less.
- √ Employees must *never* use compressed air for personal cleaning.

Safe Use of Slings, Chains and Wire Ropes

√ Employees must ensure that hoists, come-alongs, slings, chains and wire ropes are rated for the load to be lifted.

√ Employees must inspect slings, chains and wire ropes for damage and defects before each use. Employees should check for:

- Corrosion.
- Excessive wear.
- A one-third reduction in outer wire diameter.
- Deformed links, hooks or eyelets.
- Distortion or kinking.
- Broken or frayed wires or the presence of exposed warning fibers.



√ Damaged or defective slings, chains and wire ropes must be immediately tagged out (e.g., *Unsafe — Do Not Use*) and withdrawn from the work area for repair or disposal.

**DAMAGED OR DEFECTIVE SLINGS, CHAINS AND WIRE ROPES ARE AN
IMMINENT DANGER HAZARD AND MUST BE REMOVED FROM THE WORK
AREA IMMEDIATELY.**

Safe Practices for Lifting Loads with Slings, Chains and Wire Ropes

- √ The hoist operator must secure the load properly by:
- Using a sling(s), chain(s) or wire rope(s) of sufficient length so it will *not* be cut or deformed by the load.
 - Slings must *not* be shortened with knots, bolts or other makeshift devices.
 - Protecting the sling(s), chain(s) or wire rope(s) with padding when necessary to prevent cutting or abrasion.

- Securing the load so that it is sufficiently supported and will be stable.

√ The hoist operator must lift the load safely by:

- *Not* placing their hands and fingers between the sling and its load while the sling is being tightened.
- *Not* allowing employees to ride loads.
- Lifting and moving the load slowly. Fast or jerky actions and shock loading must be avoided.
- *Not* standing directly below the load.
- *Not* moving the load over other people.
 - Falling object hazard areas must be identified with signs, barricades or banner tape.

√ The hoist operator must set the load down safely by:

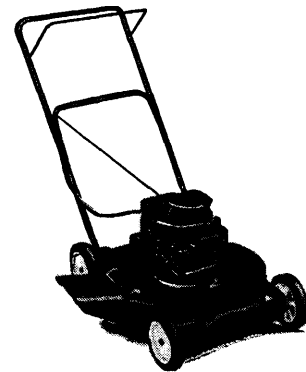
- Being sure personnel are clear.
- Setting the load down slowly and maintaining control.
- *Not* pulling a sling, chain or wire rope out from under a load when the load is resting on the sling, chain or wire rope.

Safe Use of Powered Grounds Care Equipment

√ Powered grounds care equipment (e.g., push mowers, edgers and trimmers) may only be operated by appropriately trained employees.

√ Operators must inspect powered grounds care equipment before each day's use for faulty or missing parts, especially guards and other safety devices.

- Operators must disengage all mechanical equipment, shut off the engine, and remove the wire from the spark plug (if *not* equipped with an ignition key) when powered grounds care equipment is being inspected, cleaned or serviced.
 - Operators must *never* clear the discharge chute or otherwise place their hands near the blades or cutters of operating equipment.



- Damaged or defective power grounds care equipment must be immediately tagged out (e.g., *Unsafe — Do Not Use*) and withdrawn from service for repair.

MISSING OR DEFECTIVE SAFETY DEVICES EXPOSE GROUNDS CARE EQUIPMENT OPERATORS TO IMMINENT DANGER. DEFECTIVE EQUIPMENT MUST BE REMOVED FROM SERVICE IMMEDIATELY

- √ When refueling, operators must turn off the engine and wipe or allow any spilled fuel to evaporate before the engine is restarted.
- √ Powered grounds care equipment that is *not* in use or that is left unattended must be turned off.
- √ Guards and other safety devices must *not* be removed or defeated.
- √ Operators must maintain powered grounds care equipment in a clean condition, free of excess oil and grease.
 - Non combustible agents should be used for cleaning. Low flash point solvents must *not* be used.
- √ When starting powered grounds care equipment, operators must place the equipment on a secure surface and keep their hands and feet clear of moving blades and cutters.
- √ When operating powered grounds care equipment, operators must:
 - Hold the equipment firmly with both hands placed on the equipment's designated handholds.
 - Ensure that their feet and hands are clear of moving blades and cutters, especially when the equipment is being pulled towards the operator.
 - Be alert for the presence and location of other persons.
 - Operators must instruct other persons to remain at a safe distance.
 - Immediately shut off the equipment if a mechanical problem develops.

CUSTOMIZING THE MANUAL

Adding Additional Information

As applicable, employers may customize the manual by adding the following information:

- √ Policies and procedures that pertain to the inspection, use and care of workplace-specific tools and/or tools used for specialized work.
- √ Policies and procedures that pertain to the use of ground fault circuit interrupters (GFCIs).

RECORD OF EMPLOYEE TRAINING FORM

SUMMARY OF APPLICABLE REGULATIONS

Applicable OSHA Regulations

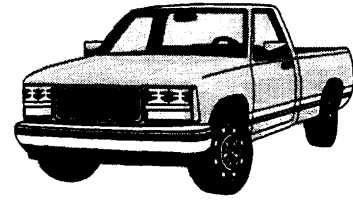
Occupational Safety and Health Administration (OSHA) *General Industry Standards* applicable to this section include, but may not be limited to:

- | | | |
|---|--------------|---|
| √ | CFR 1910.176 | Handling Material — General. |
| √ | CFR 1910.184 | Slings. |
| √ | CFR 1910.213 | Woodworking Machinery. |
| √ | CFR 1910.215 | Abrasive Wheel Machinery. |
| √ | CFR 1910.217 | Mechanical Power Presses. |
| √ | CFR 1910.218 | Forging Machines. |
| √ | CFR 1910.219 | Mechanical Power-Transmission Apparatus. |
| √ | CFR 1910.242 | Hand and Portable Powered Tools and Equipment — General. |
| √ | CFR 1910.269 | Electric Power Generation, Transmission and Distribution. |
| √ | CFR 1910.243 | Guarding of Portable Powered Tools. |
| √ | CFR 1910.244 | Other Portable Tools and Equipment. |

Section 4

Vehicle and Mobile Equipment Safety

VEHICLE AND MOBILE EQUIPMENT SAFETY



Section 4 describes safe practices for the operation of motor vehicles and mobile equipment. According to data compiled by the United States Bureau of Labor Statistics, vehicular accidents are the leading cause of workplace fatalities. It is thus important for all employees to obey traffic laws, operate vehicles and mobile equipment at speeds that are appropriate for existing conditions, and practice defensive driving.

General Requirements

- √ Vehicles and mobile equipment must be inspected, maintained and operated in accordance with the manufacturer's instructions and applicable safety standards. (Refer to the appropriate operating manual and/or safety standard for additional information.)
- √ Personal protective equipment that is suitable for workplace hazards and the work being performed must be worn when operating mobile equipment. (Refer to Section 8 for specific information on the selection, care and use of personal protective equipment.)
- √ Loose fitting clothing and jewelry that can become entangled in moving parts must *not* be worn when operating mobile equipment.

Cars and Light Trucks

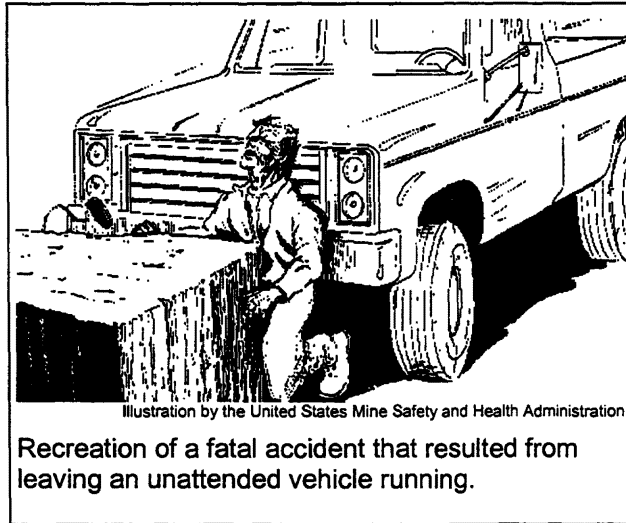
General Requirements

- √ Drivers of employer-owned cars and trucks must possess a current driver's license.
- √ Employer-owned vehicles may be used for official business only.
- √ Only authorized passengers may ride in employer-owned vehicles.

Inspection and Routine Maintenance

- √ Drivers should inspect light trucks and passenger cars before each day's use.
 - Vehicles with faulty brakes, mechanical or electrical defects, or fuel leaks must be withdrawn from service for repair.

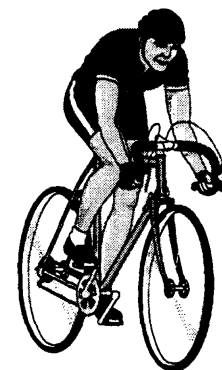
- √ Drivers must shut off the engine, set the parking brake and remove the ignition key when a vehicle is left unattended or is being inspected, serviced or refueled.



- Drivers must *not* park vehicles so as to block building exits or fire hydrants.
- Drivers must lock vehicles that are parked in public areas overnight and on weekends.

Safe Driving Practices

- √ The driver and all passengers must be seated in seats with seat belts fastened.
 - Employees must *not* ride in the back of pickup trucks.
- √ Drivers must ensure that material being transported in the back of a pickup truck is firmly secured.
- √ Drivers must obey all traffic and parking regulations.
- √ Drivers must operate vehicles at speeds that are appropriate for weather and traffic conditions.
- √ Drivers must remain alert for the movements of other vehicles, bicyclists and pedestrians.
- √ Drivers must exercise caution when backing up and use a spotter when necessary.



Safe Operation of Mobile Equipment

General Requirements

√ Mobile equipment (e.g., endloaders, backhoes, utility tractors, grounds care equipment and dump trucks) may only be operated by appropriately trained employees who possess a current driver's license.



- Operators of certain vehicles must possess a current commercial driver's license (CDL) and are therefore subject to random drug and alcohol testing.

√ Mobile equipment must *not* be modified so as to defeat safety devices or increase load capacity.

Inspection and Routine Maintenance

√ Operators must inspect mobile equipment before each day's use.

√ Operators must lower and/or disengage all mechanical equipment, shut off the engine, remove the ignition key, and set the parking brake when mobile equipment is left unattended or is being inspected, serviced or refueled.

- Hands must *not* be used to search for hydraulic oil leaks.
- Mobile equipment with faulty brakes, mechanical or electrical defects, or fuel leaks must be withdrawn from service for repair.

MISSING OR DEFECTIVE SAFETY DEVICES EXPOSE EQUIPMENT OPERATORS TO IMMINENT DANGER. DEFECTIVE EQUIPMENT MUST BE REMOVED FROM SERVICE IMMEDIATELY

- When refueling, operators must wipe up any spilled fuel or allow spilled fuel to evaporate before the engine is started.
- Operators must *not* park mobile equipment so as to block building exits or fire hydrants.
- Operators must lock mobile equipment that is parked in public areas overnight and on weekends.

- ✓ Operators must maintain mobile equipment in a clean condition, free of excess oil and grease.
 - Noncombustible agents should be used for the cleaning. Low flash point solvents must *not* be used.

Safe Operating Practices

- ✓ Operators of mobile equipment and all passengers must be seated in seats with seat belts fastened.

- ✓ Operators of mobile equipment must *not* transport or lift employees in buckets or allow employees to ride in truck boxes.

- ✓ Operators of mobile equipment must *not* place their arms or legs (or any other part of their body) between moving parts (e.g., blades, booms, arms and elevated dump boxes).

- ✓ Operators of mobile equipment must observe all applicable traffic laws and drive at speeds that are appropriate for existing conditions.

- ✓ Operators of mobile equipment must remain alert for the movements of other vehicles, bicyclists and pedestrians.

- ✓ Operators of mobile equipment must *not* suspend or swing loads over other persons or allow other persons to stand, walk, or work under elevated loads.

- ✓ Operators of mobile equipment must *not* exceed rated load capacities.

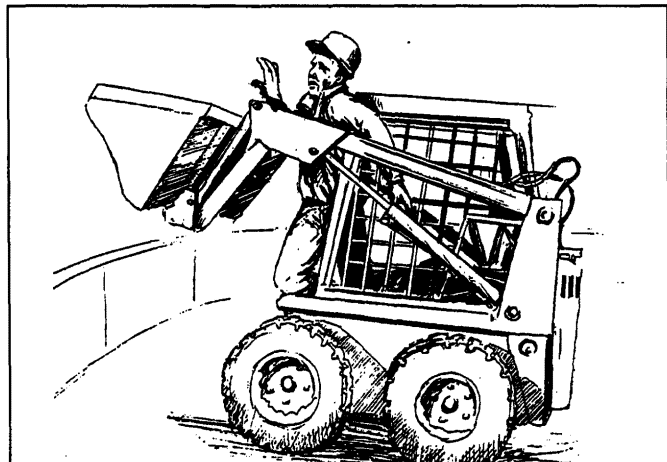


Illustration by the United States Mine Safety and Health Administration

Recreation of a fatal "skidster" accident that resulted from the failure of the operator to wear a seat belt. Many fatal mobile equipment accidents can be attributed to the failure of the operator to wear a seat belt.

✓ Operators of mobile equipment must observe the minimum approach distances listed below when operating boom trucks or elevating dump truck boxes in the vicinity of overhead power lines.

- For voltages to ground of 50kV or below, the minimum approach is ten feet.
- For voltages to ground over 50kV the minimum approach distance is ten feet plus four inches for every 10kV over 50kV.

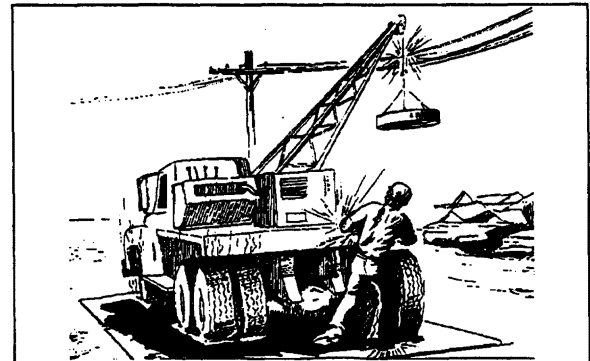


Illustration by the United States Mine Safety and Health Administration

Recreation of an electrocution that resulted when a crane came into contact with an overhead power line. Many serious injuries and fatalities have occurred when booms and dump boxes have contacted overhead power lines.

✓ Operators of mobile equipment must exercise care and caution when operating equipment near ledges or overhangs or on ramps, slopes or unstable surfaces.

✓ Operators must avoid shock loading (e.g., sudden stops or starts of the equipment).

✓ Operators of mobile equipment must exercise caution when backing up and use a spotter when necessary.

Safe Operation of Industrial Trucks

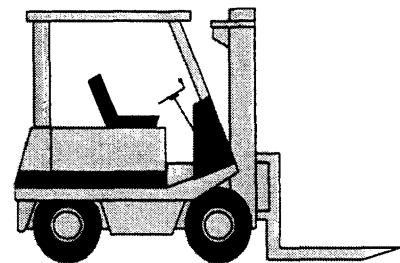
General Requirements

✓ Industrial trucks may only be operated by appropriately trained employees who possess a current driver's license.

✓ Industrial trucks may only be operated in environments and under conditions for which they were designed.

✓ Only attachments provided by or approved by the manufacturer may be used. Such attachments must be properly secured.

✓ Industrial trucks must *not* be modified so as to defeat safety devices or increase load capacity.



- √ Lift bars that are movable or replaceable must be held firmly in place by a proper securing pin.
- √ Industrial trucks must *not* be used to lift employees unless specifically equipped for personnel lifting in accordance with the manufacturer's recommendations and applicable safety standards.
- √ Industrial trucks with internal combustion engines must *not* be operated in enclosed areas for prolonged periods so as to exceed allowable carbon monoxide levels.

Inspection and General Maintenance

- √ Operators must inspect industrial trucks before each day's use.
- √ The operators must lower and/or disengage all mechanical equipment, shut off the engine, remove the ignition key and set the parking brake when an industrial truck is left unattended or is being inspected, serviced or refueled.
 - Hands must *not* be used to search for hydraulic oil leaks.
 - Industrial trucks with faulty brakes, mechanical or electrical defects, or fuel leaks must be withdrawn from service for repair.

MISSING OR DEFECTIVE SAFETY DEVICES EXPOSE INDUSTRIAL TRUCK OPERATORS TO IMMINENT DANGER. DEFECTIVE INDUSTRIAL TRUCKS MUST BE REMOVED FROM SERVICE IMMEDIATELY

- When refueling, operators must wipe up any spilled fuel or allow spilled fuel to evaporate before the engine is started.
- Operators must *not* park industrial trucks so as to block building exits or impede access to fire extinguishers, emergency showers and similar equipment.
- √ Operators must maintain industrial trucks in a clean condition, free of excess oil and grease.
 - Noncombustible agents should be used for the cleaning. Low flash point solvents must *not* be used.

Safe Operating Practices

- √ Industrial truck operators must fasten seat belts.
- √ Operators must *not* allow other employees to ride on an industrial truck.
- √ Industrial truck operators must *not* place their arms or legs (or any other part of their body) between the uprights of the mast or outside the running lines of the industrial truck.
- √ Operators must *not* attempt to lift loads that exceed the industrial truck's rated load capacity.
- √ Operators must *not* suspend or swing loads over other persons or allow other persons to stand, walk, or work under elevated forks.
- √ Industrial truck operators must observe all applicable traffic laws, remain alert for the movements of other vehicles and pedestrians, and drive at speeds that are appropriate for existing conditions.
- √ Before moving an industrial truck, the operator must make sure that no person or objects are in the path of the vehicle.
 - Clearances in all directions must always be checked, particularly overhead clearances.
 - Operators must remain alert for obstacles and hazards.
 - Operators must take extra care and caution when industrial trucks are driven on elevated loading docks.
 - Operators must exercise caution when backing up and use a spotter when necessary.
- √ When loading or unloading trucks, the wheels of the truck must be chocked.
- √ When picking up a load, operators must place the forks squarely and as far as possible under the load.

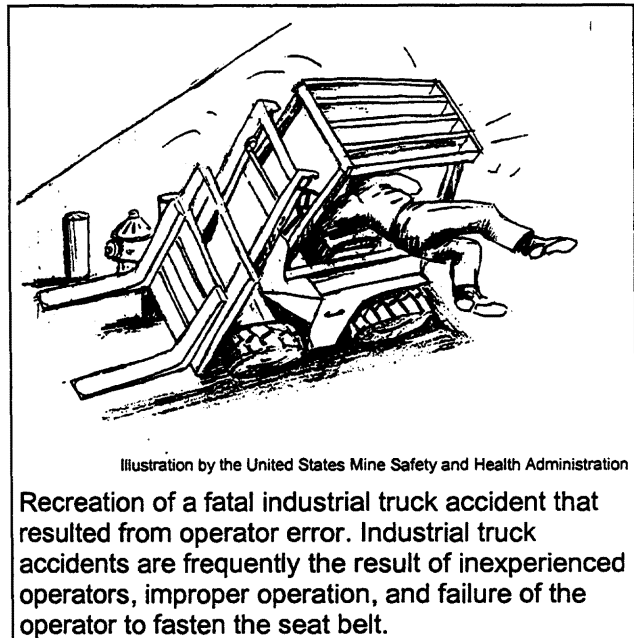


Illustration by the United States Mine Safety and Health Administration

Recreation of a fatal industrial truck accident that resulted from operator error. Industrial truck accidents are frequently the result of inexperienced operators, improper operation, and failure of the operator to fasten the seat belt.

- √ Before transporting the load, operators must ensure that the load is securely fastened or safely positioned to prevent tipping or falling.
- √ Operators must transport the load as low as possible, but high enough for the forks to clear uneven surfaces.
 - Operators must *not* raise or lower loads while traveling.
 - Operators must look in the direction of travel.
 - Operators must avoid sudden stops which might spill the load.
- √ When ascending and descending grades, operators should tilt the load back and raise the forks only as far as necessary to clear the surface.
 - When ascending or descending grades in excess of 10 percent, loaded industrial trucks must be driven with the load up grade.

Safe Operation of Bucket Trucks

General Requirements

- √ Bucket trucks may only be operated by appropriately trained employees who possess a current driver's license.
- √ Bucket trucks must *not* be modified so as to defeat or impair safety devices, or the insulating qualities of the boom and basket, or to increase load capacity.

Inspection and General Maintenance

- √ Operators must inspect bucket trucks before each day's use.
- √ Operators must lower and/or disengage all mechanical equipment, shut off the engine, remove the ignition key and set the parking brake when a bucket truck is left unattended or is being inspected, serviced or refueled.
 - Hands must *not* be used to search for hydraulic oil leaks.
 - Bucket trucks with faulty brakes, mechanical or electrical defects, or fuel leaks must be withdrawn from service for repair.

MISSING OR DEFECTIVE SAFETY DEVICES EXPOSE BUCKET TRUCK OPERATORS TO IMMINENT DANGER. DEFECTIVE BUCKET TRUCKS MUST BE REMOVED FROM SERVICE IMMEDIATELY

- When refueling, operators must wipe up any spilled fuel or allow spilled fuel to evaporate before the engine is started.
 - Operators must *not* park bucket trucks so as to block building exits or fire hydrants.
 - Operators must lock bucket trucks that are parked in public areas overnight and on weekends.
- √ Operators must maintain bucket trucks in a clean condition, free of excess oil and grease.
- Noncombustible agents should be used for the cleaning. Low flash point solvents and/or agents that adversely affect the insulating qualities of the boom and basket must *not* be used.

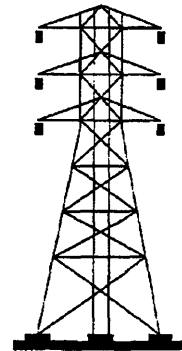
Safe Driving Practices

- √ The driver and all passengers must be seated in seats with seat belts fastened.
 - Employees must *not* ride in the back of a bucket truck.
- √ Drivers must ensure that the boom is lowered, the basket cradled and secured, and the outriggers retracted before moving a bucket truck.
- √ Drivers must *not* allow employees to ride in the basket while a bucket truck is being moved.
- √ Drivers must obey all traffic and parking regulations.
- √ Drivers must operate bucket trucks at speeds that are appropriate for weather and traffic conditions.
- √ Drivers must remain alert for the movements of other vehicles, bicyclists and pedestrians.
- √ Drivers must exercise caution when backing up and use a spotter when necessary.

Safe Practices for Aerial Work

- √ When employees are in the basket of a bucket truck:
 - The truck's emergency brake must be set.
 - Wheel chocks or outriggers must be used to provide added protection.

When bucket trucks are parked on an incline, wheel chocks must be used regardless of whether outriggers are used. The truck should sit approximately level when viewed from the rear.
- √ When outriggers are used, they must be set on pads or a solid surface.
 - Outriggers must *not* be extended or retracted outside of clear view of the operator unless all employees are outside the range of possible equipment motion.
- √ Employees working from the basket of a bucket truck must wear a full body harness and lanyard.
 - The lanyard must be attached to the boom and be of a length that prevents the wearer from climbing out of the basket.
- √ Established practices governing the use of insulating tools, rubber goods and personal protective equipment that apply to aerial work in the vicinity of energized electric lines.
- √ Unless the vehicle is equipped with lower boom and pedestal insulation rated for the voltage being worked, a bucket truck working adjacent to energized electric lines must be properly grounded or barricaded and treated as energized.
- √ Employees *not* qualified to perform live-line aerial work must *not* violate the following minimum approach distances to overhead electrical lines:
 - For voltages to ground of 50kV or below, the minimum approach distance is ten feet.
 - For voltages to ground over 50kV the minimum approach distance is ten feet plus four inches for every 10kV over 50kV.
- √ Employees must *not* stand or sit on the top or edge of the basket or on ladders placed in the basket.
- √ Employees must *not* climb out of the basket while it is elevated.



- √ Employees must *not* wear climbers while in a basket.
- √ The operator must always face in the direction in which the basket is moving and must see that the path of the boom or basket is clear when it is being moved.
- √ When a boom must be maneuvered over a street or highway, the operator must take necessary precautions to avoid accidents with traffic and pedestrians.
 - Operators must *not* suspend or swing loads over other persons or allow other persons to stand, walk, or work under elevated loads.
- √ When using pneumatic or hydraulic tools, the operator must be sure that hoses or lines do *not* become entangled in the operational controls.
- √ Operators must *not* exceed rated load limits of the boom and basket.
- √ Operators must avoid shock loading (e.g., sudden stops or starts of the equipment).

Bucket Trucks Equipped with Two Baskets

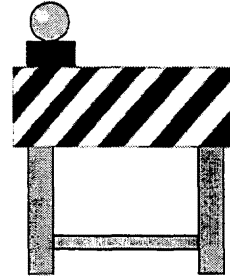
- √ When two employees are in baskets:
 - One of them must be designated to operate the controls and give all signals.
 - Extreme care must be taken to avoid one employee contacting poles, cross arms, or other grounded or live equipment while the second employee is working on equipment at a different potential.

Reporting Accidents

- √ Drivers must report all vehicle accidents to their supervisor. Vehicular accidents that result in damages of more than \$500 must also be reported to the local law enforcement agency.

Work Zone Protection

- ✓ When working in public roads, employees must wear high visibility clothing or vests.
- ✓ When working in public roads, employees must place suitable traffic control devices in accordance with *Part VI of the Manual on Uniform Traffic Control Devices (MUTCD): Standards and Guides for Traffic Controls for Street and Highway Construction, Maintenance, Utility and Incident Management Operations*, United States Department of Transportation, Federal Highway Administration.
- ✓ Employees must place suitable barricades to protect the public from hazardous work sites.



Safe Practices Working in the Vicinity of Mobile Equipment

- ✓ Employees working in the vicinity of mobile equipment, industrial trucks and bucket trucks must remain clear of:
 - Discharge chutes.
 - Elevated loads.
 - Equipment blind spots — *never* stand directly behind mobile equipment or in its path of operation.
 - Trucks that are being loaded or unloaded.



Illustration by the United States Mine Safety and Health Administration

Recreation of a fatal endloader-pedestrian accident. Many serious injuries and fatalities have resulted from standing in equipment blind spots.

CUSTOMIZING THE MANUAL

Adding Additional Information

As applicable, employers may customize the manual by adding the following information:

- √ Policies and procedures that pertain to specific types of mobile equipment used in the workplace.
- √ List of employees appropriately trained and authorized to operate mobile equipment.
- √ Policies and procedures that pertain to drug and alcohol testing.
- √ Policies, procedures and practices that pertain to work zone protection.
- √ Policies, procedures and practices that pertain to excavation and trenching operations.

Sample Forms

This section contains the following sample form:

- √ Light Vehicle Inspection Checklist.
- √ Industrial Truck Inspection Checklist.

OPERATOR'S DAILY INSPECTION REPORT

Engine Powered Industrial Trucks

Truck No.	Make	Date	Shift
Hour Meter Reading: Start		End	Hours for Shift

Check Each Item (√) = Acceptable (X) = Not Acceptable	Shift			Explain if not OK and any Action Taken
	Start	During	End	
Fuel level				
Oil Level and pressure				
Water level and fan belt				
Brakes — service and parking				
Lights — head, tail and warning				
Horn				
Hour meter and gauges				
Steering				
Tires				
Hydraulic controls				
Other conditions				

Remarks and additional explanations or suggestions

Operator's Signature _____

RECORD OF EMPLOYEE TRAINING FORM



SUMMARY OF APPLICABLE REGULATIONS

Applicable OSHA Regulations

Occupational Safety and Health Administration (OSHA) *General Industry Standards* applicable to this section include, but may not be limited to:

- √ 29 CFR 1910.67 Vehicle Mounted Elevating and Rotating Work Platforms
- √ 29 CFR 1910.178 Powered Industrial Trucks.
- √ 29 CFR 1910.269 Electric Power Generation, Transmission, and Distribution.

The following Occupational Safety and Health Administration (OSHA) *Construction Standard* may apply to specific employers and jobs:

- √ Subpart P of 29 CFR 1926 Excavations.

Section 5

Ladders, Scaffolds and Personal Fall Protection Equipment

LADDERS, SCAFFOLDS AND PERSONAL FALL PROTECTION EQUIPMENT



Section 5 provides information on safe practices for the care and use of portable ladders, scaffolds and personal fall protection equipment. Serious falls can result when portable ladders, scaffolds and personal fall protection equipment are *not* properly inspected, used and maintained. It is therefore important for all employees to exercise appropriate care and caution when using portable ladders, scaffolds and personal fall protection equipment.

General Requirements

- √ Portable ladders, scaffolds and personal fall protection equipment must be inspected, maintained and used in accordance with the manufacturer's instructions and applicable safety standards. (Refer to the appropriate operating manual and/or safety standard for additional information.)
- √ Personal protection equipment that is suitable for workplace hazards and the work being performed must be worn when working from ladders and scaffolds. (Refer to Section 8 for specific information on the selection, care and use of personal protective equipment.)

Portable Ladder Safety

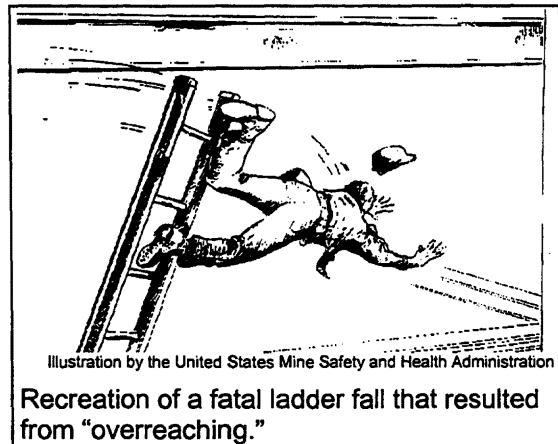
Inspection of Portable Ladders

- √ Employees must inspect ladders before each day's use for:
 - Broken or missing rungs, cleats, or steps.
 - Oil or grease on rungs, cleats and steps.
 - Broken or split rails; corroded components.
 - Faulty or loose hardware.
- √ Damaged or defective ladders must be immediately marked or tagged (e.g., *Unsafe — Do Not Use*) and withdrawn from service for repair or disposal. Before disposal, defective ladders must be made non-functional.

**DAMAGED OR DEFECTIVE LADDERS ARE AN IMMINENT DANGER
HAZARD AND MUST BE REMOVED FROM SERVICE IMMEDIATELY**

Use of Portable Ladders

- √ Ladders must be used only for the purpose for which they were designed.
- √ Ladders must *not* be loaded beyond their rated capacity.
- √ Employees must use care and caution when using ladders in the vicinity of overhead power lines.
 - The following minimum approach distances must be observed by unqualified employees working in the vicinity of energized electrical lines:
 - For voltages to ground of 50kV or below, the minimum approach distance is ten feet.
 - For voltages to ground over 50kV the minimum approach distance is ten feet plus four inches for every 10kV over 50kV.
 - Ladders must have nonconductive siderails if they are used where the worker or the ladder could contact exposed energized electrical equipment.
- √ Ladders must be used only on stable and level surfaces unless secured to prevent accidental movement.
- √ Ladders must *not* be used on slippery surfaces unless secured or provided with slip-resistant feet to prevent accidental movement. Slip-resistant feet must *not* be used as a substitute for care in placing, lashing, or holding a ladder on slippery surfaces.

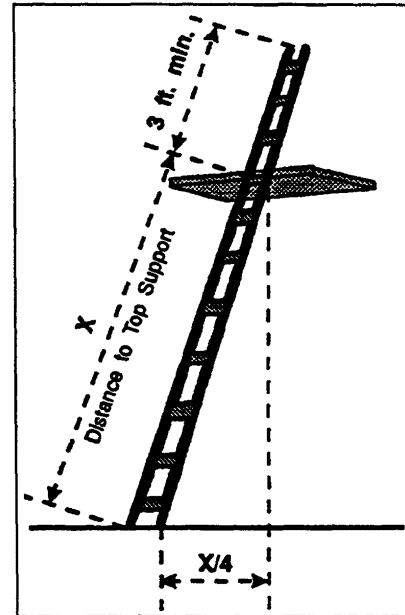


√ Ladders placed in areas such as passageways, doorways or driveways, or where they can be displaced by workplace activities or traffic, must be secured to prevent accidental movement and the work area must be barricaded, signed or constantly attended.

√ Extension ladders must be placed with the two siderails supported equally.

√ The area around the top and bottom of the ladder must be kept clear.

√ Extension ladders must be used at an angle where the horizontal distance from the top support to the foot of the ladder is approximately one-quarter of the working length of the ladder.



√ When portable ladders are used for access to an upper landing surface, the side rails must extend at least three feet (.9 m) above the upper landing surface.

√ When ascending or descending a ladder, the worker must face the ladder.

√ When ascending or descending a ladder, at least one hand must be free to grasp the ladder. Three points of contact must be maintained at all times.

√ A worker on a ladder must *not* carry any object or load that could cause the worker to lose balance and fall.

√ When working from a ladder, the vertical centerline of the worker's body must remain between the side rails of the ladder.

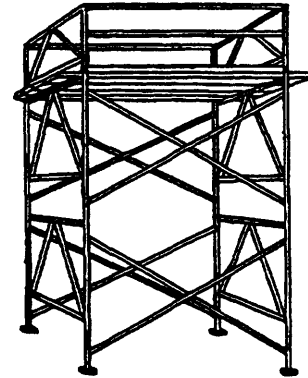
√ Ladders must *not* be moved, shifted, or extended while in use.

√ The top rung of a rung ladder, or top step of a stepladder must *not* be used as a step.

√ Cross-bracing on the rear section of stepladders must *not* be used for climbing unless the ladders are designed and provided with steps for climbing on both front and rear sections.

Scaffold Safety

The following general requirements pertain to the safe construction, operation, maintenance and use of all types of scaffolds.



- √ Scaffolds must be constructed by knowledgeable employees.
- √ Scaffolds and their components must be capable of supporting at least four times the maximum intended load.
- √ All scaffolds must be sufficiently secured and braced.
- √ The maximum work height of manually propelled mobile scaffolds must *not* exceed four times the minimum base dimension unless outriggers, guys or braces are added to provide stability.
- √ The footing or anchorage for scaffolds must be sound, rigid and capable of carrying the maximum intended load without settling or displacement. Unstable objects, such as barrels, boxes, loose brick, or concrete blocks must *not* be used to support scaffolds or planks.
- √ Guardrails, midrails, and toeboards must be installed on all open sides and ends of scaffolds:
 - That are 4 to 10 feet in height and that have a minimum horizontal dimension of 45 inches or less.
 - That are more than 10 feet in height.
- √ Wire mesh must be installed between the toeboard and the guardrail along the entire opening in situations where persons are required to work or pass under the scaffolds.
- √ Scaffold planks or boards must be either cleated to prevent accidental movement or extend at least 6 inches but not more than 12 inches beyond the end supports.
- √ Scaffolds must be maintained in a safe condition and must be inspected before each day's use. Damaged or weakened scaffolds must be immediately repaired and must *not* be used until repairs have been completed.

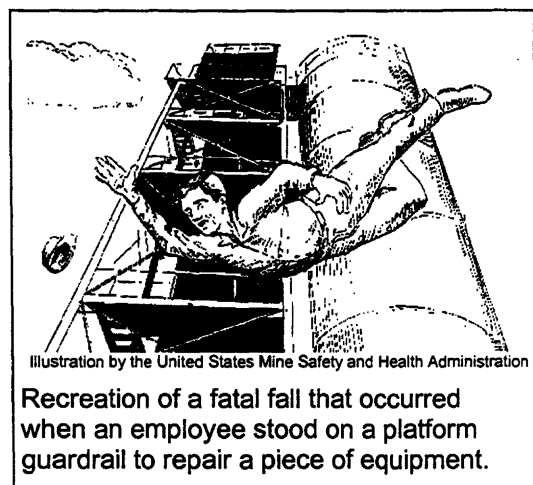
DAMAGED OR DEFECTIVE SCAFFOLDS ARE AN IMMINENT DANGER HAZARD AND MUST BE REMOVED FROM SERVICE IMMEDIATELY

- √ A safe means must be provided to gain access to the working platform level through the use of a ladder, ramp, etc. Structural members must *not* be used.
- √ Overhead protection must be provided for personnel on a scaffold exposed to overhead hazards.
- √ Scaffolds must *not* be altered or moved horizontally while they are in use or occupied.
- √ The casters or wheels on movable scaffolds must be locked to prevent accidental movement when the scaffolds are in use or occupied.
- √ All loose material and tools must be removed before a scaffold is moved.
- √ Employees must *not* work on scaffolds during storms or high winds or when the scaffold surface is covered with ice or snow.

Personal Fall Protection Equipment

OSHA Established Employer Duties for Protecting Employees from Fall Hazards

- √ *OSHA General Industry Standards* require every open-sided floor or platform 4 feet or more above the adjacent floor or ground level to be guarded by a standard railing on all open sides except where there is an entrance to a ramp, stairway, or fixed ladder.



√ OSHA Construction Standards require each employee on a walking/working surface with an unprotected side or edge (including openings such as skylights) which is 6 feet or more above a lower level to be protected from falling by one of the following:

- Guardrail system.
- Safety net system.
- Personal fall protection system.
- Warning line system.
- Safety monitor system.

Special Note: The *Fall Protection Standard for Construction* contains many specific provisions and requirements. Affected persons should refer to the standard for more specific information.

Personal Fall Protection Equipment

Personal fall protection equipment is the most feasible method of fall protection when short-term work must be performed from unguarded platforms or surfaces. There are two types of personal fall protection equipment:

- Work-positioning equipment.
- Fall-arresting equipment.

Work-Positioning Equipment

√ The purpose of work-positioning equipment is to hold a worker in position so as to free both hands. Examples of work-positioning equipment include a body belt:

- Attached to a secure structural member.
- Attached to a ladder.
- Connected to a grab rail.

√ Work-positioning equipment is *not* designed to arrest a fall and must be rigged to limit free fall to a maximum of 2 feet.

Fall-Arresting Equipment

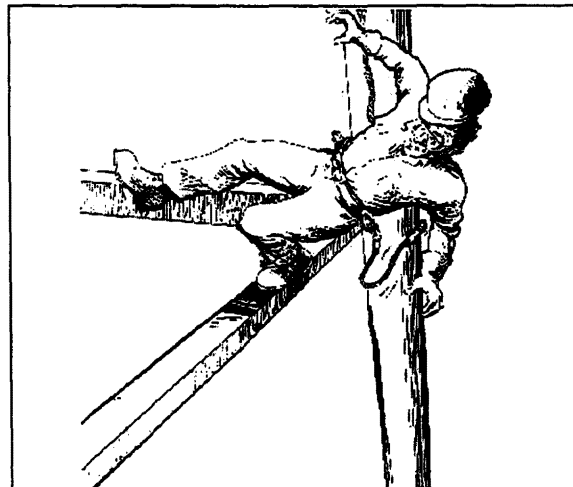


Illustration by the United States Mine Safety and Health Administration

Recreation of a fatality that occurred from the use of work-positioning equipment to arrest a fall. Serious injury or death can result when body belts are used to arrest a fall.

- √ The purpose of fall-arresting equipment is to stop a fall without causing serious injury or contact with lower surfaces.
 - Fall-arresting equipment consists of a body harness attached to a lanyard.
 - Fall-arresting equipment must be rigged so that user cannot free fall more than 6 feet or contact a lower surface.

Rigging and Use of Personal Fall Protection Equipment

- √ Fall-arresting equipment and work-positioning devices must be stored in a cool, dry place, which is *not* subjected to direct sunlight.
- √ Lanyards must *not* be used for material lifting or purposes other than arresting falls.
- √ Prior to each use, employees must visually inspect all fall-arresting equipment and work-positioning devices for cuts, cracks, tears or abrasions, undue stretching, overall deterioration, mildew, operational defects, heat damage, or corrosion.
 - Equipment showing any defect must be immediately tagged out (e.g., *Unsafe — Do Not Use*) and withdrawn from service for repair or replacement.

DAMAGED OR DEFECTIVE BODY BELTS, BODY HARNESSSES AND LANYARDS EXPOSE THE WEARER TO IMMINENT DANGER. DAMAGED OR DEFECTIVE EQUIPMENT MUST BE REMOVED FROM SERVICE IMMEDIATELY.

- √ Personal equipment subjected to impact loading must be immediately removed from service and must *not* be used again for employee protection until inspected and determined by a qualified person to be undamaged and suitable for reuse.
- √ Body harnesses must be donned, adjusted and rigged in accordance with the manufacturer's instructions.
- √ When rigging fall protection equipment, employees must *avoid* the following lanyard snap-hook connections to help eliminate the possibility of accidental disengagement (roll-out):
 - Snap-hooks without locks.

- Two or more snap-hooks connected to one D-ring.
- Two snap-hooks connected to each other.
- A snap-hook connected back on its integral lanyard.
- Improper dimensions of the D-ring, rebar, or other connection to the snap-hook dimension.

√ When rigging fall protection equipment, snaphooks may *not* be connected to loops made in webbing-type lanyards.

√ When rigging work-positioning and fall-arresting equipment, employees must ensure that:

- Work-positioning equipment will limit free fall to two feet or less.
- Fall-arresting equipment will limit free fall to six feet or less and will *not* allow the wearer to come into contact with a lower surface, whichever is less.
- Anchorage points for fall-arresting equipment and positioning devices are capable of supporting a shock load.
 - Personal fall protection equipment must *not* be anchored to guard rails or movable equipment such as hoists.
- The attachment point of the body harness is located in the center of the wearer's back near shoulder level.

√ When vertical lifelines are used, each employee must be protected by a separate lifeline. The lifeline must be properly weighted at the bottom and terminated to preclude a device such as a rope grab from falling off the line.

√ Horizontal lifelines should be limited to two persons at one time between supports.

CUSTOMIZING THE MANUAL

Adding Additional Information

As applicable, employers may customize the manual by adding the following information:

- √ Policies and procedures that pertain to portable rung and step ladders, scaffolds and personal fall protection equipment.

RECORD OF EMPLOYEE TRAINING FORM

SUMMARY OF APPLICABLE REGULATIONS

Applicable OSHA Regulations

Occupational Safety and Health Administration (OSHA) *General Industry Standards* applicable to this section include, but may not be limited to:

- √ 29 CFR 1910.25 Portable Wood Ladders.
- √ 29 CFR 1910.26 Portable Metal Ladders.
- √ 29 CFR 1910.28 Safety Requirements for Scaffolding.
- √ 29 CFR 1910.29 Manually Propelled Mobile Ladder Stands and Scaffolds.

The following Occupational Safety and Health Administration (OSHA) *Construction Standards* may apply to certain employers or jobs:

- √ Subpart L of 29 CFR 1926 Scaffolds.
- √ Subpart M of 29 CFR 1926 Fall Protection.

Section 6

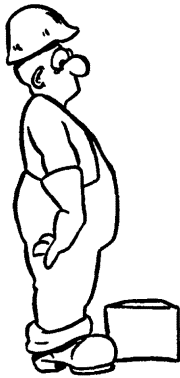
Proper Lifting Techniques

PROPER LIFTING TECHNIQUES



Section 6 provides information on proper lifting techniques and the prevention of back injuries. Improper lifting of heavy objects can result in serious back injuries. Consequently it is important for all employees to use proper lifting techniques.

Proper Lifting Technique



✓

Approach the load and size it up. Evaluate weight, size and shape. Plan your lift before you start. Determine:

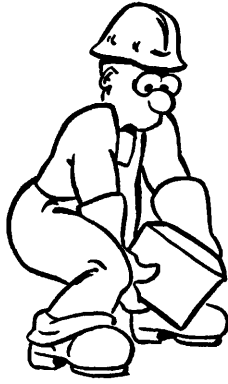
- How you will grip the load.
- Where you are going.
- The path that will taken.
- Where the load will be placed.

Consider your physical ability to handle the load. Tip the load on its side to get an idea of its weight. Don't over estimate your ability. If it's too heavy, get help or use a two-wheeled cart.



✓

Place one foot alongside of the object and one foot behind it. Keep feet comfortably spread and firmly on the floor with your body weight centered over your feet. Bend your knees and get a good hold on the object using the palms of your hands. Tuck in your chin and keep your back straight.



- √ Lift the load straight up. Lift smoothly and evenly. Use your leg muscles *not* your back. Keep the load and your arms close to your body.



- √ Lift the load into the carrying position. Do *not* twist or turn while carrying a heavy load. Turn your body with changes in foot position while making sure your path is clear of slipping or tripping hazards. Use caution when ascending and descending stairs. Take slow and careful steps. Do *not* attempt to carry more than you can handle.



- √ Setting the load down is just as important. Using leg and back muscles, comfortably lower the load by bending your knees. When the load is in position, release your grip. A helpful hint is to avoid strain by storing heavy objects at least 12 inches above the floor.

Improper Actions



√ Do *not* attempt to carry more than you can handle. Make more than one trip when necessary.



√ Do *not* carry the load in such a way that it impedes your vision. Always know what is in your path.



√ Do *not* over-reach or stand on chairs or boxes to reach overhead loads. Use a ladder when necessary.

CUSTOMIZING THE MANUAL

Adding Additional Information

As applicable, employers may customize the manual by adding the following information:

- √ Policies and procedures that pertain to other workplace-specific ergonomic issues.

RECORD OF EMPLOYEE TRAINING FORM

SUMMARY OF APPLICABLE REGULATIONS

Applicable OSHA Regulations

At the present time the Occupational Safety and Health Administration (OSHA) has not issued a specific standard for lifting and other ergonomic issues.

Section 7

Hazard Communication

HAZARD COMMUNICATION (Hazardous Chemicals In The Workplace)



Section 7 provides information on OSHA's Hazard Communication Standard and instruction on the properties and proper handling of hazardous chemicals. Serious injuries and fires can result from the improper use and storage of hazardous chemicals. It is therefore important for all employees to be knowledgeable of hazardous chemicals in the workplace.

OSHA Hazard Communication Standard

Underlying Premise of OSHA's Hazard Communication Standard

Every employee has the right to know the health and physical hazards of the chemicals that he or she is exposed to in the workplace.

Employer Duties Established in the Hazard Communication Standard *

Employers must:

- √ Prepare a list of hazardous chemicals in the workplace.
- √ Have a material safety data sheet (MSDS) for each hazardous chemical in the workplace.
- √ Ensure that chemical containers are labeled, marked or tagged with the following information:
 - Identity of the hazardous chemical(s) contained therein.
 - Appropriate hazard warnings.
- √ Provide information and instruction on workplace chemical hazards to employees.
- √ Exchange chemical hazard information with outside contractors.
- √ Prepare a written Hazard Communication Program.



*** Special Note:** Some states have enacted right-to-know laws that may include additional requirements.

Subpart Z of 29 CFR 1910 - Toxic and Hazardous Substances

The Occupational Safety and Health Administration (OSHA) has promulgated many regulations over and above the Hazard Communication Standard to protect employees from toxic and hazardous substances. These standards are published as Subpart Z of 29 CFR 1910.

Exposure Limits

The Occupational Safety and Health Administration (OSHA) has established legally enforceable exposure limits to protect employees from being exposed to harmful airborne concentrations of toxic and hazardous substances. These limits are published as Tables Z-1, Z-2 and Z-3 in 29 CFR 1910.1000. A portion of Table Z-1 follows as an example.

Portion of Table Z-1 Limits for Air Contaminants				
Substance	CAS No.	ppm	mg/m ³	Skin Designation
Acetaldehyde.....	75-07-0	200	360	
Acetic acid.....	64-19-7	10	25	
Acetic anhydride.....	108-24-7	5	20	
Acetone.....	67-64-1	1000	2400	
↓	↓	↓	↓	↓
Acetylene tetrabromide.....	79-27-6	1	14	
Acrolein.....	107-02-8	0.1	0.25	
Acrylamide.....	79-06-1	0.3	-----	X
↓	↓	↓	↓	↓
Allyl glycidyl ether (AGE).....	106-92-3	(C)10	(C)45	

Unless designated as a ceiling limit (C) or short term exposure limit (STEL), permissible exposures limits listed on Tables Z-1, Z-2 and Z-2 are 8-hour time-weighted averages. A "skin" notation indicates that the substance may be absorbed by the skin, mucous membranes and eyes.

Exposure Limits - Terminology

Permissible Exposure Limits (PEL) identify airborne concentrations that must *not* be exceeded as measured as a time-weighted average (TWA) over an 8-hour work shift. PELs represent the maximum concentration that an average worker can be exposed to over a long period of time without suffering ill effects.

Threshold Limit Values (TLVs) established by the American Conference of Governmental Industrial Hygienists (ACGIH) are similar to PELs but are not enforceable by law.

Short-Term Exposure Limits (STEL) identify airborne concentrations that must *not* be exceeded as measured over a 15-minute period.

Ceiling Limits (C) identify airborne concentrations that must *not* be exceeded even momentarily.

Immediately Dangerous to Life and Health (IDLH) values identify the concentration of any toxic, corrosive or asphyxiant substance that poses an immediate threat to life or would cause irreversible or delayed adverse health effects or would interfere with an individual's ability to escape.

Substance-Specific Regulations in Subpart Z

The Occupational Safety and Health Administration (OSHA) has determined that certain substances pose serious health hazards to employees in the workplace (e.g., human carcinogens). Such substances are regulated by specific sections in Subpart Z of 29 CFR 1910.

Substances Regulated by Specific Sections in Subpart Z of 29 CFR 1910

1,2-dibromo-3-chloropropane	1,3-Butadiene
2-Acetylaminofluorene	3,3'-Dichlorobenzidine (and its salts)
4-Aminodiphenyl	4-Dimethylaminoazobenzene
Acrylonitrile	alpha-Naphthylamine
Asbestos	Benzidine
Benzene	beta-Naphthylamine
beta-Propiolactone	bis-Chloromethyl ether
Bloodborne pathogens	Cadmium
Coke oven emissions	Cotton Dust
Ethylene oxide	Ethyleneimine
Formaldehyde	Inorganic Arsenic
Lead	Methyl Chloromethyl Ether
Methylene Chloride	Methylenedianiline
N-Nitrosodimethylamine	Vinyl Chloride

These substance-specific sections of Subpart Z generally require affected employers to:

- √ Conduct employee training.
- √ Conduct exposure monitoring.
- √ Establish engineering and work practice controls to reduce employee exposure to levels below the substance's permissible exposure limit.
- √ Conduct employee medical surveillance.

Hazardous Chemicals

A hazardous chemical is any substance that has the ability to cause hurt or harm to people, property or the environment. The hurt or harm caused by a hazardous chemical results from the substance's toxicity, flammability, reactivity, corrosiveness and/or conditions of storage.

Category	Substances	Potential Hazards
<p>Toxic Materials</p> <p>Toxic materials cause injury or illness when they contact or enter the human body.</p> <p>There are four routes by which toxic substances can enter the human body:</p> <ul style="list-style-type: none"> • Inhalation • Skin absorption • Ingestion • Injection <p>Toxic effects can be:</p> <ul style="list-style-type: none"> • Immediate or • Delayed. 	<p>Irritants</p> <p>Asphyxiants</p> <p>Sensitizers</p> <p>Central nervous system depressants</p> <p>Systemic poisons</p> <p>Teratogens</p> <p>Mutagens</p> <p>Carcinogens</p> <p>Radioactive materials</p>	<p>Cause irritation to skin, eyes and respiratory tract irritants cause discomfort but do <i>not</i> destroy tissue.</p> <p><i>Simple asphyxiants</i>: Displace oxygen in air. <i>Chemical asphyxiants</i>: Interfere or inhibit transportation of oxygen by circulatory system or absorption of oxygen by body tissues.</p> <p>Repeated exposures cause an allergic-type reaction.</p> <p>Cause an intoxicated effect.</p> <p>Toxify, damage or inhibit specific systems or organs of the body (<i>target organ effect</i>) distant from the point of contact (e.g., liver, lungs or central nervous system).</p> <p>Cause damage to a developing fetus.</p> <p>Cause genetic changes in cells.</p> <p>Cause cancer.</p> <p>Cause radiation burns, radiation sickness, changes to blood, and cancer.</p>
<p>Flammable Materials</p>	<p>Flammable gases</p> <p>Flammable liquids</p> <p>Flammable solids</p>	<p>Fire, explosion, violent rupture of container, heat and toxic smoke.</p> <p>Fire, explosion, violent rupture of container, heat and toxic smoke.</p> <p>Fire, heat and toxic smoke.</p>
<p>Reactive Materials</p>	<p>Explosives</p> <p>Oxidizers</p> <p>Metal peroxides</p> <p>Organic peroxides</p> <p>Pyrophoric materials</p> <p>Self-polymerizing materials</p> <p>Water-reactive materials</p>	<p>Detonation, heat and concussion.</p> <p>Support and accelerate combustion.</p> <p>Unstable; will support and accelerate combustion.</p> <p>Very unstable; may undergo self-decomposition and will support and accelerate combustion.</p> <p>Spontaneous ignition in air.</p> <p>"Run-away chemical reaction" that produces heat, pressure and toxic vapors/gases.</p> <p>React with water to produce heat, fire, toxic vapors/gas and/or a corrosive solution.</p>
<p>Corrosive Materials</p>	<p>Acids and bases</p>	<p>Destruction of living tissue and metals; may react violently with many common substances.</p>
<p>Other Categories Of Hazardous Chemicals</p>	<p>Compressed gases</p> <p>Cryogenic liquids</p> <p>Biohazardous materials</p>	<p>Stored energy of compressed gas; health and physical hazards of specific gas. Fire, explosion, and violent rupture of container.</p> <p>Frostbite, high expansion ratio; health and physical hazards of specific gas. Fire, explosion, and violent rupture of container.</p> <p>Disease-causing organisms or agents.</p>

Material Safety Data Sheets (MSDSs)

Material safety data sheets (MSDSs) communicate detailed information on the health and physical hazards of a chemical product. There is not an established format for material safety data sheets (MSDSs). A typical material safety data sheet (MSDS) is shown on pages 7-5 and 7-6.

MATERIAL SAFETY DATA SHEET (MSDS) — UNLEADED GASOLINE					
SECTION I — GENERAL INFORMATION					
MANUFACTURER'S NAME ABC Petroleum Products				EMERGENCY TELEPHONE NO. 1-800-000-0000	
ADDRESS 125 Industrial Road, Dallas, Texas					
CHEMICAL NAME AND SYNONYMS Light petroleum distillate — motor fuel UN #1203			TRADE NAME AND SYNONYMS Unleaded gasoline		
CHEMICAL FAMILY Hydrocarbon			FORMULA NA		
SECTION II — HAZARDOUS INGREDIENTS					
HAZARDOUS INGREDIENT	%	TLV (Units)	HAZARDOUS INGREDIENT	%	TLV (Units)
Gasoline	100	300 ppm	Hexane	1-3	50 ppm
Xylene	4-10	100 ppm	N-Butane	1-3	800 ppm
Toluene	3-10	100 ppm	Ethyl Benzene	1-2	100 ppm
Benzene *	1-5	1 ppm	Heptane	1-2	400 ppm
Normal Pentane	1-4	600 ppm	Methyl Tert-Butyl Ether	0-2	NA
1,2,4-Trimethylbenzene	0-4	25 ppm			
* Benzene is identified as a carcinogen by NTP, IARC and OSHA					
SECTION III — PHYSICAL DATA					
BOILING POINT	140-390° F.		SPECIFIC GRAVITY (H₂O =1)	0.7321	
VAPOR PRESSURE (mm Hg)	>259 mm Hg @ 68° F		PERCENT VOLATILE BY VOLUME	100%	
VAPOR DENSITY (AIR=1)	> 3.0		EVAPORATION RATE	Less than ether	
SOLUBILITY IN WATER	Insoluble				
APPEARANCE AND ODOR Brown to clear liquid with gasoline odor					
SECTION IV — FIRE AND EXPLOSION DATA					
FLASH POINT (Method used)	-36° F. (cc)		FLAMMABLE LIMITS	LEL 1.4% UEL 7.4%	
EXTINGUISHING METHOD Regular foam, water fog, carbon dioxide or dry chemical					
SPECIAL FIRE FIGHTING PROCEDURES Wear self-contained breathing apparatus with full face-piece operated in positive pressure mode when fighting fires.					
UNUSUAL FIRE AND EXPLOSION HAZARDS Material is highly volatile. Vapors may travel a considerable distance to an ignition source. Vapor explosion may occur in closed areas. Runoff to sewer may create a fire/explosion hazard. Containers may explode in a fire. Cool containers exposed to fire heat with water fog.					

SECTION V — HEALTH HAZARD DATA

EFFECTS OF EXPOSURE

PRIMARY ROUTES OF EXPOSURE: Inhalation, skin absorption and skin contact

ACUTE **Eyes:** may cause severe irritation. **Skin:** prolonged or repeated exposure may cause irritation. **Inhalation of vapors:** may cause headache, dizziness and depression of central nervous system. **Ingestion:** may cause gastrointestinal irritation, headache, nausea, vomiting and Unconsciousness; can be fatal if ingested.

CHRONIC Repeated or prolonged exposure to benzene, even at low concentrations, may result in various blood disorders ranging from anemia to leukemia.

TOXICITY LD₅₀ = 0.5 to 5 g/kg

FIRST AID INFORMATION

SKIN Thoroughly wash exposed area with soap and water. Remove and launder contaminated clothing.

EYES Flush with large amounts of water, lifting upper and lower lids occasionally. Get medical attention.

INGESTION Do not induce vomiting. Keep person warm and quiet and get medical attention. Aspiration of material into the lungs due to vomiting can cause chemical pneumonia which can be fatal.

INHALATION If breathing is affected, remove individual to fresh air. If breathing is difficult, administer oxygen. If breathing has stopped, give artificial respiration. Keep person warm and quiet and get medical attention.

SECTION VI — REACTIVITY DATA

STABILITY

Stable () or Unstable ()

CONDITIONS TO AVOID

Storage near ignition sources

HAZARDOUS POLYMERIZATION

Yes () or No ()

INCOMPATIBILITY WITH OTHER MATERIALS

Strong oxidizers

HAZARDOUS DECOMPOSITION PRODUCTS Combustion may form toxic materials, carbon dioxide, carbon monoxide and various Hydrocarbons.

SECTION VII — SPILL AND LEAK PROCEDURES

STEPS TO BE TAKEN IN CASE MATERIAL IS SPILLED OR RELEASED Eliminate all sources of ignition. **Small spills:** absorb liquid with vermiculite or floor dry. **Large spills:** Isolate spill area. Use water fog or regular foam to control vapors. Control runoff to sewers. Dike to contain liquid. Absorb with vermiculite, floor dry or sand, or collect liquid with suitable equipment and transfer to suitable container for later disposal. Wear self-contained breathing apparatus and suitable protective clothing.

WASTE DISPOSAL METHOD Dispose of used material and absorbent in accordance with local, state and federal regulations.

SECTION VIII — SPECIAL PROTECTION INFORMATION

RESPIRATORY PROTECTION Use a suitable respiratory protective device if concentration exceeds TLV.

VENTILATION Provide forced ventilation and/or local exhaust to maintain concentration below TLV.

PROTECTIVE GLOVES Neoprene, nitrile or polyvinyl alcohol

EYE PROTECTION Chemical splash goggles or face shield

OTHER PROTECTIVE EQUIPMENT As required to prevent prolonged contact with skin.

SECTION IX — SPECIAL PRECAUTIONS

PRECAUTIONS TO BE TAKEN WHEN STORING Store in a safety can away from ignition sources and in a secure location.

OTHER PRECAUTIONS Empty containers may contain flammable vapors. All hazard precautions must be observed for empty containers.

PREPARED BY Safety Division, ABC Petroleum Products

DATE 6/14/93

BIBLIOGRAPHY

CHRIS Manual, United States Coast Guard
Emergency Response Guidebook, Department of Transportation
Pocket Guide To Chemical Hazards, NIOSH
Material Safety Data Sheet for Gasoline, Ashland Oil Company

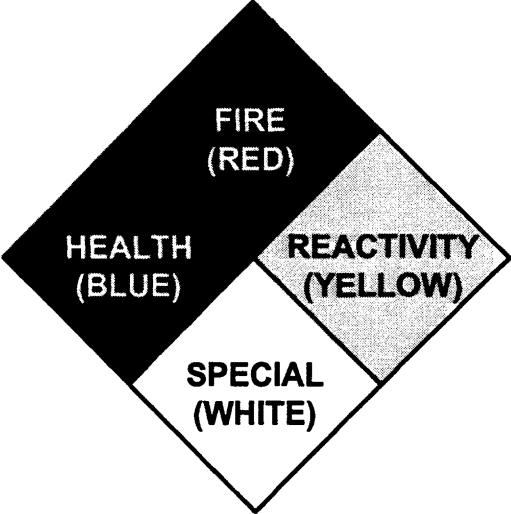



Special Note: Employees should contact their supervisor for additional information on the availability and use of material safety data sheets (MSDSs).

Signs, Placards and Labels

Many different types of signs, placards and labels are used to communicate chemical hazard information. Common types are shown on pages 7-7 to 7-10.

NFPA 704 Signs

NFPA 704 signs communicate chemical hazard information. The signs convey hazard information only and do *not* identify the substance. NFPA 704 signs are frequently posted on buildings and chemical storage tanks.

																							
<p>Health, flammability and reactivity hazards are ranked on a 0 to 4 rating scale.</p> <table><tr><td>4</td><td>Extreme danger</td></tr><tr><td>3</td><td>Very hazardous</td></tr><tr><td>2</td><td>Moderately hazardous</td></tr><tr><td>1</td><td>Hazardous</td></tr><tr><td>0</td><td>Non hazardous</td></tr></table>	4	Extreme danger	3	Very hazardous	2	Moderately hazardous	1	Hazardous	0	Non hazardous	<p>Other hazards are communicated by words or symbols.</p> <table><tr><td>W</td><td>Water reactive</td></tr><tr><td>OXY</td><td>Oxidizer</td></tr><tr><td>COR</td><td>Corrosive</td></tr><tr><td>ACID</td><td>Acid</td></tr><tr><td>ALK</td><td>Alkaline</td></tr><tr><td></td><td>Radioactive</td></tr></table>	W	Water reactive	OXY	Oxidizer	COR	Corrosive	ACID	Acid	ALK	Alkaline		Radioactive
4	Extreme danger																						
3	Very hazardous																						
2	Moderately hazardous																						
1	Hazardous																						
0	Non hazardous																						
W	Water reactive																						
OXY	Oxidizer																						
COR	Corrosive																						
ACID	Acid																						
ALK	Alkaline																						
	Radioactive																						

DOT Placards

Department of Transportation (DOT) placards are affixed to certain large hazardous material containers while in transit (e.g., semi-tank trailers, railroad tank cars, portable tanks and drums).



DOT placards communicate the primary hazard of a substance while in transit and are designed to be used in conjunction with the *North American Emergency Response Guidebook* at the scene of a transportation accident.

Placard color identifies primary shipping hazard:

Placard Color	Primary Shipping Hazard
Orange	Explosive
Yellow	Oxidizer
Red (solid or stripes)	Flammable
White background/black lettering	Corrosive or poisonous
Green	Non-flammable compressed gas
Upper 1/2 yellow/lower 1/2 white	Radioactive

UN Numbers

Some placards contain a four digit number. The numbers identify specific substances when used in conjunction with the *North American Emergency Response Guidebook*.



Chemical Container Labels

Chemical container labels warn of potential hazards and communicate instructions and precautions. There is *not* a set standard for chemical container labels and many styles and forms can be found in the workplace. Three examples follow:

Typical Proprietary Chemical Container Label

SODIUM HYDROXIDE (CAUSTIC SODA)		
AVOID CONTACT SKIN, EYES OR RESPIRATORY TRACT	DANGER CORROSIVE	AVOID BREATHING FUMES OR DUST
CAUSES SEVERE BURNS. CORROSIVE. REACTS VIOLENTLY WITH MANY ORGANIC MATERIALS		
<small>WHEN PREPARING OR DILUTING SOLUTIONS, ADD SODIUM HYDROXIDE SLOWLY AND IN SMALL AMOUNTS TO AVOID VIOLENT REACTION. WHEN USING SOLID SODIUM HYDROXIDE PREVENT LARGE LUMPS FROM FALLING INTO SOLUTION. WEAR GOGGLES OR FACE SHIELD. CLEAN UP SPILLAGE AT ONCE. FLUSH WITH LARGE QUANTITIES OF WATER AND NEUTRALIZE WITH DILUTE ACETIC ACID OR SIMILAR. DO NOT STORE WITH MATERIALS WHICH MIGHT REACT VIOLENTLY</small>		
FIRST AID INFORMATION		
<small>IMMEDIATELY FLUSH SKIN OR EYES WITH WATER FOR AT LEAST 15 MINUTES. REMOVE FROM CONTAMINATED AREA. REMOVE ALL CONTAMINATED CLOTHING. KEEP WARM. GET MEDICAL ATTENTION. NEVER ATTEMPT TO GIVE ANYTHING BY MOUTH TO AN UNCONSCIOUS PERSON</small>		
SEE MSDS FOR ADDITIONAL INFORMATION		
ACME CHEMICAL COMPANY 1240 INDUSTRIAL PARK RD. OMAHA NEBRASKA		

← Name of substance.

← Signal word - *Danger Corrosive*.

← Statement of conditions to avoid.

← Statement of hazards.

← Special instructions/precautions.

← First aid information.

← Reference to MSDS.

← Name and address of manufacturer.

Typical Self-Adhesive Secondary Container Label

WINDEX
CONTAINS
2-Butoxy Ethanol, Isopropyl Alcohol and Ammonium Hydroxide
CAUTION
May cause skin/eye irritation. Harmful if swallowed.
See MSDS for additional information
Manufactured by the Drackett Company

HMIS Secondary Container Label

<p style="text-align: center;"><u>ROUTE OF ENTRY</u></p> <p><input type="checkbox"/> INHALATION <input type="checkbox"/> SKIN ABSORPTION <input type="checkbox"/> INGESTION <input type="checkbox"/> SKIN OR EYE CONTACT</p>	<p style="font-size: 24pt; font-weight: bold;">HEALTH</p>
<p style="text-align: center;"><u>HEALTH HAZARDS</u></p> <p><input type="checkbox"/> NO HEALTH HAZARD <input type="checkbox"/> TOXIC <input type="checkbox"/> HIGHLY TOXIC <input type="checkbox"/> REPRODUCTIVE HAZARD <input type="checkbox"/> IRRITANT <input type="checkbox"/> CORROSIVE <input type="checkbox"/> SENSITIZER <input type="checkbox"/> CARCINOGEN</p>	<p style="font-size: 24pt; font-weight: bold;">FLAMMABILITY</p>
<p style="text-align: center;"><u>PHYSICAL HAZARDS</u></p> <p><input type="checkbox"/> NO PHYSICAL HAZARDS <input type="checkbox"/> COMBUSTIBLE LIQUID <input type="checkbox"/> COMPRESSED GAS <input type="checkbox"/> OXIDIZER <input type="checkbox"/> FLAMMABLE GAS <input type="checkbox"/> EXPLOSIVE <input type="checkbox"/> FLAMMABLE LIQUID/SOLID <input type="checkbox"/> PYROPHORIC <input type="checkbox"/> ORGANIC PEROXIDE <input type="checkbox"/> WATER REACTIVE <input type="checkbox"/> UNSTABLE (REACTIVE)</p>	<div style="border: 1px solid black; height: 20px; width: 100%;"></div> <p style="font-size: 24pt; font-weight: bold;">PROTECTIVE EQUIPMENT</p>
<p>CONSULT MSDS FOR MORE INFORMATION</p>	

Hazardous Material Information System (HMIS) secondary container labels are prepared from information contained on the product's material safety data sheet (MSDS).

Spaces are provided to identify:

- √ Name of substance.
- √ Health, flammability and reactivity hazards on a 0 to 4 scale.
- √ Personal protective equipment that must be used, for example:
 - A = safety glasses.
 - B = safety glasses + gloves.
 - C = safety glasses + gloves + apron.
 - D = safety glasses + face shield + gloves + apron.
- √ Route of entry.
- √ Health hazards.
- √ Physical hazards.

Detecting Exposure to a Toxic Substance

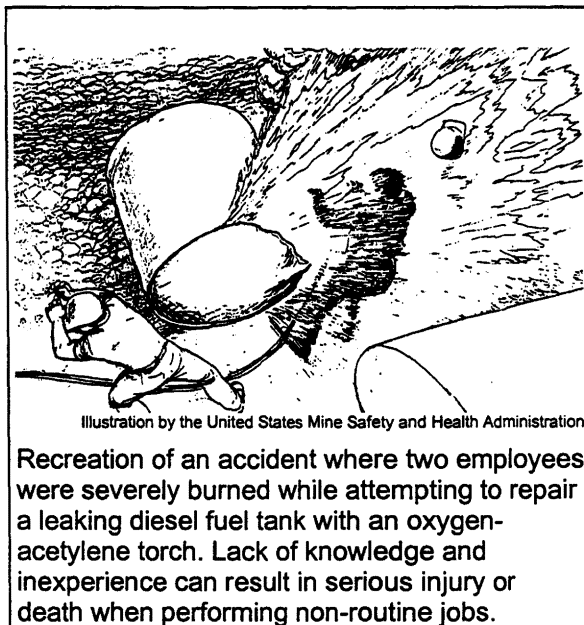
Employees can detect toxic substance exposure and thereby protect their health by:

- √ Knowing the signs and symptoms of toxic substance exposure.
- √ Performing area and confined space air tests.
- √ Participating in personal exposure monitoring conducted by their employer.
- √ Participating in medical monitoring programs established by their employer.

Supervisors Must Plan Non-Routine Jobs that Involve Chemical Hazards

- √ During the planning of non-routine jobs that involve chemical hazards (e.g., confined space entry and line breaking), supervisors must identify and communicate to all affected employees chemical hazards and appropriate protective measures. As required by the work to be performed, supervisors must ensure that all employees are informed of:

- Chemical hazards associated with the work to be performed.
- Chemical hazards posed by unlabeled lines and pipes.
- Appropriate protective measures including required personal protective equipment and special precautions.
- Emergency procedures.



Construction Project Managers Must Exchange Chemical Hazard Information

- √ Through their designated project managers, host employers and outside contractors have a duty to exchange chemical hazard information.
- √ As required by the work to be performed, project managers must ensure that all individuals involved with the job are informed of:
 - The location of material safety data sheets (MSDSs).
 - Chemical hazards associated with the work to be performed.
 - Chemical hazards posed by unlabeled lines and pipes.
 - Appropriate protective measures including required personal protective equipment and special precautions.
 - Emergency procedures.

Actions Employees Can Take To Protect Their Health and Safety

Employees can protect themselves from workplace chemical hazards by:

Being Knowledgeable of Potential Hazards and Protective Measures

- √ Read labels.
- √ Review material safety data sheets (MSDSs).

Being Careful When Using Chemical Products

- √ Select and use non-toxic/non-flammable products when available.
- √ Observe manufacturer's instructions and precautions.
- √ Provide ventilation/local exhaust.
- √ Wear personal protective equipment that is suitable for chemical hazards and the work to be performed. Consult product label or MSDS for specific requirements.
- √ Exercise appropriate personal hygiene (e.g., do *not* eat, drink or smoke while using chemicals and wash hands).

Being Careful Storing Chemical Products

- √ Store at a safe and secure location.
- √ Separate incompatibles.
- √ Limit quantities in storage.

Being Prepared for an Emergency

- √ Know the locations of emergency showers, fire extinguishers, first aid supplies and similar equipment.
- √ Know emergency notification and evacuation procedures.

Summary of Common Workplace Chemical Hazards

This table summarizes workplace operations that involve hazardous chemicals. The table provides general information only. Consult appropriate material safety data sheet (MSDS) for specific information and protective measures.

Operation	Products	Hazards	Precautions
Routine Maintenance Operations	<ul style="list-style-type: none"> • Solvents • Paints • Adhesives • Glues • Lubricants • HTH chlorine • Calibration gases • Insulation products • Freon 	<ul style="list-style-type: none"> • Specific products may be irritating, corrosive, sensitizing, reactive, flammable and/or central nervous system depressants. • Some can cause systemic effects. • HTH chlorine is very reactive and can release chlorine gas or cause a fire if mixed with other chemicals. • Specific calibration gases may be flammable and/or toxic. • Insulation products are skin, eye and respiratory tract irritants. • Freon is a simple asphyxiant and can produce toxic thermal decomposition products when exposed to heat. 	<ul style="list-style-type: none"> • Use only as directed by manufacturer. • Wear appropriate personal protective equipment — refer to product's MSDS. • Use in well-ventilated area or provide local ventilation or exhaust. • Eliminate potential ignition sources. • Exercise appropriate personal hygiene. • Store flammable liquids in approved containers/cabinets. • Store compressed gas cylinders at a designated location with protective caps on and secure in place with a chain.
Welding Operations	<ul style="list-style-type: none"> • Welding rods • Compressed gases • Fluxes 	<ul style="list-style-type: none"> • Specific welding gases may be flammable, oxidizing and/or asphyxiating. • Welding operations involve potential electric shock, thermal burn and fire hazards. • Welding processes can produce toxic metal fumes, ozone and harmful light radiation. Certain metal fumes produced during welding processes (e.g., cadmium, chromium and lead) are very toxic and can cause serious illness. 	<ul style="list-style-type: none"> • Inspect welding and cutting equipment before each use. • Wear appropriate personal protective equipment — refer to product's MSDS. • Use welding curtains when necessary to protect other employees. • Provide local ventilation or exhaust. • Move or protect nearby combustibles. • Exercise appropriate personal hygiene. • Store compressed gas cylinders at a designated location with protective caps on and secure in place with a chain.

Summary of Common Workplace Chemical Hazards, *Continued*

Operation	Products	Hazards	Precautions
Grounds Care Operations	<ul style="list-style-type: none"> • Fertilizers • Pesticides 	<ul style="list-style-type: none"> • Specific pesticides may be poisonous, irritating, sensitizing and/or flammable. Many are toxic through skin absorption. • Specific fertilizers may cause skin, eye and respiratory tract irritation. Some are strong oxidizers. 	<ul style="list-style-type: none"> • Use only as directed by manufacturer. • Wear suitable personal protective equipment when handling pesticides and fertilizers — refer to product's MSDS. • Exercise appropriate personal hygiene. • Store in a secure location.
Custodial Operations	<ul style="list-style-type: none"> • Cleaners • Disinfectants • Strippers • Polishes 	<ul style="list-style-type: none"> • Specific products may be irritating, corrosive, sensitizing, reactive, flammable and/or central nervous system depressants. Some can cause systemic effects. • Some products contain sulfuric acid or sodium hydroxide. These products are very corrosive and can cause severe burns and can react violently with other substances. 	<ul style="list-style-type: none"> • Use only as directed by manufacturer. • <i>Never</i> mix products such as bleach and ammonia. • Wear appropriate personal protective equipment — refer to product's MSDS. • Provide ventilation and eliminate potential ignition sources as required. • Exercise appropriate personal hygiene.
Clerical Operations	<ul style="list-style-type: none"> • Cleaners • Ink cartridges • Toners • Polishes • Glues 	<ul style="list-style-type: none"> • Specific products may be irritating, corrosive, sensitizing, reactive, flammable and/or central nervous system depressants. Some can cause systemic effects. 	<ul style="list-style-type: none"> • Use only as directed by manufacturer. • Wear appropriate personal protective equipment — refer to product's MSDS. • Provide ventilation and eliminate potential ignition sources as required. • Exercise appropriate personal hygiene.
Fleet Operations	<ul style="list-style-type: none"> • Gasoline • Diesel fuel • Antifreeze • Brake and hydraulic fluids • Battery electrolyte • Lubricants 	<ul style="list-style-type: none"> • Specific products may be toxic, irritating, sensitizing, flammable, corrosive and/or central nervous system depressants. • Gasoline vapors can travel a long distance to an ignition source. • Battery electrolyte is very corrosive and can cause severe burns. 	<ul style="list-style-type: none"> • Wear appropriate personal protective equipment — refer to product's MSDS. • Use in well-ventilated areas. • Eliminate potential ignition sources. • Exercise appropriate personal hygiene. • Store small quantities in approved flammable liquid storage containers.

Summary of Common Workplace Chemical Hazards, *Continued*

Operation	Products	Hazards	Precautions

Instructions: Customize manual by summarizing chemical hazards associated with workplace-specific operations. For each operation that involves the use of hazardous chemicals, identify the chemical type of products used, associated hazards and precautions that employees must observe. Prepare copies of the form as required.

CUSTOMIZING THE MANUAL

Adding Additional Information

As applicable, employers may customize the manual by adding the following information:

- √ Identity of Hazard Communication Program Coordinator (person or position).
- √ Policies and procedures applicable to the exchange of chemical hazard information with outside contractors.
- √ Procedures that pertain to non-routine tasks.
- √ Hazardous chemical inventory list.
- √ Identity and location of asbestos-containing material in the workplace.
- √ Location of surfaces coated with lead based paint.
- √ Material safety data sheets (this is only feasible when a limited number of hazardous chemicals are present in the workplace).
- √ Documentation of annual Hazard Communication Program review.

Sample Forms

This section contains the following sample form:

- √ Hazardous Chemical Inventory List.

RECORD OF EMPLOYEE TRAINING FORM

SUMMARY OF APPLICABLE REGULATIONS

Applicable OSHA Regulations

Occupational Safety and Health Administration (OSHA) *General Industry Standards* applicable to this section include, but may not be limited to:

- √ 29 CFR 1919.119 Process Safety Management of Highly Hazardous Chemicals
- √ 29 CFR 1910.120 Hazardous Waste Operations and Emergency Response
- √ 29 CFR 1910.1200 Hazard Communication
- √ 29 CFR 1910.1201 Retention of DOT Markings, Placards and Labels
- √ 29 CFR 1910.1450 Occupational Exposure to Hazardous Chemicals In Laboratories
- √ Subpart Z of 29 CFR 1910 Toxic and Hazardous Substances

SARA Title III Reporting and Planning

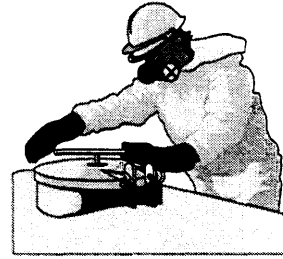
Certain employers may be subject to SARA Title III reporting and planning contained in:

- √ 40 CFR 300 Emergency Planning and Community Right To Know Act

Section 8

Personal Protective Equipment

PERSONAL PROTECTIVE EQUIPMENT



Section 8 provides information on hazards that require the use of personal protective equipment and instruction on the selection, use, care and limitations of personal protective equipment. Personal protective equipment is the last line of defense from workplace hazards. It is important for all employees to be knowledgeable about the selection, use, care and limitations of personal protective equipment.

Basic Requirements

- √ Personal protective equipment must be worn when a hazard requiring its use is present.
- √ When required, personal protective equipment must be suitable for the hazard and the work to be performed.
- √ Personal protective equipment must be maintained in a clean and sanitary condition.
- √ Damaged personal protective equipment must *not* be used and must be disposed of properly.

OSHA Established Employer Duties

The Occupational Safety and Health Administration (OSHA) requires employers to:

- √ Select (and require employees to wear) personal protective equipment on the premise of a workplace hazard assessment.

FAILURE TO WEAR SUITABLE PERSONAL PROTECTIVE EQUIPMENT CAN RESULT IN EXPOSURE TO IMMINENT DANGER.

√

Provide employees with effective training on:

- When personal protective equipment is necessary.
- What personal protective equipment is necessary.
- How to properly put on, take off, adjust and wear personal protective equipment.
- The limitations of personal protective equipment.
- The proper care, maintenance, useful life and disposal of personal protective equipment.

√

Provide personal protective equipment at no cost to employees except for very personal items and equipment that is normally worn off the job site (e.g., items such as safety shoes and glasses are normally addressed in employer/employee agreements).

Certification of Hazard Assessment for the Selection of Personal Protective Equipment

This table identifies operations and locations that require the use of personal protective equipment and the type of personal protective equipment that must be worn.

Operation/Location	Hazards	Required Personal Protective Equipment
Name of Workplace:	Performed By:	Date:

Instructions: Customize manual by including an assessment of workplace hazards that require the use of personal protective equipment. List operations and locations that expose employees to hazards that require the use of personal protective equipment. For each operation/location identify the hazards involved and the type of personal protective equipment that must be worn. In the spaces provided identify the workplace, who performed the evaluation and the date that the evaluation was performed. Prepare copies of the form as required.

Hard Hats

- √ Hard hats must be worn when:
- Employees are exposed to overhead falling object hazards.
 - The head could come into contact with energized electrical conductors.



- √ Hard hats must meet ANSI standards. The approval is located on the manufacturer's label.

Manufacturer's Name
ANSI Z89.1-1997
Class B

Selection

- √ Select a hard hat that is appropriate for existing hazards.
- Hard hats are made in the following types and classes:
Type 1 — helmets with full brim, not less than 1 ¼ inches wide.
Type 2 — brimless helmets with a peak extending forward from the crown.
 - There are three classes of hard hats for industrial applications:
Class A — general service, limited voltage protection.
Class B — utility service, high-voltage helmets.
Class C — special service, no voltage protection.

Fit

Adjust hard hats for a firm but comfortable fit.

Inspection and Care

- √ Hard hat shells may be cleaned by dipping them in hot water (approximately 140° F) containing a good detergent for at least a minute. Shells may then be scrubbed and rinsed in clear hot water. After rinsing, the shell should be carefully inspected for any signs of damage.

√ All components, shells, suspensions, headbands, sweatbands, and any accessories should be visually inspected daily for signs of dents, cracks, penetration, or any other damage that might reduce the degree of safety originally provided.

- Any part that comes into contact with the wearer's head must not be irritating to normal skin.
- Damaged or defective hard hats must be immediately withdrawn from service for repair or replacement.

√ Hard hats must be stored in a clean and sanitary location where they will not be subject to damage or chemical contamination.

Eye and Face Protection

√ Employees must use appropriate eye/face protection when exposed to eye or face hazards such as:

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



Photograph by David Ballard

Worker grinding a weld. The worker is wearing safety glasses and a face shield.

√ Eye protection that provides side protection must be worn when there is a hazard from flying objects. Detachable side protectors such as clip-on or slide-on side shields may be used.

√ When vision correction is required, eye/face protectors must either:

- Incorporate vision correction or
- *Not* interfere with the wearing of corrective spectacles.

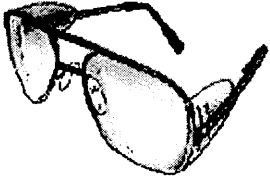
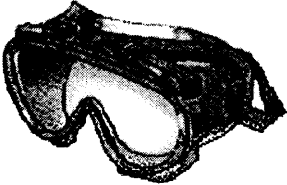

√ Eye/face protectors must meet ANSI standards and be marked to identify the manufacturer.

Manufacturer's Name ANSI Z87.1-1989
--

Selection of Eye/Face Protectors

Select eye/face protectors that are suitable for the hazard and the work to be performed in accordance with guidelines established by the Occupational Health and Health Administration (Refer to pages 8-6 through 8-8).

Types of Eye/Face Protectors

Type	Advantages/Application	Limitations/Disadvantages
<p>Safety Glasses</p> 	<ul style="list-style-type: none"> • Available in many styles and can be fitted with corrective lenses. • Lightweight and comfortable to wear. • Protect the wearer from "routine" eye hazards such as flying objects and particles. 	<ul style="list-style-type: none"> • <i>Not</i> suitable for severe eye hazards. • Must be fitted with side protection to be effective. • Provide only limited chemical splash protection. • Do <i>not</i> protect the wearer from harmful dusts, fumes and mists. • Do <i>not</i> protect the face. • Safety glasses with corrective lenses must be fitted by qualified optical personnel.
<p>Goggles</p> 	<ul style="list-style-type: none"> • Provide a greater level of protection than safety glasses. • Goggles are available in several styles for different types of hazards. <ul style="list-style-type: none"> <u>Direct vented goggles</u> <ul style="list-style-type: none"> – Provide impact protection only. <u>Indirect vented goggles</u> <ul style="list-style-type: none"> – Provide impact and chemical splash protection. <u>Unvented goggles</u> <ul style="list-style-type: none"> – Provide protection from harmful dusts, vapors, and mists as well as impact and chemical splash protection. <u>Eyecup chipping goggles</u> <ul style="list-style-type: none"> – Provide protection from flying particles and hot sparks. <u>Welding goggles</u> <ul style="list-style-type: none"> – Provide protection from hot sparks and glare. 	<ul style="list-style-type: none"> • Type used must be suitable for the hazard. • May cause minor discomfort. • May fog over. • Do <i>not</i> protect the face. • May interfere with the wearing of corrective spectacles and other items of personal protective equipment. • Must be cleaned and sanitized between users when used by more than one employee.
<p>Face Shields</p> 	<ul style="list-style-type: none"> • Protect the face from flying particles, chemical splashes and hot sparks. • Provide additional protection from severe hazards. 	<ul style="list-style-type: none"> • Do <i>not</i> protect the eyes from harmful dusts, fumes and mists. • Must be used as secondary protection (e.g. worn over safety glasses or goggles). • May cause minor discomfort. • May work loose. • May interfere with the wearing of other items of personal protective equipment. • Must be inspected and cleaned on a regular basis when placed in the workplace for general use.

OSHA Eye and Face Protection Selection Chart

Source	Assessment of Hazard	Protection
IMPACT Chipping objects, grinding machining, masonry work, woodworking, sawing, drilling, chiseling, powered fastening, riveting and sanding	Flying fragments, objects, large chips, particles, sand, dirt, etc.	Spectacles with side protection, goggles, face shields. See notes (1), (3), (5), (6), (10). For severe exposure, use face shield.
HEAT Furnace operations, pouring, casting, hot dipping and welding	Hot sparks	Face shields, goggles, spectacles with side protection. For severe exposure use face shield. See notes (1), (2), (3).
	Splash from molten metals	Face shields worn over goggles. See notes (1), (2) (3).
	High temperature exposure	Screen face shields, reflective face shields. See notes (1), (2), (3)
CHEMICALS Acid and chemicals handling, degreasing and plating	Splash	Goggles, eyecup and cover types. For severe exposure use face shield. See notes (3), (11)
	Irritating mists	Special purpose goggles.
DUST Woodworking, buffing, general dusty conditions	Nuisance dust	Goggles, eyecup and cover types. See note (8)
LIGHT AND/OR RADIATION		
Welding: Electric arc	Optical radiation	Welding helmets or welding shields. Typical shades: 10 – 14 See notes (9), (12).
Welding: Gas	Optical radiation	Welding goggles or welding face shield. Typical shades: gas welding; 4 – 8 cutting; 3 – 6 brazing; 3 – 4 See note (9)
Cutting, torch brazing torch soldering	Optical radiation	Spectacles or welding face shield. Typical shades: 1.5 – 3. See notes (3), (9).
Glare	Poor vision	Spectacles with shaded or special-purpose lenses, as suitable. See notes (9), (10).

Notes to Eye and Face Protection Selection Chart:

- (1) Care should be taken to recognize the possibility of multiple and simultaneous exposure to a variety of hazards. Adequate protection against the highest level of each of the hazards should be provided. Protective devices do *not* provide unlimited protection.
- (2) Operations involving heat may also involve light radiation. As required by the standard, protection from both hazards must be provided.
- (3) Face shields should only be worn over primary eye protection (spectacles or goggles).
- (4) As required by the standard, filter lenses must meet the requirements for shade designations in 1910.133(a)(5). Tinted and shaded lenses are *not* filter lenses unless they are marked or identified as such.
- (5) As required by the standard, persons whose vision requires the use of prescription (Rx) lenses must wear either protective devices fitted with prescription (Rx) lenses or protective devices designed to be worn over regular prescription (Rx) eyewear.
- (6) Wearers of contact lenses must also wear appropriate eye and face protection devices in a hazardous environment. It should be recognized that dusty and/or chemical environments may represent an additional hazard to contact lens wearers.
- (7) Caution should be exercised in the use of metal frame protective devices in electrical hazard areas.
- (8) Atmospheric conditions and the restricted ventilation of the protector can cause lenses to fog. Frequent cleansing may be necessary.
- (9) Welding helmets or face shields should be used only over primary eye protection (spectacles or goggles).
- (10) Non-sideshield spectacles are available for frontal protection only, but are *not* acceptable eye protection for the sources and operations listed for "impact."
- (11) Ventilation should be adequate, but well protected from splash entry. Eye and face protection should be designed and used so that it provides both adequate ventilation and protects the wearer from splash entry.
- (12) Protection from light radiation is directly related to filter lens density. See note (4) . Select the darkest shade that allows task performance.

Welding, Cutting and Brazing

√ The correct filter lens must be used for the work being performed:

Operations	Electrode Size 1/32 in.	Arc Current	Minimum * Protective Shade
Shielded Metal Arc Welding	Less than 3	Less than 60	7
	3 – 5	60 – 160	8
	5 – 8	160 – 250	10
	More than 8	250 – 550	11
Gas Metal Arc Welding And Flux Cored Arc Welding		Less than 60	7
		60 – 160	10
		160 – 250	10
		350 – 500	10
Gas Tungsten Arc Welding		Less than 50	8
		50 – 150	8
		150 – 500	10
Air Carbon Arc Cutting	(Light)	Less than 500	10
	(Heavy)	500 – 1000	11
Plasma Arc Welding		Less than 20	6
		20 – 100	8
		100 – 400	10
		400 – 800	11
Plasma Arc Cutting	(Light) **	Less than 300	8
	(Medium) **	300 – 400	9
	(Heavy) **	400 – 800	10
Torch Brazing, Torch Soldering Carbon Arc Welding			3
			2
			14

Operations	Plate Thickness inches.	Plate Thickness mm	Minimum (*) Protective Shade
Gas Welding	Under 1/8	Under 3.2	4
	1/8 to 1/2	3.2 – 12.7	5
	Over 1/2	Over 12.7	6
Oxygen Cutting	Under 1	Under 25	3
	1 to 6	25 to 150	4
	Over 6	Over 150	5

* As a rule of thumb, start with a shade that is too dark to see the weld zone. Then go to a lighter shade which gives sufficient view of the weld zone without going below the minimum. In oxy/fuel gas welding or cutting where the torch produces a high yellow light, it is desirable to use a filter lens that absorbs the yellow or sodium line in the visible light of the (spectrum) operation.

** These values apply where the actual arc is clearly seen. Experience has shown that lighter filters may be used when the arc is hidden by the workpiece.

Fit

- √ Adjust eye/face protectors in accordance with manufacturer's recommendations for a firm but comfortable fit.

Inspection and Care

- √ Eye and face protectors must be inspected before each day's use for:
 - Dirty lenses.
 - Pitted or scratched lenses.
 - Slack, worn-out, sweat-soaked, or twisted headbands.
- √ Damaged or defective eye/face protectors must be immediately withdrawn from service for repair or replacement.
- √ Clean and sanitize eye/face protectors in accordance with the manufacturer's instructions.
- √ When not in use, eye/face protectors must be stored in a clean and sanitary location where they will not be subject to damage or chemical contamination.

Hand Protection

- √ Appropriate gloves must be worn when the hands are exposed to hazards such as:
 - Skin absorption of harmful substances.
 - Severe lacerations, abrasions or punctures.
 - Chemical burns.
 - Thermal burns.
 - Harmful temperature extremes.



Selection

- √ Select and wear gloves that are suitable for the hazard and the work to be performed. Examples of gloves used for industrial applications include:
- Leather or cloth work gloves.
 - Welding gloves.
 - Chemical resistant gloves.
 - Cut-resistant gloves.

Fit

- √ Select gloves that are of the proper size.

Care

- √ Inspect gloves before each day's use for damage, deterioration or chemical contamination.
- √ Damaged, defective or contaminated gloves must be removed from service and disposed of properly.
- √ Decontaminate and clean chemical protective gloves in accordance with the manufacturer's recommendations.
- √ Gloves must be stored where they will not be subject to damage or chemical contamination.

Protective Footwear

- √ Appropriate foot protection must be worn where:
- There is a danger of foot injuries from falling or rolling objects.
 - There is a danger of foot injuries from objects piercing the sole.
 - The feet are exposed to electrical hazards.
 - The feet are exposed to chemical hazards.
 - Workers must stand in water.



- √ Protective footwear must meet ANSI standards.

ANSI Z41.1-1991

Selection

- √ Select foot protection that is suitable for the hazard and the work to be performed such as:
 - Work shoes/boots with steel toes and insoles.
 - Water or chemical resistant boots with steel toes and insoles.

Fit

- √ Select protective footwear that fits properly and is comfortable to wear.

Care

- √ Protective footwear should be periodically inspected for damage and deterioration. Damaged footwear that presents a hazard must be replaced.
- √ Decontaminate and clean chemical protective footwear in accordance with the manufacturer's recommendations.
- √ Store protective footwear where they will not be subject to damage or chemical contamination.

Protective Clothing

- √ Suitable protective clothing must be worn when the body is exposed to hazards such as:
 - Chemical splashes.
 - Irritating dusts.
 - Sparks and molten metal.
 - Electric arcs and flames.



Single and double-piece chemical splash suits.

Types of Protective Clothing

- ✓ Select and wear protective clothing that is suitable for the hazard and the work to be performed.

Type	Application/Advantages	Limitations/Disadvantages
Chemical Splash Apron	<ul style="list-style-type: none"> Protects front of body from chemical splashes. Lightweight and relatively comfortable to wear. 	<ul style="list-style-type: none"> Does <i>not</i> protect entire body. <i>Not</i> suitable for severe hazards.
Regular Tyvek® Coveralls	<ul style="list-style-type: none"> Protects body from nuisance and irritating dusts. Lightweight and relatively comfortable to wear. Limited use — no maintenance and disposable. 	<ul style="list-style-type: none"> Does <i>not</i> provide chemical splash protection. Suits can tear easily. <i>Not</i> fire retardant.
P.E. Coated (Yellow) Tyvek® Coveralls	<ul style="list-style-type: none"> Protects front of body from chemical splashes. Lightweight and relatively comfortable to wear. Limited use — no maintenance and disposable. 	<ul style="list-style-type: none"> Seams can leak. Suits can tear easily. <i>Not</i> fire retardant. Increases the potential for heat stress.
Chemical Splash Suits	<ul style="list-style-type: none"> Protects front of body from chemical splashes. More durable than P.E. coated Tyvek® coveralls. 	<ul style="list-style-type: none"> <i>Not</i> fire retardant. Increases the potential for heat stress. Requires periodic inspection and maintenance. Must be decontaminated and cleaned after each use.
Welder's Leathers	<ul style="list-style-type: none"> Protects the body from hot sparks and flash burns. 	<ul style="list-style-type: none"> Increases the potential for heat stress. Requires periodic inspection and maintenance.
Fire Retardant Clothing	<ul style="list-style-type: none"> Protects the body from flames and arcs. Available in many different styles such as coveralls, jackets and switch-pullers suits. 	<ul style="list-style-type: none"> Increases the potential for heat stress. Requires periodic inspection and maintenance. Does <i>not</i> provide chemical splash protection.

Fit

Select protective clothing that fits properly and is comfortable to wear. Oversized protective clothing can become entangled in machinery and poses a slip, trip and fall hazard.

Care

- √ Inspect protective clothing for damage and defects such as tears and rips before each day's use.
- √ Damaged or defective protective clothing must be removed from service for repair or replacement.
- √ Limited use protective clothing must be disposed of in an appropriate waste container.
- √ Decontaminate and clean chemical protective clothing in accordance with the manufacturer's recommendations.
- √ Wash fire retardant clothing in accordance with the manufacturer's recommendations.
- √ Protective clothing must be stored at a location where it will not be subject to damage or chemical contamination.

Selection of Chemical Protective Equipment

Select and use chemical protective equipment in accordance with information:

- √ Contained on the product's material safety data sheet (MSDS).
- √ Supplied by the equipment's manufacturer.



CUSTOMIZING THE MANUAL

Adding Additional Information

As applicable, employers may customize the manual by adding the following information:

- √ Policies and procedures that pertain to the selection, use and care of personal protective equipment.
- √ Agreements that pertain to providing personal protective equipment at no cost to employees.
- √ Documentation of annual Personal Protective Equipment Hazard Assessment review.

RECORD OF EMPLOYEE TRAINING FORM

SUMMARY OF APPLICABLE REGULATIONS

Applicable OSHA Regulations

Occupational Safety and Health Administration (OSHA) *General Industry Standards* applicable to this section include, but may not be limited to:

- | | | |
|---|-----------------|--------------------------------|
| √ | 29 CFR 1910.132 | General Requirements. |
| √ | 29 CFR 1910.133 | Eye and Face Protection. |
| √ | 29 CFR 1910.134 | Respiratory Protection. |
| √ | 29 CFR 1910.135 | Head Protection. |
| √ | 29 CFR 1910.136 | Foot Protection. |
| √ | 29 CFR 1910.137 | Electrical Protective Devices. |
| √ | 29 CFR 1910.138 | Hand Protection. |

Section 9

Negative Pressure Air Purifying Respirators

CARTRIDGE-TYPE AIR-PURIFYING RESPIRATORS (Respiratory Protection)



Section 9 provides information on the nature of respiratory hazards and instruction on the selection, use, care and limitations of cartridge-type air purifying-respirators. Serious injury or illness can result from the inhalation of hazardous air contaminants. Consequently it is important for all employees to be knowledgeable of the selection, use, care and limitations of cartridge-type air-purifying respirators.

Nature of Respiratory Hazards

A respiratory hazard is any hazardous air contaminant that is capable of causing injury or illness upon exposure. Respiratory hazards include:

- √ Harmful particulates such as asbestos, agricultural lime and fiberglass insulation.
- √ Harmful gases such as carbon monoxide, sulfur dioxide and ammonia.
- √ Harmful fumes such as those produced by welding operations.
- √ Harmful vapors such as those produced when volatile liquids evaporate.
- √ Harmful mists and sprays such as those released in degreasing and spray painting operations.
- √ Oxygen deficient atmospheres (any atmosphere that contains less than 19.5 percent oxygen is considered to be oxygen deficient).



**FAILURE TO CONTROL THE RESPIRATORY HAZARDS DESCRIBED
ABOVE CAN RESULT IN SERIOUS IMMEDIATE OR DELAYED
ADVERSE HEALTH EFFECTS.**

Employer Duties Established By OSHA

The Occupational Safety and Health Administration (OSHA) requires employers to establish a written Respiratory Protection Program when their employees are required to wear respirators. A minimal Respiratory Protection Program must include the following elements:

- √ Written standard operating procedures that govern the selection and use of respirators.
- √ Selection of suitable respirators on the basis of an assessment of respiratory hazards.
- √ Employee training and instruction on the proper use of respirators and their limitations.
- √ Respirator fit testing.
- √ Regular cleaning and disinfection of respirators.
- √ Storage of respirators in a convenient, clean, and sanitary location.
- √ Routine inspection of respirators including the repair or replacement of damaged respirators.
- √ Surveillance of workplace conditions that require the use of respirators.
- √ Periodic evaluation of the Respiratory Protection Program to ensure its continued effectiveness.
- √ Assessment of employee medical fitness to wear respiratory protective devices.
- √ Selection of respirators jointly approved by the Mine Safety and Health Administration and the National Institute for Occupational Safety and Health.



Photograph by David Ballard

Worker wearing a sample pump and cassette filter to determine his exposure to dust. Personal sampling must be used to assess employee exposure to hazardous air contaminants and specify suitable respirators.

Special Note: Employees should contact their supervisor for information on the results of workplace personal exposure monitoring.

Control of Respiratory Hazards

You can control your exposure to respiratory hazards through the use of engineering controls (the preferred method) or by wearing a respirator.

- √ Always evaluate other methods that can be used to control the hazard before electing to wear a respirator. Consider the following methods:
 - Substituting non-hazardous products for hazardous products.
 - Changing the manner in which the work is performed.
 - Isolating the hazardous substance.
 - Providing ventilation or exhaust.
- √ When other control methods are not feasible, a suitable respirator must be worn.

Requirements for Respirator Use

To wear a respirator, employees must:

- √ Be medically fit to wear a respirator as determined by a medical professional.
- √ Receive training on the use, care and limitations of respirators.
- √ Be fit tested.



Photograph by David Ballard

All respirators must be fit tested in a test atmosphere to ensure a proper face to facepiece seal.



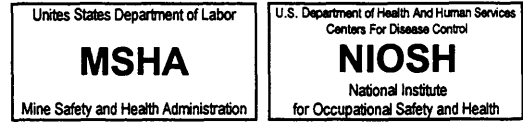
Photograph by David Ballard

Pulmonary function tests are used to evaluate medical fitness to wear a respirator.

Use of Respiratory Protection Devices

√ The following procedures must be observed when using air-purifying respirators:

- Respirator must be NIOSH/MSHA certified for the hazard.



- Respirators must *not* be modified in any manner.
- Parts and filters/cartridges must *not* be interchanged between different manufacturers and models.
- Negative pressure air-purifying respirators must *not* be worn by persons with facial hair or other factors (e.g., temple bars of eyeglasses) that interfere with the face to facepiece seal.
- Respirators must be selected, used, inspected, sanitized and stored in accordance with established procedures.
- Contact lenses must *not* be worn with a respirator.



Limitations of Air-Purifying Respirators

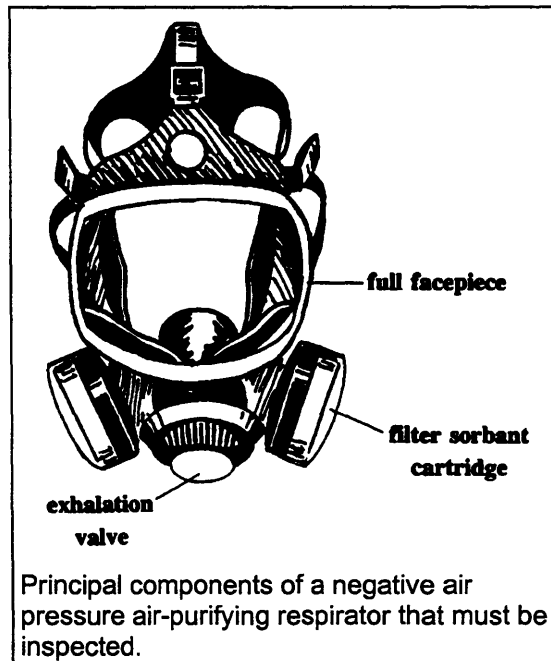
√ Air-purifying respirators must *not* be used in:

- Oxygen deficient atmospheres (less than 19.5 percent oxygen).
- Atmospheres that are immediately dangerous to life and health (IDLH).
- Situations where contaminants lack sufficient warning properties.
- Atmospheres that contain unknown contaminants or concentrations.
- Atmospheres that contain concentrations exceeding the maximum use concentration of the respirator and/or cartridge.
- Untested confined spaces.

Inspection and Use of Respirators

- √ Only a clean and sanitized respirator that is suitable for the hazard may be worn.
- √ Respirators must be inspected before and after each use. As applicable, inspect the following items:

- Inhalation and exhalation valves and seats.
- Cartridge retainers and seating surfaces.
- Face to facepiece sealing surface.
- Head straps.
- Face shield.
- Hoses and connections.
- Respirator assembly.



- √ Any defective item must be replaced before the respirator is worn.

- √ Select and install cartridges/filters that are suitable for the hazard. Use the following chart to select suitable cartridges:

Cartridge Color	Hazard
White	Acid gases (e.g., sulfur dioxide and chlorine).
Black	Organic vapors (e.g., solvents and paints).
Purple or magenta	HEPA filter (dust, including asbestos).
Green	Ammonia.
Yellow	Combination acid gas/organic vapor cartridge.

- √ Put on and wear the respirator according to the manufacturer's instructions for the model chosen.
 - If worn in conjunction with disposable coveralls and attached hoods, the respirator headgear must be worn under the hood.

Summary of Workplace Operations that Require the Use of a Respirator

The following table identifies workplace operations that require the use of a respirator.

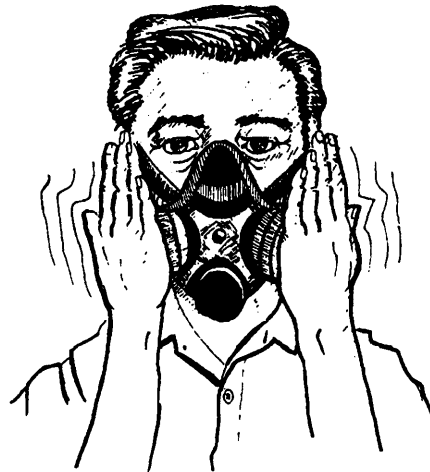
Operation	Hazard	Specified Respirator
Name of Workplace:	Prepared By:	Date:

Instructions: Customize manual by including an assessment of hazards that require the use of respirators. List operations that expose employees to hazards that require the use of respirators. For each operation, identify the hazard(s) involved and the type of respirator that must be worn. In the spaces provided, identify the workplace, who prepared the chart and the date it was prepared. Prepare copies of the form as required.

√ Perform a negative and positive fit check each time the respirator is donned. If leakage is detected, readjust and perform fit checks again. Contact your supervisor if any problem exists with your respirator.

√ Cartridges and/or filters have a limited period of usefulness. Cartridges and/or filters must be immediately replaced if breathing becomes difficult or contaminant breaks through (e.g., you can smell or taste the contaminant).

√ Spent respirator cartridges must be disposed of in an appropriate waste container. Damaged or defective respirators that are not fit to use must be made unusable before disposing in a trash container (e.g., remove head gear).



Respirator Sanitation and Storage

√ Respirators must be cleaned after each use:

- Completely disassemble respirator and inspect all parts. Replace any damaged or worn parts.
- Wash respirator components in a solution of germicidal detergent and hot water (140° F maximum).
- Rinse respirator components in hot water (140° F maximum), and allow to air dry or wipe dry with a soft lint-free towel.
- Reassemble respirator and thoroughly inspect.

√ Clean respirators must be placed in a clean plastic bag and stored in a convenient, clean and sanitary location where they will not be subjected to damage or chemical contamination. Respirators must not be stored in a manner that would deform or place stress upon the facepiece or headgear.

Emergency Procedures

- √ Leave the contaminated area immediately if you:
 - Become dizzy or nauseated.
 - Develop respiratory tract irritation.
 - Smell or taste the contaminant.
 - Experience any problem with your respirator.
 - Detect imminent danger in any way.

- √ Do *not* re-enter the contaminated area. Check your respirator and contact your supervisor.

CUSTOMIZING THE MANUAL

Adding Additional Information

As applicable, employers may customize the manual by adding the following information:

- √ Results of personal exposure monitoring.
- √ Policies and procedures that pertain to respiratory protection and the use of respirators (e.g., facial hair policy).
- √ Contract or letter of understanding with the local health care provider that will be evaluating the medical fitness of employees that wear respirators.
- √ Completed respirator approval forms for respirator users (only feasible when a limited number of employees are required to wear respirators).
- √ Documentation of annual Respiratory Protection Program review.

Sample Forms

This section contains the following sample form:

- √ Employee Respirator Approval Form.

EMPLOYEE RESPIRATOR APPROVAL FORM

Employee Information <small>(To be completed by employee)</small>		
Last Name:	First Name:	Middle:
S.S. #:	Birth Date:	Work Phone:
Employer:	Position:	
Work Phone:		

Employee Medical Information For Respirator Use <small>(To be completed by employee)</small>		
1	YES NO	Do you have any known or suspected major health problems at present (i.e., disease of the heart, lungs, or other vital organs, high blood pressure, diabetes, epilepsy, cancer, hernia, perforated eardrums, serious back or joint disorders, or recent major surgery) or are you under the care of a doctor for a diagnosis or treatment?
2	YES NO	Have you had any major health or physical problems in the past which have left you with any lasting impairment of bodily function, limitations, or restrictions in normal physical activity?
3	YES NO	Do you have any significant symptom or health problem which you believe would be made worse by using respiratory protective equipment?
4	YES NO	Other than mild discomfort and/or annoyance experienced while wearing respirators, do you have any major objections to using respiratory protective equipment?
5	YES NO	Have you had a physical within the past 12 months?

Hazard Assessment And Respirator Specification <small>(To be completed by trainer/fit tester)</small>					
Respiratory Hazard	Specified Respirator	Respirator Manufacturer	Respirator Model	Respirator Size	Respirator Filter/Cartridge

Fit Testing Protocol:	
Trainer/Fit Tester Signature: <small>(Signature certifies accurate information and training/fit testing)</small>	Date:
Employee Signature: <small>(Signature certifies accurate information and training/fit testing)</small>	Date:

Medical Approval For Respirator Use <small>(To be completed by a medical professional)</small>	
The above named person has been examined and is judged <u>to be physically fit</u> to wear a respirator.	<small>Check one</small>
The above named person has been examined and is judged <u>not to be physically fit</u> to wear a respirator.	
Comments:	
Signature of Medical Professional:	Date:

RECORD OF EMPLOYEE TRAINING FORM

SUMMARY OF APPLICABLE REGULATIONS

Applicable OSHA Regulations

Occupational Safety and Health Administration (OSHA) *General Industry Standards* applicable to this section include, but may not be limited to:

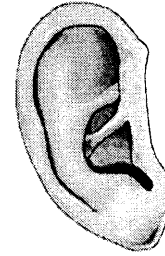
√ 29 CFR 1910.134 Respiratory Protection.

Section 10

Noise Exposure and Hearing Protection

NOISE EXPOSURE AND HEARING PROTECTION

(Hearing Conservation)



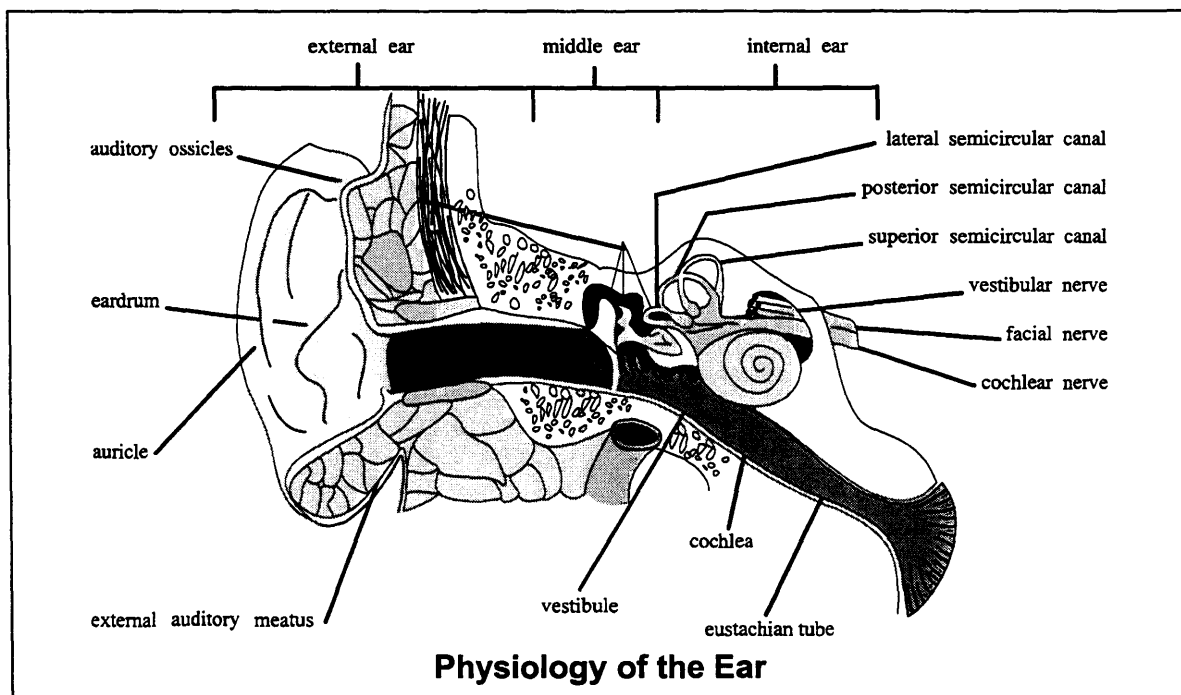
Section 10 provides information on the effects of noise on hearing and hearing conservation. Exposure to loud noise both on and off the job can result in hearing loss. Consequently it is important for all employees to protect their hearing by wearing suitable hearing protectors when exposed to loud noise.

Effects of Noise

Exposure to high noise levels may cause fatigue, elevated blood pressure, tension and nervousness and hearing loss.

Hearing Loss

Loud noise adversely affects hearing by damaging tiny "hair cells" located in the cochlea of the inner ear. Repeated exposure to loud noise causes the "hair cells" to lose some of their resilience. When this occurs the "hair cells" no longer function properly.



- √ Exposure to loud noise can cause such symptoms as “ringing” in the ears and/or muffled hearing. These are symptoms of temporary hearing loss.
- √ Repeated exposure to loud noise may also result in permanent hearing loss. Hearing loss can happen quickly but more frequently occurs slowly over time. Gradual hearing loss:
 - Does not cause pain or discomfort.
 - Can go unnoticed until you realize that you cannot hear high-pitched noises or low voices.
 - Is not treatable. Once damaged, the “hair cells” cannot be replaced and may result in profound hearing loss.
- √ Gradual hearing loss is also part of the natural aging process. This type of hearing loss cannot be prevented by the wearing of hearing protectors.
- √ Noise does not have to be a continuous sound to damage hearing. Short loud bursts, called impulse noise, can be damaging too.

Special Note: Employees should contact a medical professional for specific questions concerning hearing loss.

Noise Measurement

- √ Sound energy is measured in decibels (dB).
- √ The decibel scale is not linear. An increase of six decibels equals a doubling of noise produced. This means that a noise level of 96 decibels is twice as harmful as a noise level of 90 decibels.

Typical Noise Levels

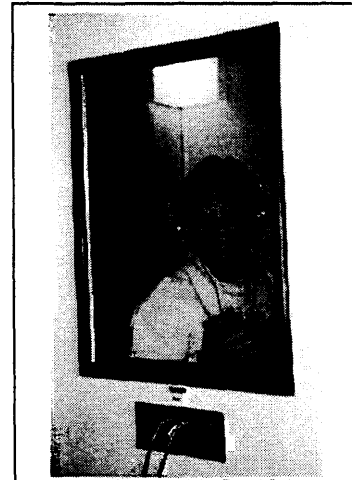
<u>Threshold of hearing</u>	<u>0 - 20 dBA</u>
Whisper	20 dBA
Normal conversation	65 dBA
<u>OSHA 8-hour exposure limit</u>	<u>90 dBA/TWA</u>
Machines/electric motors	70 - 95 dBA
Lawn mower	95 dBA
Chain saw	100 dBA
<u>Pain Threshold</u>	<u>125 dBA</u>
Jack Hammer	100 - 120 dBA
Jet Engine	140+ dBA
Shotgun blast	155 dBA



Employer Duties for Conserving Employee Hearing

All employers must evaluate employee noise exposure. When employee noise exposures equal or exceed an 8-hour time weighted average of 85 dBA, employers must implement a Hearing Conservation Program that includes five basic components:

- √ Employee noise monitoring.
- √ Employee audiometric testing.
- √ Implementation of engineering controls when feasible.
- √ The availability and use of hearing protectors.
- √ Employee training.
- √ Recordkeeping.



Photograph by David Ballard

Audiometric testing is used to evaluate the effect of noise on hearing.

OSHA Permissible Noise Exposure Limits

Hearing protection is required when the noise exposures shown below are exceeded.

Noise Level (dBA)	Exposure Duration*
90	8 hours
92	6 hours
95	4 hours
97	3 hours
100	2 hours
102	1-1/2 hours
105	1 hour
110	1/2 hour
115	1/4 hour

* Although not mandated by OSHA regulations, hearing protectors should be worn whenever noise levels equal or exceed 90 decibels, regardless of exposure duration. People who have experienced a threshold shift in hearing must wear hearing protection when noise exposure is 85 dBA/TWA or above.

Hearing Protective Devices

The quality of protection provided by a hearing protective device is expressed as the noise reduction rating (NRR). The higher the noise reduction rating, the better the device reduces the unwanted noise. Noise reduction ratings range from about 20 to 35, depending on the manufacturer.


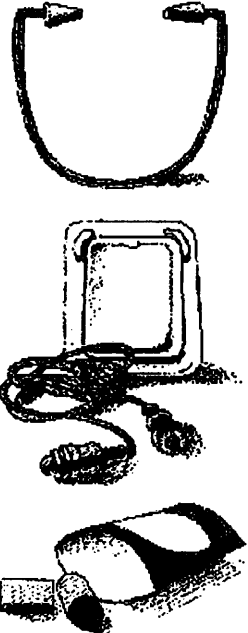
- √ The noise reduction rating can be found on the manufacturer's label or instructions.
- √ Select and use a hearing protective device that has a noise reduction rating that is adequate for the noise hazard. Noise protective devices must reduce noise exposure to at least 90 dBA and at least 85 dBA when a standard threshold shift in hearing has occurred.

There are two main types of hearing protectors:

- √ Ear muffs.
- √ Ear plugs.

<p>Special Note: Employees should contact their supervisor for information on the availability and use of hearing protectors.</p>
--

Advantages, Disadvantages, Fitting and Care of Ear Muffs and Ear Plugs

Type	Advantages	Disadvantages	Fitting	Care
<p style="text-align: center;">Ear Muffs</p> 	<ul style="list-style-type: none"> • Available in different sizes and styles. • Headband can be adjusted for comfort and fit. • Comfortable, easy to wear and to keep clean. • Seldom come loose during workday. 	<ul style="list-style-type: none"> • Obstructions such as eyeglass temple bars and hair can reduce the effectiveness of the seal between the head and the muff cushion. • May interfere with the wearing of other types of personal protective equipment. 	<ul style="list-style-type: none"> • Place over the ear in order to form a good seal between the head and the muff cushion. • The cushion of the muff should fit comfortably, be flexible, and form a good seal. • There should be no interference with temple bars or other obstructions. 	<ul style="list-style-type: none"> • Clean muff cushions with a damp cloth rinsed in mild soapy water. Wipe again with a damp cloth rinsed in clean water. Allow to air dry. • Replace muffs if the cushions become worn or defective. • Store in original container or a clean plastic bag.
<p style="text-align: center;">Ear Plugs</p> 	<ul style="list-style-type: none"> • Inexpensive. • Available in different styles. • Can be worn with any hair style. • Movement of the head is not restricted. • Does not interfere with the wearing of other types of personal protective equipment. • Require little or no maintenance. 	<ul style="list-style-type: none"> • Some people notice a slight wearing discomfort until they become accustomed to the fit. • May work loose. • Must be replaced periodically. • Small and can be lost easily. 	<ul style="list-style-type: none"> • Wash your hands prior to inserting ear plugs. <p>Preformed Plugs:</p> <ul style="list-style-type: none"> • Pull outer ear upward and back. • With opposite hand, insert plug by twisting and pushing until it fits snugly. <p>Expandable foam plugs:</p> <ul style="list-style-type: none"> • Roll plug between thumb and forefinger until completely compressed. • With opposite hand, pull the ear upward and back, then insert the plug until it starts to expand. • Hold finger against the plug until it starts to expand. 	<ul style="list-style-type: none"> • Reusable plugs should be washed after each day's use (use warm soapy water, then rinse and air dry). • Disposable plugs are to be properly discarded when they are dirty. Dirty plugs can cause ear infection.

CUSTOMIZING THE MANUAL

Adding Additional Information

As applicable, employers may customize the manual by adding the following information:

- √ Policies and procedures that pertain to hearing conservation.
- √ List of positions required to wear hearing protectors.
- √ Contract or letter of understanding with local health care provider that will be performing audiometric testing of employees.
- √ Documentation of annual Hearing Conservation Program review.

RECORD OF EMPLOYEE TRAINING FORM

SUMMARY OF APPLICABLE REGULATIONS

Applicable OSHA Regulations

Occupational Safety and Health Administration (OSHA) *General Industry Standards* applicable to this section include, but may not be limited to:

√ 29 CFR 1910.95 Occupational Noise Exposure.

Section 11

Control of Hazardous Energy Sources (Lockout/Tagout)

CONTROL OF HAZARDOUS ENERGY SOURCES (Lockout/Tagout)



Section 11 provides information on the nature and magnitude of hazardous energy sources and lockout/tagout procedures. Lockout/tagout procedures protect workers from accidental startup and unexpected movement when servicing or repairing machinery. It is thus important for all employees to be knowledgeable of and to observe lockout/tagout procedures and restrictions.

Basic Requirements

OSHA Lockout/Tagout Requirements

- √ When servicing or repairing machinery, all hazardous energy sources (e.g., electrical, mechanical, pneumatic, hydraulic or thermal) that are capable of causing death or serious injury must be identified, secured and locked/tagged out in accordance with established procedures.
- √ Lockout/tagout is *not* required for:
 - Work on cord-and-plug-connected equipment when the employee working on the device is in sole control of the cord and plug (e.g., within arm's reach).
 - Hot tap operations performed by qualified employees.
 - Work performed by qualified employees in the vicinity of exposed energized electrical conductors.
 - Routine adjustments and minor tool changes in normal production operations that do not expose employees to hazardous energies.

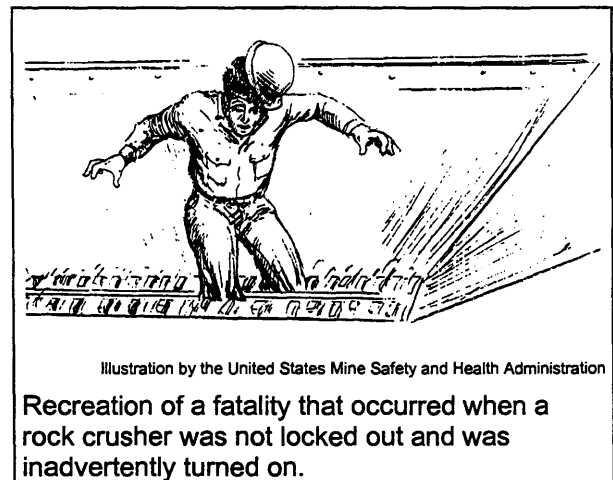


Illustration by the United States Mine Safety and Health Administration

Recreation of a fatality that occurred when a rock crusher was not locked out and was inadvertently turned on.

Special Note: Employees should contact their supervisor for specific questions concerning lockout/tagout procedures and the availability of lockout/tagout hardware and devices.

Summary of Common Hazardous Energy Sources

As summarized on the following table, maintenance operations may involve the identification and control of many different types of hazardous energies.

Source	Energy	Consequences of Failure to Control
Exposed electrical conductors on electric motors, circuits and devices.	Electricity.	Electric shock, thermal burns, electrocution and death.
Mechanical equipment (e.g., pumps, fans, crushers/grinders and conveyors).	Mechanical movement.	Cuts, abrasions, contusions, fractures, dismemberment and death.
Haulage equipment (e.g., dump truck, endloader, backhoe, garbage truck and fork lift).	Hydraulic/mechanical movement.	Cuts, abrasions, contusions, fractures, dismemberment and death; injection of a toxic substance into the body.
Tension/unexpected movement on mechanical equipment (e.g., belts, drag chains and gear drives).	Stored energy.	Cuts, abrasions, contusions, fractures, dismemberment and death.
Compressed air tanks, lines and air powered equipment.	Mechanical movement and stored pressure.	Cuts, abrasions, contusions, fractures, dismemberment and death.
Steam powered equipment and steam lines.	Pressure/thermal.	Thermal burns to skin and respiratory tract, traumatic injuries and death.
Chemical energy (hazardous flows).	Toxic, flammable or reactive substances.	Fire/explosion and exposure to a toxic substance; injury, illness and death.

Duties Established by OSHA for the Control of Hazardous Energy Sources

Employer Duties

Employers must establish a Hazardous Energy Control (Lockout/Tagout) Program to protect employees from unexpected energization, startup, or release of stored energy while servicing or repairing machinery. Key components of the program include:

- √ Written lockout/tagout procedures.
- √ Availability and use of lockout devices and hardware.
- √ Employee training.
- √ Periodic inspections.

Authorized Employees

- √ Employees performing lockout/tagout (authorized employees) have the responsibility to:
- Be in sole control of those hazardous energy sources that they are exposed to while servicing or repairing machinery.
 - Properly identify, secure and lockout/tagout the hazardous energies that they are exposed to while servicing or repairing a machine, device or system.
 - Notify affected employees of the application of a lockout/tagout.



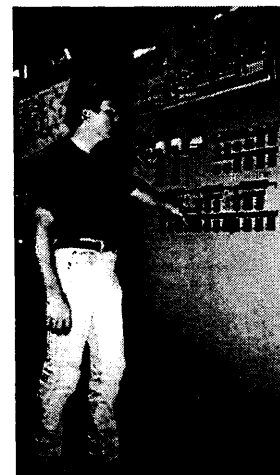
Photograph by David Ballard

Worker repairing a pump that has been locked and tagged out. The worker has affixed personal locks and tags to all hazardous energy sources and is the authorized employee.

FAILURE TO CONTROL ALL HAZARDOUS ENERGY SOURCES WHEN SERVICING OR REPAIRING MACHINERY CAN RESULT IN EXPOSURE TO IMMINENT DANGER.

Affected Employees

- √ Employees working around machinery that has been locked/tagged out (affected employees) have a responsibility to *not*:
- Attempt to operate any energy-isolating device that has been locked out or tagged out.
 - Remove, deface or tamper with any lockout/tagout device.



Photograph by David Ballard

Worker operating water treatment equipment. Machine operators are the most frequently affected employees.

Lockout Devices and Hardware

- √ Locks and tags must:
- Be durable, substantial, standardized and identifiable.
 - Tags must be attached with nylon cable ties.
 - Tags must be of the plastic-coated type when exposed to the elements.
 - Locks must be of sufficient strength to prevent accidental removal.
 - Locks/tags must convey an appropriate warning and the identity of the employee using the device.
- √ Locks and tags used to control hazardous energy sources must *not* be used for other purposes.



Basic Lockout/Tagout Procedure

Special Note: This section describes a “generic” lockout/tagout procedure. Employees should contact their supervisor for additional information on equipment-specific lockout/tagout procedures.

The following basic procedure must be used to apply a lockout.

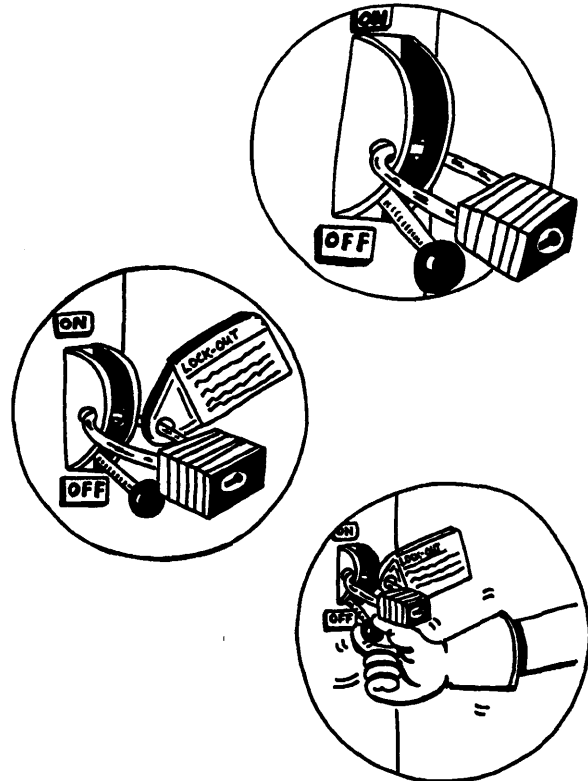
- √ Planning and preparation.
 - If there is an Equipment-Specific Lockout Procedure on file, obtain a copy and review.
 - If an equipment-specific procedure does not exist, complete a Lockout Procedure/Work Plan for the piece of equipment.
 - Identify all energy sources and isolating devices.
 - Complex systems may involve more than one energy. Complex shutdowns and isolations should always be done with assistance. If there are any questions, do *not* take any actions until it is certain that the correct energy-isolating device has been identified.

- √ Notify all employees affected by the lockout/tagout.

- √ Shut down the machine or system by normal operating switches/controls.

- √ Isolate the machine or system by operating energy-isolating devices (e.g., opening electrical disconnects and closing valves.)

- √ Affix locks and tags to all energy-isolating devices. Tags must identify the employee(s) protected by the lockout/tagout and the date that the lockout/tagout was applied.

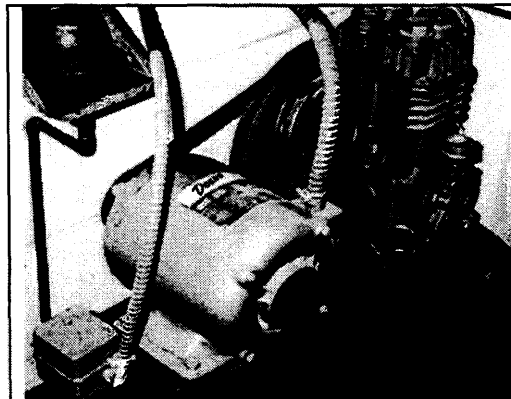


- √ Reduce machine or system to a zero energy state. For example:
 - Discharge capacitors on electrical equipment.
 - Vent and drain pressurized fluids and gases.
 - Cool hot lines equipment.
 - Block machinery that could move, rotate or fall.
 - Ground electrical lines/equipment.
- √ Verify that the piece of equipment has been properly de-energized and isolated from all hazardous energy sources.
 - Verification may be done by electrical test instruments, visual inspection of vents/drains, or by attempting to operate the piece of equipment from its normal operating switch.
- √ Perform work using appropriate safety procedures.

Returning Equipment to Normal Service

The following basic procedure must be followed when clearing a lockout/tagout.

- √ When maintenance or servicing has been completed, or when it is necessary to energize the equipment for testing, checks must be completed before the equipment is re-energized and the lockout cleared. Check to ensure that:
 - All remote control stations are in OFF or NEUTRAL position.
 - All devices positioned to dissipate stored energy are re-positioned as necessary for normal start-up.
 - The job site is secure and the equipment is ready to be energized.
 - Maintenance personnel have a specific duty to ensure that electrical faceplates, equipment guards and similar devices are properly replaced before a piece of equipment or machine is released for normal operation.



Photograph by David Ballard

Missing belt guard on an air compressor. Missing guards and covers can result in serious injuries.

- All affected personnel are informed that the equipment is to be re-energized and are stationed at a safe location.

√ After ensuring that the equipment can be safely energized and that all personnel are clear, remove the lockout locks and tags and energize the equipment using normal operating procedures.

Tagout

Tagouts may only be used when a machine, device or system is physically incapable of accepting a locking device. Tagouts must provide the same level of employee protection as locking devices and must be accomplished in accordance with the following basic procedure:

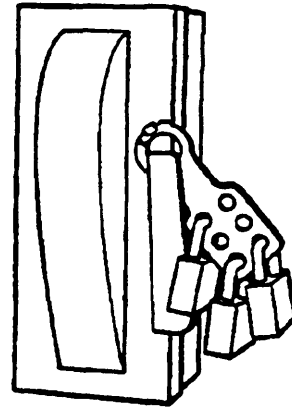
- √ Tagouts must be accomplished with a properly executed Lockout Procedure/Work Plan that states that a tagout is being applied.
- √ Tagouts must comply with the basic lockout procedure.
- √ Tags must be viewed as a warning device only.
- √ All tags must be affixed at the same location that a lock would be applied.
- √ All affected employees must be briefed on the safety significance of the tags.
- √ Additional safety precautions must be taken to isolate the equipment and prevent accidental energization when tags are used. Acceptable methods of isolating the equipment being tagged out include:
 - Removing a circuit breaker.
 - Blocking a switch in the open position.
 - Opening a second disconnecting device.
 - Removing a valve handle.
 - Stationing a safety observer at the energy-isolating device.

Group Lockout/Tagout Procedures

Each employee servicing or repairing a machine device or system must be protected from all hazardous energy sources that they are exposed to by their own locks and tags. In such situations, group lockout/tagout procedures utilizing either multiple hasp devices or key lock boxes must be used.

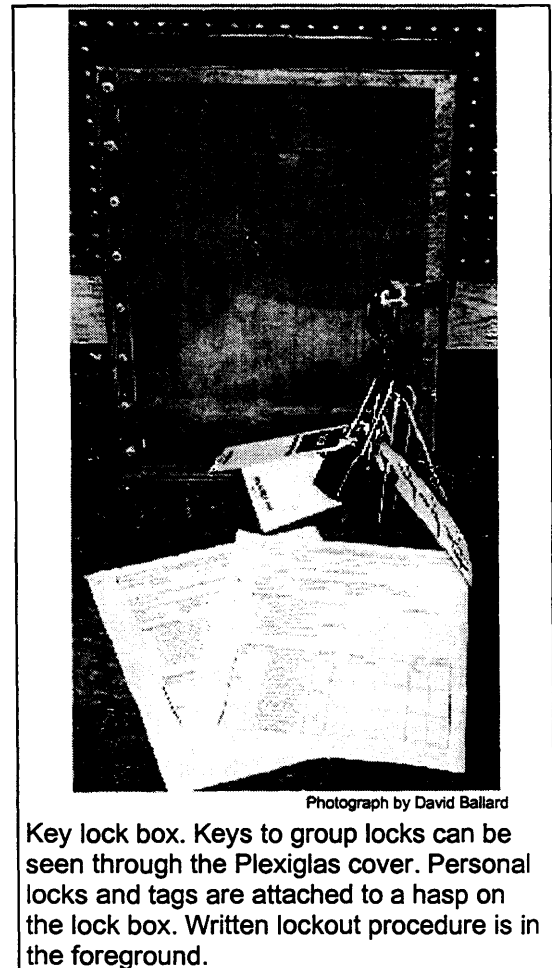
Multiple Lock Devices

- √ A device capable of accepting multiple locks must be attached to each energy-isolating device.
- √ Each employee working on the machine, device or system must attach their personal lock and tag to the multiple lock device.



Key Lock Box

- √ A group leader must be designated (and identified on the Lockout Procedure/Work Plan) to coordinate the lockout/tagout.
- √ The group leader applies a group lock and tag to each energy-isolating device.
- √ The keys to the group locks are placed in a key lock box.
- √ Each employee working on the equipment places their personal lock and tag on the key lock box.
 - Each employee must verify that all hazardous energy sources have been identified and locked out before affixing their personal lock to the key lock box.
 - Each employee is responsible for applying and releasing their personal locks from the key lock box.



Key lock box. Keys to group locks can be seen through the Plexiglas cover. Personal locks and tags are attached to a hasp on the lock box. Written lockout procedure is in the foreground.

Working with Outside Contractors

Extra care and caution must be taken when working with the employees of an outside contractor. Although the employees of an outside contractor are responsible for affixing personal locks and tags, the host employer's project manager has a duty to assist them in identifying and properly securing hazardous energy sources.

Transference of a Lockout/Tagout

If a lockout must be transferred because of shift changes or scheduled absences, it is the responsibility of the employees involved to coordinate the continuity of the lockout/tagout.

- √ Transference may be accomplished by transferring the key to the lock rather than by removing the existing locking device.
 - The transference must be recorded on the Lockout Procedure/Work Plan and on all tags.
 - All affected employees must be notified of the transference.
- √ If an employee will be on scheduled leave, any attached personal locks and tags should be transferred or removed.

Removal of a Lockout in a Person's Absence

The following actions must be taken before another person's locks and tags are removed. A supervisor must:

- √ Verify that the employee is *not* on the premises.
- √ Verify that the equipment can be safely energized.
- √ Record that the person's lockout was removed on the Lockout Procedure/Work Plan.
- √ Inform the employee upon return that their lock was removed.

CUSTOMIZING THE MANUAL

Adding Additional Information

As applicable, employers may customize the manual by adding the following information:

- √ Policies and procedures that pertain to lockout/tagout.
- √ Policies and procedures that pertain to electrical live line work and hot tap operations.
- √ List of authorized employees.
- √ Equipment-specific lockout procedures (this is only feasible when the workplace contains relatively few machines).
- √ Documentation of annual evaluation and review of lockout/tagout procedures.

Sample Forms

This section contains the following sample form:

- √ Lockout Procedure/Work Plan.

LOCKOUT PROCEDURE/WORK PLAN

Equipment: _____ Location: _____
 Work Scope: _____
 Contact Person: _____

Energy/Flow to be Controlled (Cross off those that DO NOT Apply)

Steam	Natural Gas	Moving Parts	Chemicals
Electric Power	Compressed Air	Pneumatic	_____
Control Power	Water	Hydraulic	_____

Lockout Checklist

- Review procedure or complete a Lockout/Procedure/Work Plan
- Identify all energy sources
- Notify affected employees
- Shut down the equipment
- Isolate the equipment
- Apply lockout devices
- Reduce equipment to a zero energy state
- Verify equipment isolation
- Perform task
- Return equipment to service

Lockout Points

Hazard	Action Required	Lock #	Name	Locks On	Locks Off

(front)

Lockout Points (Continued)

Hazard	Action Required	Lock #	Name	Locks On	Locks Off

Group Lockout

Group Lockout Leader: _____

Employees Operating Under a Group Lockout:

Lock Number	Name	Date Affixed	Date Removed

Periodic Inspection Section

Inspection Performed By: _____ **Date:** _____

Satisfactory

Modifications Made:

RECORD OF EMPLOYEE TRAINING FORM

SUMMARY OF APPLICABLE REGULATIONS

Applicable OSHA Regulations

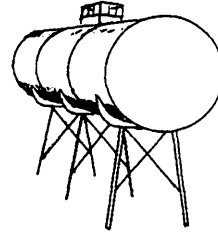
Occupational Safety and Health Administration (OSHA) General Industry Standards applicable to this section include, but may not be limited to:

- √ 29 CFR 1910.147 The Control of Hazardous Energy (lockout/tagout).
- √ 29 CFR 1910.269 Electric Power Generation, Transmission and Distribution.
- √ 29 CFR 1910.333 Selection and Use of Work Practices.
- √ 29 CFR 1910.272 Grain Handling Facilities.

Section 12

Permit-Required Confined Spaces

PERMIT-REQUIRED CONFINED SPACES



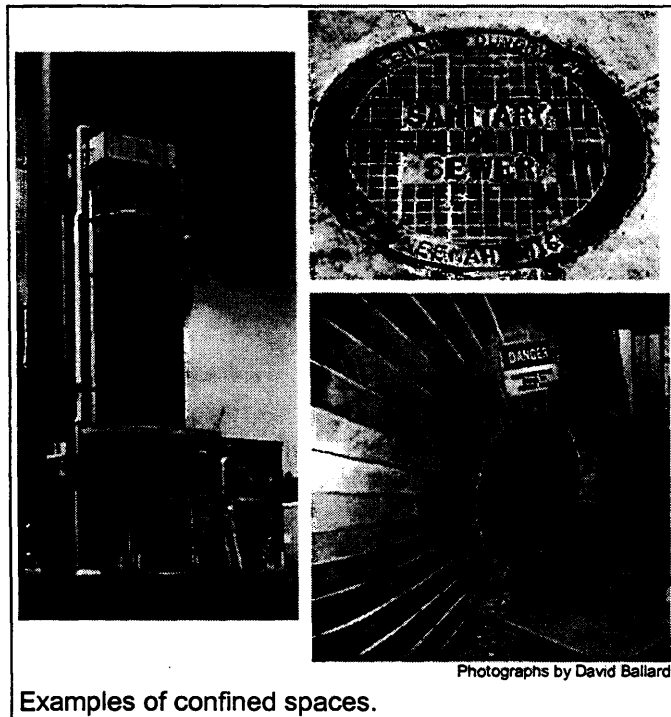
Section 12 provides information on confined space hazards and entry procedures. Confined spaces are potentially hazardous to enter and require special precautions and entry procedures. Consequently all employees must be knowledgeable of and observe established procedures and restrictions when working around or entering confined spaces.

Definitions

Confined Space

The Occupational Safety and Health Administration (OSHA) defines a confined space as any vessel or enclosure that:

- √ Is large enough and so configured that an employee can bodily enter and perform assigned work; *and*
- √ Has limited or restricted means for entry or exit (for example, tanks, vessels, silos, storage bins, hoppers, vaults, and pits are spaces that may have limited means of entry); *and*
- √ Is *not* designed for continuous employee occupancy.



Examples of confined spaces.

Photographs by David Ballard

Permit Required Confined Space

The Occupational Safety and Health Administration (OSHA) defines a permit-required confined space as a confined space that:

- √ Contains or has a potential to contain a hazardous atmosphere (e.g., oxygen-deficient, oxygen-enriched, flammable or toxic);
- √ Contains a material that has the potential for engulfing an entrant (e.g., sand, coal or grain);
- √ Has an internal configuration such that an entrant could be trapped or asphyxiated by inwardly converging walls or by a floor which slopes downward and tapers to a smaller cross-section; (e.g., conveyor hoppers) or
- √ Contains any other recognized safety or health hazard that is capable of causing death or serious injury (e.g., hazardous chemical residue, moving machinery, exposed energized electrical conductors, and/or lines that discharge into the space).



Illustration by the United States Mine Safety and Health Administration

Recreation of a confined space fatality that resulted from engulfment in a sand hopper.

Special Note: Employees should contact their supervisor for information on the identity and location of confined spaces in the workplace.

Non-Permit Confined Space

A non-permit confined space is a vessel or enclosure that does not contain or have the potential to contain permit-required confined space hazards.

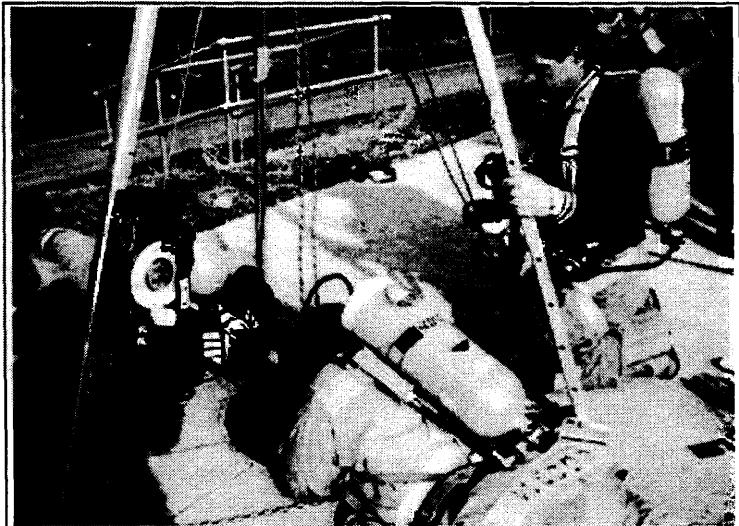
Confined Space Entry

The Occupational Safety and Health Administration (OSHA) defines confined space entry to occur when any part of the entrant's body breaks the plane of an opening into the space.

Facts From OSHA Investigations

Investigations of fatal confined space accidents conducted by the Occupational Safety and Health Administration (OSHA) reveal the following facts:

- √ Hazardous atmospheres are involved in the majority of confined space fatalities (approximately 60 to 70 percent). Conditions responsible for the fatalities most frequently involved oxygen deficiency or the presence of such common hazardous gases as methane, carbon monoxide or hydrogen sulfide. (Refer to table on next page.)
- √ Internal confined space rescues are technically difficult and require specialized equipment and trained rescuers. Unplanned rescues attempted by untrained coworkers most often result in additional injuries or deaths.



Photograph by David Ballard

Photograph of a simulated internal confined space rescue taken at the Iowa Fire Service Institute, Iowa State University.

FAILURE TO OBSERVE CONFINED SPACE ENTRY PROCEDURES AND RESTRICTIONS CAN RESULT IN EXPOSURE TO IMMINENT DANGER.

Hazardous Atmospheres Frequently Associated with C.S. Fatalities

The following table summarizes the properties of hazardous atmospheres frequently associated with confined space fatalities.

Oxygen Deficiency	Oxygen deficiency results from the displacement of normal atmospheric oxygen by other gases that do not support respiration.	
Percent Oxygen	Effects	
23.5%	Maximum permissible oxygen level (OSHA).	
20.9%	Normal atmospheric oxygen level.	
19.5%	Minimum permissible oxygen level (OSHA).	
15% to 19%	Decreased ability to perform strenuous work. May impair coordination and may induce early symptoms of oxygen deprivation in persons with coronary, pulmonary or circulatory problems.	
12% to 15%	Respiration and pulse increase with exertion. Impaired coordination, perception and judgment.	
10% to 12%	Respiration increases in depth and rate. Poor judgment. Lips turn blue.	
8% to 12%	Mental failure, fainting, unconsciousness, ashen face, blueness of lips, nausea and vomiting.	
6% to 8%	8 minutes — 100% fatal. 6 minutes — 50% fatal. 4 to 5 minutes — recovery with treatment.	
4% to 6%	Coma in 40 seconds, convulsions, respiration ceases and death.	
Carbon Monoxide	Carbon monoxide is a very dangerous chemical asphyxiant that is both odorless and colorless. Carbon monoxide is produced by combustion and organic decomposition processes.	
Concentration	Effects	Time
50 ppm	OSHA permissible exposure limit (PEL) as averaged over an eight-hour workday.	8 hours
200 ppm	Slight headache and discomfort.	3 hours
400 ppm	Headache and discomfort.	2 hours
600 ppm	Headache and discomfort.	1 hour
1000 to 2000 ppm	Confusion, headache and nausea.	2 hours
1000 to 2000 ppm	Slight palpation of the heart.	1.5 hours
2000 to 2500 ppm	Unconsciousness	30 minutes
4000 ppm	Fatal	30 minutes
12% to 75% in atmosphere	Flammable. Will ignite and burn or explode.	
Hydrogen Sulfide	Hydrogen sulfide is a very dangerous toxic gas. At low concentrations hydrogen sulfide has a "rotten egg" odor and causes eye and respiratory tract irritation. Higher concentrations cause olfactory fatigue and respiratory paralysis. Hydrogen sulfide is frequently produced during organic decomposition.	
Concentration	Effects	Time
10 ppm	OSHA permissible exposure limit (PEL) as averaged over an eight-hour workday.	8 hours
50 to 100 ppm	Mild eye and respiratory tract irritation.	1 hour
200 to 300 ppm	Marked eye and respiratory tract irritation.	1 hour
500 to 700 ppm	Unconsciousness and death.	1/2 to 1 hour
1000 ppm or more	Unconsciousness and death.	minutes
4.3% to 45% in atmosphere	Flammable. Will ignite and burn or explode.	
Methane	Methane is a flammable gas and a simple asphyxiant. It is the principal component of natural gas and is also a frequent product of organic decomposition. Methane is odorless. Natural gas has an odorant added.	
Concentration	Effects	
5% to 15% in atmosphere	Flammable. Will ignite and burn or explode.	

OSHA Established Duties for Permit-Required Confined Space Entry

To protect employee health and safety, the Occupational Safety and Health Administration (OSHA) has established specific duties and responsibilities for:

- √ Employers.
- √ Confined space entry supervisors.
- √ Confined space entrants.
- √ Confined space attendants.

Employers

All employers must:

- √ Survey their workplaces to identify all confined spaces.
- √ Evaluate the hazards associated with each confined space to identify permit-required confined spaces.

If the workplace contains permit-required confined spaces employers must:

- √ Post signs near permit-required confined spaces (or otherwise identify permit-required confined spaces) to notify employees of hazards and that entry must be authorized.
- √ Establish a written Permit-Required Confined Space Entry Program.
- √ Require the use of Entry Permits.
- √ Establish permit-required confined spaces entry procedures
- √ Prevent unauthorized entry into permit-required confined spaces.
- √ Provide information and training to confined space entry supervisors, entrants and attendants.
- √ Provide permit-required confined space entry equipment.
- √ Provide outside contractors with information on confined space hazards and entry procedures when their employees must enter permit-required confined spaces.
 - Debrief contractors at the conclusion of permit-required confined space work.

- Coordinate entries when the employees of both employers must enter a permit-required confined space.

√ Prepare for confined space emergencies by either:

- Training and equipping an in-house rescue team or
- Contracting with an appropriately trained and equipped local emergency response agency.

<p>Instructions: Customize manual by identifying the organization designated to provide confined space rescue services.</p>	
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<p>Special Note: Employers have a specific regulatory duty to ensure that in-house confined space rescue teams and local emergency response organizations designated to provide confined space rescue services are appropriately trained and equipped and can respond in a timely fashion. Simply designating the local fire department does not ensure the availability of a qualified rescue team or achieve regulatory compliance. Affected employers should refer to the OSHA Permit-Required Confined Space regulation and confer with their local emergency response services for additional information and assistance.</p>

Permit-Required Confined Space Entry Supervisors

Entry supervisors are responsible for authorizing permit-required confined space entries. Entry supervisors must:

- √ Be knowledgeable of permit-required confined space hazards and entry procedures.
- √ Authorize entries by completing entry permits and specifying conditions of entry.
- √ Verify that conditions of entry are *not* violated.
- √ Certify hazard elimination when a permit-required confined space is reclassified to a non-permit confined space.
- √ Review and cancel entry permits.

Permit-Required Confined Space Entrants

Permit-required confined space entrants must:

- √ Be knowledgeable of permit-required confined space hazards and entry procedures.
- √ Enter permit-required confined spaces in accordance with conditions specified on the entry permit.
- √ Properly inspect and use confined space entry equipment.
- √ Verify hazard control before entering permit-required confined spaces.
- √ Maintain communication with the attendant.
- √ Evacuate the space when:
 - Instructed to do so by the attendant.
 - A hazard is observed or perceived.
 - Entry conditions are violated.
- √ Notify the attendant when a permit-required confined space is being evacuated because of a hazardous condition.

Permit-Required Confined Space Attendants

Confined space attendants have three principal duties:

- √ The first principal duty of an attendant is to protect the health and safety of confined space entrants. To fulfill this duty attendants must:
 - Be knowledgeable of permit-required confined space hazards and entry procedures.
 - Remain at duty station unless properly relieved.
 - Keep a continuous and accurate count of confined space entrants.
 - Maintain effective communications with confined space entrants.
 - Monitor conditions of entry.
 - Ward off unauthorized entrants.

√

The second principal duty of an attendant is to order an evacuation of a permit-required confined space. To fulfill this duty, attendants must order an evacuation of a permit-required confined space when:

- A non-permitted condition is observed.
- Behavioral changes are observed in the entrants.
- A situation outside of the confined space might endanger the entrants.
- A serious hazard is observed in the space.
- Attention must be given to the rescue of personnel from another permit-required confined space.
- The attendant cannot remain at his/her duty station.

√

The third principal duty of an attendant is to initiate the employer's emergency action plan in the event of a confined space emergency.

- The attendant's primary role is to summon assistance and to initiate external rescue procedures (when appropriate and so equipped).
- The attendant must be prepared to provide pertinent information to the rescue team.
- The attendant must *not* enter the space or attempt an unassisted internal rescue.



Basic Requirements for Entering a Permit-Required Confined Space

√

Entry must be planned and authorized by the completion of an entry permit.

√

All hazards must be identified and controlled by:

- Isolating the confined space through lockout/tagout procedures.
- Purging and flushing.
- Atmospheric testing.
- Ventilation.
- Barricades and guards.
- Personal protective equipment.

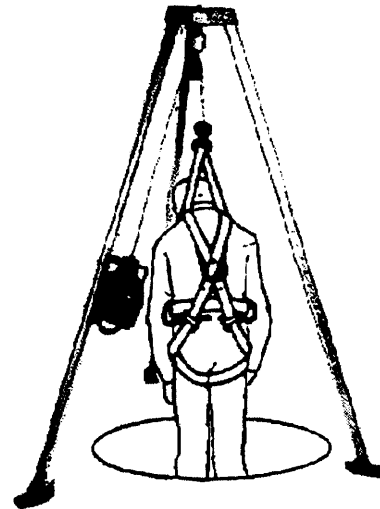


√ Conditions of entry must be satisfied:

Condition	Minimum Requirements
Oxygen	Minimum 19.5% and maximum 23.5%.
Flammable gases	No greater than 10% of lower flammability limit (LEL).
Hydrogen sulfide (H ₂ S)	No greater than 10 parts per million (ppm).
Carbon monoxide (CO)	No greater than 50 parts per million (ppm).
Other toxic substances	No greater than substance's permissible exposure limit (PEL).
Flammable dusts	Must not reduce visibility to 5 feet or less.
Engulfment hazards	No engulfment hazard may be present.
Hazardous flows	Must be secured and locked/tagged out.
Hazardous energies	Must be secured and locked/tagged out.
External hazards	External hazards must be controlled.

√ Entrants must wear retrieval equipment unless the use of retrieval equipment would increase the overall risk of entry or would not contribute to the rescue of the entrant.

- Retrieval equipment must include a full body harness attached to a retrieval line. The opposite end of the retrieval line must be fastened at a point on the exterior of space.
- The retrieval line must be connected to a mechanical lifting device designed for human lifting when the space is deeper than five feet.



√ Attendant must be stationed at opening.

√ Rescue team must be available.

Testing a Confined Space for the Presence of a Hazardous Atmosphere

√ Select a properly calibrated air testing device that is capable of detecting potential air contaminants within the space.

√ Check the instrument's calibration as per the manufacturer's instructions before each day's use, more often as deemed necessary.

√ When using separate instruments, check the atmosphere in the following order:

1. Oxygen.
2. Flammable gases.
3. Toxic substances.

- √ Check the confined space atmosphere before entry is made and then periodically during the entry.
- √ Always perform air tests before ventilating a confined space.
- √ Slowly check the entire depth of the space. Some hazardous gases are lighter than air and will be near the top (e.g., methane) while other hazardous gases are heavier than air and will be near the bottom (e.g., hydrogen sulfide).
- √ Record initial results on permit.



Photograph by David Ballard

Worker testing the atmosphere in a fifteen feet deep valve pit with a four-gas monitor. The bottom of the pit was found to contain only 9 percent oxygen.

Special Note: All persons entering a confined space have the right to observe and see the results of air testing.

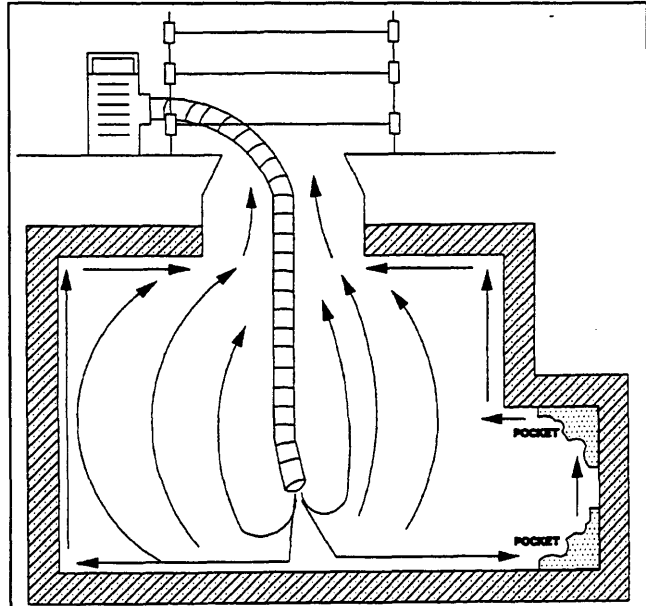
Ventilating a Confined Space

- √ Confined spaces must be ventilated to:
 - Control a hazardous atmosphere that has been detected through air testing.
 - Reduce high temperatures.
 - Improve environmental conditions.
- √ Provide ventilation by discharging clean fresh air into the space.
 - *Never* use pure oxygen.
 - Discharging air into the space is more efficient than exhausting air from the space. (Fans used to exhaust a flammable atmosphere must be explosion proof.)
- √ Place the blower so that vehicle exhaust and/or air discharged from the space does *not* enter the blower intake.

√

Ventilate the entire space.

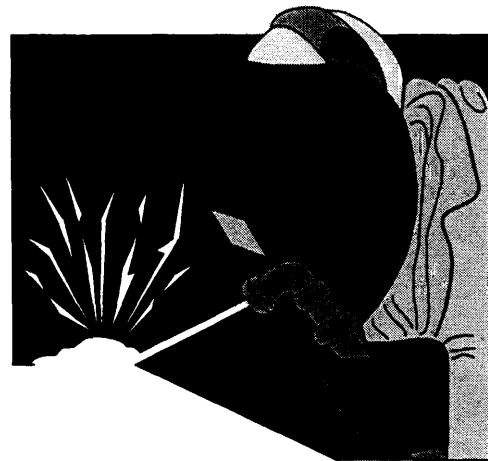
- Use a blower of sufficient capacity.
- Allow sufficient time for complete ventilation.
- Create turbulence by discharging air into corners so as to ventilate the entire space.



When ventilating a confined space, move the discharge hose and create turbulence to ventilate the space. As shown in the illustration, dangerous gas pockets can remain when air is simply discharged into the space.

Hot Work

Hot work includes such activities as welding, cutting or brazing. Additional precautions must be taken when hot work is performed in a confined space. Hot work must be authorized on either the entry permit or a separate hot work permit. The following precautions must be observed when hot work is performed in a confined space:



√

Local exhaust of welding fumes and continuous air monitoring must be provided.

- Suitable respirators must be worn when ventilation alone cannot reduce harmful air contaminants to acceptable levels.

√

All welders and helpers must wear retrieval equipment and suitable personal protective equipment.

√

An attendant with a preplanned rescue procedure must be stationed outside to observe the welder at all times and be capable of putting rescue operations into effect.

- √ Oxygen and fuel gas cylinders must be positioned on the exterior of the confined space.
- √ Oxygen must *never* be used to ventilate a confined space.
- √ When welding operations are suspended for more than a few minutes (e.g., over lunch):
 - Welding gas hoses must be withdrawn from the space and cylinder valves must be closed.
 - Electric arc welding cables must be withdrawn from the space and the welder must be disconnected from its power source.

Use of Chemical Products in Confined Spaces

Extra care must be taken when chemical products are used in confined spaces. Such common products as adhesives, paints, solvents and cleaners have the potential to create a very toxic and/or flammable atmosphere within a poorly ventilated confined space. Review material safety data sheets (MSDSs) carefully, use only as directed and take special precautions such as:

- √ Providing additional ventilation.
- √ Providing for continuous air monitoring.
- √ Using suitable personal protective equipment as specified on the product's material safety data sheet (MSDS).
- √ Remaining alert for any signs or symptoms of chemical overexposure and immediately evacuating the space when hazard is detected or perceived.

Working with Outside Contractors

Employees must take extra care when entering a permit-required confined space with the employees of an outside contractor. The host employer's project manager must ensure that the entry is coordinated with all affected employees and that the contractor's employees are informed of:

- √ Hazards associated with the confined space to be entered.
- √ In-house entry procedures and restrictions.
- √ In-house emergency procedures.

Special Note: Outside contractors are responsible for protecting the health and safety of their employees when they enter a host employer's permit-required confined space. Outside contractors are therefore obligated to have their own Permit-Required Confined Space Entry Program or observe the host employer's procedures and restrictions.

Basic Requirements for Entry into Non-Permit Confined Spaces

- √ Verify that the space does not contain permit hazards by:
 - Assessing existing conditions to ensure that abnormal conditions have *not* developed.
 - Conducting appropriate air tests to ensure that a hazardous atmosphere has *not* developed.
 - Evaluating the work to be performed to ensure that the work will *not* introduce serious hazards.

Don't take chances. If something doesn't look safe, it probably isn't safe. Upgrade the space to permit-required and enter as per permit-required procedures.

- √ If the space is proven not to contain permit hazards, it may be entered without:
 - A permit.
 - An attendant.
 - Retrieval equipment.
- √ Perform work safely and remain alert for hazards.
- √ Immediately evacuate the space (and upgrade to permit-required) if a serious hazard is observed or perceived.

Basic Requirements for Reclassifying a Permit-Required Space

- √ A permit-required confined space may be reclassified to non-permit for a specific entry if all of the following conditions are satisfied:
 - All permit hazards (e.g., hazards capable of causing death or serious injury) must be *eliminated*. If entry is required to eliminate permit hazards, the space must be entered as per permit-required procedures.
 - The work must *not* introduce serious hazards.

- √ Hazard elimination must be certified in writing on the permit.
- √ If all permit hazards are eliminated, a permit-required confined space may be reclassified to non-permit and entered without:
 - A permit.
 - An attendant.
 - Retrieval equipment.
- √ If permit hazards are observed or perceived the space must be:
 - Immediately evacuated.
 - Upgraded to a permit-required confined space until all permit hazards have been eliminated.

CUSTOMIZING THE MANUAL

Adding Additional Information

As applicable, employers may customize the manual by adding the following information:

- √ Confined space-specific entry procedures.
- √ List of suitably trained confined space entry supervisors, entrants and attendants.
- √ Letter of agreement (or contract) with rescue service.
- √ Documentation of annual Permit-Required Confined Space Entry Program review.

Sample Forms

This section contains the following sample forms:

- √ Confined Space Entry Permit.
- √ Pre-Entry Checklist For Non-Permit Confined Spaces.

RECORD OF EMPLOYEE TRAINING FORM

SUMMARY OF APPLICABLE REGULATIONS

Applicable OSHA Regulations

Occupational Safety and Health Administration (OSHA) *General Industry Standards* applicable to this section include, but may not be limited to:

- | | | |
|---|-----------------|--|
| √ | 29 CFR 1910.119 | Process Safety Management of Highly Hazardous Chemicals. |
| √ | 29 CFR 1919.252 | Welding and Cutting — General Requirements. |
| √ | 29 CFR 1910.146 | Permit-Required Confined Spaces. |
| √ | 29 CFR 1910.268 | Telecommunications. |
| √ | 29 CFR 1910.269 | Electric Power Generation, Transmission, and Distribution. |
| √ | 29 CFR 1910.272 | Grain Handling Facilities. |

Section 13

Bloodborne Pathogens

BLOODBORNE PATHOGENS

(Infection Control Procedures and Practices)



Section 13 provides basic information on bloodborne pathogens, including disease transmission and universal precautions. Exposure to blood and certain other body fluids can result in serious illness. It is therefore important for all employees to recognize and protect themselves from potentially infectious material.

OSHA Established Employer Duties

The Occupational Safety and Health Administration (OSHA) requires employers with employees that have a “reasonably anticipated” occupational exposure to blood and other potentially infectious materials as part of their assigned job duties to implement a written Exposure Control Plan.

Special Note: The OSHA standard is applicable to employees in the workplace that have a duty to provide first aid/CPR but does *not* apply to good samaritan acts.

An Exposure Control Plan must include the following elements:

- √ Exposure determination.
 - List of job classifications where all employees have an occupational exposure based on assigned job duties.
 - List of job classifications where some employees have an occupational exposure based on the performance of certain tasks.



- √ Methods of compliance.
 - Engineering and work practice controls.
 - Selection, care and use of personal protective equipment.
 - Housekeeping.
- √ Post-exposure evaluation and medical follow-up procedures.
- √ Hepatitis B vaccinations must be offered at no cost to affected employees.
- √ Communication of hazards.
 - Signs, labels and tags.
 - Employee information and training.
- √ Recordkeeping.
 - Medical records.
 - Training records.
- √ Annual review and update.

Special Note: The OSHA standard also contains special provisions for HIV and hepatitis research laboratories.

EXPOSURE DETERMINATION

Job Titles For Which <i>All</i> Employees Have Exposure Potential			Job Titles For Which <i>Some</i> Employees Have Exposure Potential		
Position	Duties Involving Potential Exposure	Names of Employees Performing Those Duties	Position	Duties Involving Potential Exposure	Names of Employees Performing Those Duties

Instructions: Customize manual by identifying positions that have an occupational exposure to bloodborne pathogens, the source of the exposure, and the names of employees in the job classification. Prepare copies of the form as required.

Bloodborne Pathogens

Bloodborne pathogens are disease causing microorganisms that are transmitted by blood and certain other body fluids (e.g., semen, vaginal secretions, cerebrospinal fluid, synovial fluid, pleural fluid, pericardial fluid, peritoneal fluid, amniotic fluid, saliva in dental procedures, any body fluid visually contaminated with blood, and all body fluids in situations where it is difficult or impossible to differentiate between body fluids). Although there are a variety of harmful bloodborne pathogens, the hepatitis B virus (HBV) and human immunodeficiency virus (HIV) are the most common and generate the greatest concern.

Hepatitis B Virus (HBV)

Hepatitis means "inflammation of the liver," and, as its name implies, hepatitis B is a virus that infects the liver. While it initially may result in inflammation of the liver, it can lead to more serious conditions such as cirrhosis and liver cancer.

In the United States, approximately 300,000 people are infected with HBV annually. Of these cases, a small percentage are fatal.

There is no "cure" or specific treatment for HBV, but many people who contract the disease will develop antibodies which help them get over the infection and protect them from getting it again. Those who do not will become "carriers," or people who will carry the infection for life. It is important to note, however, that there are different kinds of hepatitis, so infection with HBV will *not* stop someone from getting another type.

After exposure to HBV it can take one to nine months before symptoms become noticeable, if at all. The symptoms of HBV are very much like a mild "flu." Initially there is a sense of fatigue, possible stomach pain, loss of appetite, and even nausea. As the disease continues to develop, jaundice (a distinct yellowing of the skin and eyes) and a darkened urine will often occur. However, people who are infected with HBV will often show no symptoms for some time. Loss of appetite and stomach pain, for example, commonly appear within one to three months, but can occur as soon as two weeks or as long as six to nine months after infection.

Human Immunodeficiency Virus (HIV)

AIDS, or acquired immune deficiency syndrome, is caused by a virus called the human immunodeficiency virus, or HIV.

Estimates on the number of people infected with HIV vary, but some estimates suggest that an average of 35,000 people are infected every year. By the year 2002, it is possible that two to nine percent of the American population will be infected, or 5 to 15 million people. Many people who are infected with HIV may be completely unaware of it.

Once a person has been infected with HIV, it may be many years before AIDS actually develops. HIV attacks the body's immune system, weakening it so that it cannot fight other deadly diseases. AIDS is a fatal disease, and while treatment for it is improving, there is no known cure.

AIDS infection essentially occurs in three broad stages. The first stage happens when a person is actually infected with HIV. After the initial infection, a person may show few or no signs of illness for many years. Eventually, in the second stage, an individual may begin to suffer swollen lymph glands or other lesser diseases which begin to take advantage of the body's weakened immune system. The second stage is believed to eventually lead to AIDS, the third and final stage, in all cases. In this stage, the body becomes completely unable to fight off life-threatening diseases and infections. Symptoms of HIV infection can vary, but often include weakness, fever, sore throat, nausea, headaches, diarrhea, a white coating on the tongue, weight loss, and swollen lymph glands.

Transmission of HIV and HBV

HIV and HBV may be transmitted:

- √ By sexual contact.
- √ By sharing hypodermic needles.
- √ From mothers to their babies at or before birth.
- √ By accidental puncture from contaminated needles, broken glass, or other sharp items.
- √ By contact between broken or damaged skin and infected body fluids.
- √ By contact between mucous membranes and infected body fluids.

HIV and HBV are *not* transmitted by touching or working around people who carry the disease.

In most work or laboratory situations, transmission is most likely to occur through blood-to-blood contact. In other words, infected blood somehow comes into contact with another person's blood (e.g., through open sores, cuts, abrasions, acne, or any sort of damaged or broken skin).

Cutting or puncturing yourself on a contaminated needle or piece of glass can result in blood-to-blood contact with the potential for transmission of bloodborne pathogens. Bloodborne pathogens can also be transmitted through the mucous membranes of the eyes, nose, and mouth. A splash of contaminated blood or body fluids to the eyes can result in transmission.

Special Note: Employees should contact a medical professional for specific questions concerning HIV and HBV.

Universal Precautions

Universal precautions is the name for a prevention strategy in which all blood and potentially infectious materials are treated as if they are, in fact, infectious, regardless of the perceived status of the source individual. In other words, whether or not you think the blood/body fluid is infected with bloodborne pathogens, you treat it as if it is. This approach is used in all situations where exposure to blood or potentially infectious materials is possible. This also means that certain engineering and work practice controls must always be utilized in situations where exposure may occur.

Personal Protective Equipment

The most important thing to do in any situation where the employee may be exposed to bloodborne pathogens is to ensure that he or she is wearing the appropriate personal protective equipment (PPE). For example, emergency medical personnel, doctors, nurses, dentists, dental assistants, and other health care providers all wear vinyl or latex gloves. This is a simple precaution that should be used in order to prevent blood or potentially infectious body fluids from making contact with the skin. Again, if a person has sores, cuts, or rashes, bloodborne pathogens could be transmitted through these gaps in the barrier of the skin. To protect the worker, it is essential to have an impervious barrier between him/her and the potentially infectious material.

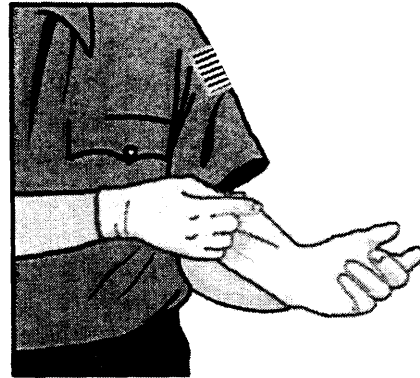
Rules for employees to follow:

- √ Always wear personal protective equipment in potential exposure situations.
- √ Remove and replace PPE that is torn or punctured, or that loses its ability to function as a barrier to bloodborne pathogens.
- √ Remove PPE before leaving the work area.

If an employee works in an area with routine exposure to blood or potentially infectious materials, the necessary PPE should be readily accessible. Contaminated gloves, clothing, PPE, or other materials should be placed in appropriately labeled bags or containers until it is disposed of, decontaminated, or laundered. It is important for an employee to find out where these bags or containers are located in his/her area before beginning work.

Gloves

Gloves should be made of latex, nitrile, rubber, or other water impervious materials. If glove material is thin or flimsy, double gloving can provide an additional layer of protection. Also, if an employee knows he/she has cuts or sores on his/her hands, he/she should cover these with a band-aid or similar protection as an additional precaution before donning their gloves. Employees should always inspect their gloves for tears or punctures before putting



them on. If a glove is damaged, don't use it! When removing contaminated gloves, workers should do so carefully. They should not touch the outside of the gloves with any bare skin. They should dispose of the gloves in a proper container so that others will not come in contact with them.

Goggles

Anytime there is a risk of splashing or vaporization of contaminated fluids, goggles and/or other eye protection should be used to protect the eyes. Again, bloodborne pathogens can be transmitted through the thin membranes of the eyes so it is important to protect them. Splashing could occur while cleaning up a spill, during laboratory procedures, or while providing first aid, etc.



Face Shields

Face shields may be worn in addition to goggles to provide additional face protection. A face shield will protect against splashes to the nose and mouth.

Aprons

Aprons should be worn to protect clothing and to keep blood or other contaminated fluids from soaking through the clothing to the skin.

Other Precautions

Normal clothing that becomes contaminated with blood or potentially infectious materials should be removed as soon as possible because fluids can seep through the cloth to come into contact with skin. Contaminated laundry should be handled as little as possible, and it should be placed in an appropriately labeled bag or container until it is decontaminated, disposed of, or laundered.

Employees should avoid contact with blood or other potentially infectious materials whenever possible. When potential exposure is unavoidable, suitable personal protective equipment should be worn. If a worker finds himself/herself in a situation where he/she has to come in contact with blood or other potentially infectious materials and they don't have any standard personal protective equipment handy, they can improvise. They should use a towel, plastic bag, or some other barrier to help avoid direct contact. Employees must always remember to use universal precautions.

Hygiene Practices

Handwashing is the most important and easiest method that can be used to prevent transmission of bloodborne pathogens. Hands should be washed immediately (or as soon as feasible) after the removal of gloves or other personal protective equipment. Workers should use a soft, antibacterial soap, if possible. They should avoid harsh, abrasive soaps, as these may open fragile scabs or other sores. Hands or other exposed skin should also be thoroughly washed as soon as possible following an exposure incident.



Because handwashing is so important, employees should familiarize themselves with the location of the handwashing facilities nearest to them. Laboratory sinks, public restrooms, janitor closets, and so forth may be used for handwashing if they are normally supplied with soap. If employees are working in an area without access to such facilities, they may use an antiseptic cleanser in conjunction with clean cloth or paper towels or antiseptic towelettes. If these alternative methods are used, hands should be washed with soap and running water as soon as feasible.

Workers should flush mucous membranes, such as the eyes, with copious amounts of clean water following a splash of blood or potentially contaminated fluids.

If employees are working in an area where there is reasonable likelihood of exposure, they should *never*:

- √ Eat.
- √ Drink.
- √ Smoke.
- √ Apply cosmetics or lip balm.
- √ Handle contact lenses.



No food or drink should be kept in refrigerators, freezers, shelves, cabinets, or on countertops where blood or potentially infectious materials are present.

Workers should also try to minimize the amount of splashing, spraying, splattering, and generation of droplets when performing any procedures involving blood or potentially infectious materials, and they should *never* pipette or suction these materials by mouth.

Decontamination and Sterilization

All surfaces, tools, equipment and other objects that come in contact with blood or potentially infectious materials must be decontaminated and sterilized as soon as possible. Equipment and tools must be cleaned and decontaminated before servicing or being put back to use. Decontamination should be accomplished by using:

- √ A solution of 5.25 percent sodium hypochlorite (household bleach) diluted between 1:10 and 1:100 with water. The standard recommendation is to use at least a quarter cup of bleach per one gallon of water.
- √ EPA-registered tuberculocidal disinfectant.

When cleaning up a spill of blood, the employee should carefully cover the spill with paper towels or rags, then gently pour the 10 percent solution of bleach over the towels or rags, and leave it for at least 10 minutes. This will help ensure that the bloodborne pathogens are killed before the worker actually begins cleaning or wiping the material up. Covering the spill with paper towels or rags decreases the chances of causing a splash when the bleach is poured on it.

When decontaminating equipment or other objects, such as scalpels, microscope slides, broken glass, saw blades, tweezers, mechanical equipment (upon which someone has been cut), or first-aid boxes, the employee should leave the disinfectant in place for at least 10 minutes before continuing the cleaning process.

Any materials used to clean up a spill of blood or potentially infectious materials must be decontaminated immediately, as well. This would include mops, sponges, reusable gloves, buckets, pails, etc.

The Employee's Own Blood or Other Body Fluids

If the worker is capable of doing so, he/she has the primary responsibility for cleaning and disinfecting spills of their blood/body fluids.

Sharps

Far too frequently, housekeepers, custodians and others are punctured or cut by improperly disposed-of needles and broken glass. When an employee is cleaning up broken glass or moving a garbage bag to the dumpster, the needle or broken glass will poke through the bag and injure the worker. This, of course, exposes the person to whatever infectious material may have been on the glass or needle. For this reason, it is especially important to handle and dispose of all sharps carefully in order to protect yourself as well as others.



Needles

Needles or other sharps should *not* be bent, recapped, or moved except as noted below:

- √ Needles must only be recapped using a mechanical device.
- √ Needles should be moved only by using a mechanical device or tool such as forceps, pliers, or broom and dustpan.
- √ Never break or shear needles.
- √ Needles must be disposed of in labeled sharps containers only.
- √ Sharps containers must be closable, puncture-resistant, leak-proof on sides and bottom, and must be labeled or color-coded.

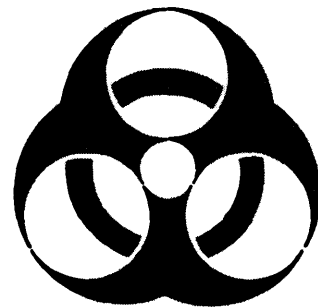
- ✓ When sharps containers are being moved from the area of use, the containers should be closed immediately before removal or replacement to prevent spillage or protrusion of contents during handling or transport.

Broken Glassware

- ✓ Broken glassware that has been visibly contaminated with blood must be sterilized with an approved disinfectant solution before it is disturbed or cleaned up.
- ✓ Glassware that has been decontaminated may be disposed of in an appropriate sharps container (e.g., closable, puncture-resistant, leak-proof on sides and bottom, with appropriate labels).
- ✓ Broken glassware must *not* be picked up directly with the hands. Sweep or brush the material into a dustpan.
- ✓ Uncontaminated broken glassware may be disposed of in a closable, puncture-resistant container such as a cardboard box or coffee can.

Warning Labels

Warning labels must be affixed to containers of regulated waste, refrigerators and freezers containing blood or other potentially infectious material, and other containers used to store, transport or ship blood or other potentially infectious materials. The labels must be fluorescent orange, red or orange-red and contain the universal biohazard warning symbol.



Regulated Biohazardous Waste

Regulated biohazardous waste includes:

- ✓ Any liquid or semi-liquid blood or other potentially infectious materials.
- ✓ Contaminated items that would release blood or other potentially infectious materials in a liquid or semi-liquid state if compressed.
- ✓ Items that are caked with dried blood or other potentially infectious materials and are capable of releasing these materials during handling.
- ✓ Contaminated sharps.

- √ Pathological and microbiological wastes containing blood or other potentially infectious materials.

All regulated waste must be placed in properly labeled containers or red/orange biohazard bags and disposed at an approved facility.

Only appropriately trained and authorized employees may handle regulated biohazardous waste. Employees should contact their supervisor for questions concerning the disposal of regulated biohazardous waste.

Material considered to be non-regulated biohazardous waste includes the following items:

- √ Material that has been decontaminated or autoclaved prior to disposal.
- √ Material resulting from the cleanup of small spills of blood (e.g., resulting from a minor cut)
- √ Personal first-aid supplies (e.g., band-aids with dried blood).
- √ Feminine hygiene products.

Non-regulated biohazardous waste may be disposed in regular plastic trash bags.

Emergency Procedures

In an emergency situation involving blood or potentially infectious materials, employees should always use universal precautions and try to minimize their exposure by wearing gloves, splash goggles and protective clothing. They should use a pocket mask when providing mouth-to-mouth resuscitation.

If an employee is exposed (e.g., blood on the skin or splashed in the eyes) he or she should:

- √ Wash the exposed area thoroughly with soap and running water. They should use non-abrasive, antibacterial soap if possible.

- √ If blood is splashed in the eye or mucous membrane, flush the affected area with running water for at least 15 minutes.

Exposure Incidents

An exposure incident is a “specific eye, mouth, other mucous membrane, non-intact skin, or parenteral contact with blood or other potentially infectious materials that results from the performance of an employee's duties.” Exposure examples include a needlestick or cut from a sharp object contaminated with blood or other potentially infectious materials; a splash to eye, nose, or mouth from body fluids; or a skin exposure to blood or other potentially infectious materials when the skin is chapped, abraded, or otherwise non-intact. Exposure incidents should be reported as soon as possible to the person (or position) listed below:

Instructions: Customize manual by identifying the person (or position) that exposure incidents are to be reported to.	
Instructions: Customize manual by identifying the health care provider designated to evaluate exposure incidents.	

Exposure evaluations will include:

- √ Documentation of the route(s) of exposure and the circumstances under which the exposure incident occurred.
- √ Identification and documentation of the source individual (if possible).
- √ Appropriate medical consultation, tests and treatment.
- √ Counseling.
- √ Long term medical monitoring of the exposed individual, including the evaluation of any reported illnesses.

Apart from the circumstances surrounding the exposure itself, all other findings or diagnosis must remain entirely confidential.

Hepatitis B Vaccination

The hepatitis B vaccination is given in a series of three shots. The second shot is given one month after the first, and the third shot follows five months after the second. This series gradually builds up the body's immunity to the hepatitis B virus.

The vaccine itself is made from yeast cultures; there is no danger of contracting the disease from getting the shots. Once vaccinated, a person does *not* need to receive the series again. There are booster shots available, however, and in some instances these may be recommended (for example, if there is an outbreak of hepatitis B at a particular location).

Employees who have routine potential exposure to bloodborne pathogens (e.g., medical professionals, designated first-aid providers and some custodians) must be offered the hepatitis B vaccine series at no cost. Although the vaccine must be offered by the employer, employees do *not* have to accept that offer. Employees may opt to decline the vaccination series, in which case they will be asked to sign a declination form. Even if an employee declines the initial offer, he/she may choose to receive the series at any time during their employment thereafter, if for example, he/she is exposed on the job at a later date.

"Typical" Hepatitis B Vaccine Declination

I understand that due to my occupational exposure to blood or other potentially infectious materials I may be at risk of acquiring hepatitis B virus (HBV) infection. I have been given the opportunity to be vaccinated with hepatitis B vaccine, at no charge to myself. However, I decline hepatitis B vaccination at this time. I understand that by declining this vaccine, I continue to be at risk of acquiring hepatitis B, a serious disease. If in the future I continue to have occupational exposure to blood or other potentially infectious materials and I want to be vaccinated with hepatitis B vaccine, I can receive the vaccination series at no charge to me.

Employee Name: _____ Date: _____

Employees also may request a hepatitis B vaccination following an exposure incident.

Special Note: Employers should contact a medical professional for additional information and questions concerning hepatitis B vaccination.

ADDITIONAL INFORMATION

Adding Additional Information

As applicable, employers may customize the manual by adding the following information:

- √ Policies and procedures that pertain to bloodborne pathogens.
- √ Documentation of annual Exposure Control Plan review.

RECORD OF EMPLOYEE TRAINING FORM

SUMMARY OF APPLICABLE REGULATIONS

Applicable OSHA Regulations

Occupational Safety and Health Administration (OSHA) *General Industry Standards* applicable to this section include, but may not be limited to:

√ 29 CFR 1919.1030 Bloodborne Pathogens.

Section 14

Installation, Use, and Maintenance of Emergency Equipment

INSTALLATION, USE AND MAINTENANCE OF EMERGENCY EQUIPMENT



Section 14 provides information on the installation, use and maintenance of emergency equipment installed for employee protection. Workplace emergency equipment can mean the difference between life or death and sight or blindness. To be there when it is needed, emergency equipment must be properly installed and maintained.

First-Aid Kits

- ✓ Suitable and appropriate first-aid supplies must be readily available in the workplace.
- ✓ First-aid supplies exposed to the weather must be stored in waterproof containers.
- ✓ First-aid supplies must be individually wrapped.
- ✓ The contents of first-aid kits must be clean and sanitary.
- ✓ First aid-kits must be inspected and kept completely stocked.

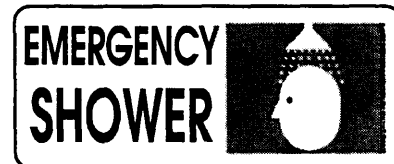


First-aid supplies are kept at the following location:

<p>Instructions: Customize manual by identifying the location of the workplace first-aid kit.</p>	
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Emergency Showers/Eye Washes

- ✓ Where the eyes or body of any person may be exposed to injurious corrosive materials, suitable facilities for quick drenching or flushing of the eyes and body must be provided within the work area for immediate emergency use. ANSI standard Z358.1-1998 recommends installation within 100 feet of the hazard (and no more than 10 feet away for strong corrosives).



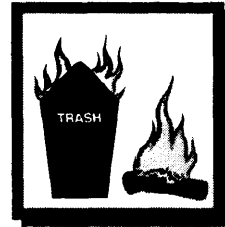
- √ Access to emergency showers and eye washes must *never* be blocked by supplies and equipment.
- √ Emergency showers and eye washes must be installed, inspected, cleaned and flushed in accordance with ANSI Standard Z358.1-1998.

Fire Extinguishers

Classes of Fire Extinguishers

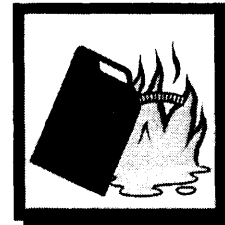
- √ Class A — Ordinary combustibles.

- Wood
- Paper
- Plastic
- Cloth



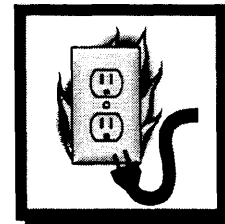
- √ Class B — Flammable liquids.

- Gasoline
- Oil
- Solvents
- Diesel fuel



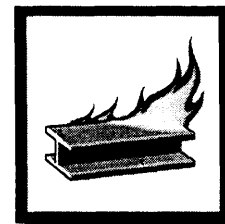
- √ Class C — Energized electrical equipment.

- Motors
- Appliances
- Computers
- Breakers and disconnects



- √ Class D — Combustible metals.

- Magnesium
- Sodium
- Titanium
- Zirconium



General

- √ Fire extinguishers must be mounted, located and identified so that they are readily accessible.



- √ Fire extinguishers must be distributed in accordance with the following maximum travel distances.

Class	Maximum Travel Distance
A	75 feet
B	50 feet
C	Based on an appropriate pattern for Class A or B hazards
D	75 feet

- √ Only approved fire extinguishers may be installed. Fire extinguishers containing carbon tetrachloride or chlorobromomethane and/or with soldered or inverted riveted shells must *not* be present in the workplace.
- √ Except during use, fire extinguishers must be:
 - Fully charged and operable.
 - At their designated location.
- √ Access to a fire extinguisher must *never* be blocked by supplies and equipment.

Inspection and Maintenance of Fire Extinguishers

- √ Fire extinguishers must be inspected monthly in accordance with NFPA requirements (NFPA Standard 10, Standard for Portable Fire Extinguishers, 1994). Monthly fire extinguisher inspections should ensure that:
 - Fire extinguishers are at their designated locations.
 - Access to or visibility of fire extinguishers is *not* obstructed.

- Fire extinguisher safety seals and tamper indicators are *not* broken or missing.
- Fire extinguishers are full (as determined by weighing or “hefting”).
- Fire extinguishers are free from obvious physical damage, corrosion, leakage or clogged nozzles.
- Fire extinguisher pressure gauges or indicators are within the operable range.
- Wheels, tires and carriages are operable on wheeled fire extinguishers.

√ Fire extinguishers must be subjected to annual maintenance by a qualified person in accordance with NFPA requirements (NFPA Standard 10, Standard for Portable Fire Extinguishers, 1994). Annual maintenance must include a thorough examination of:

- Mechanical parts.
- Extinguishing agent.
- Expelling means.

Hydrostatic Testing

Stored pressure fire extinguishers must be subjected to periodic hydrostatic testing in accordance with Table L-1 of 29 CFR 1910.157:

Fire Extinguisher Type	Frequency of Hydrostatic Testing in Years
Soda acid (stainless steel shell)	5
Cartridge-operated water and/or antifreeze	5
Stored pressure water and/or antifreeze	5
Wetting agent	5
Foam (stainless steel shell)	5
Aqueous Film Forming foam (AFFF)	5
Loaded stream	5
Dry chemical with stainless steel	5
Carbon Dioxide	5
Dry chemical, stored pressure, with mild steel, brazed brass or aluminum shells	12
Dry chemical, cartridge or cylinder-operated, with mild steel shells	12
Halon 1211	12
Halon 1301	12
Dry powder, cartridge or cylinder-operated with mild steel shells	12

Special Note: Stored pressure dry chemical extinguishers that require a 12-year hydrostatic test must be emptied and subjected to applicable maintenance procedures every 6 years. Dry chemical extinguishers having non-refillable disposable containers are exempt from this requirement. When recharging or hydrostatic testing is performed, the 6-year requirement begins from that date.

Alternate equivalent protection must be provided when portable fire extinguishers are removed from service for maintenance and recharging.

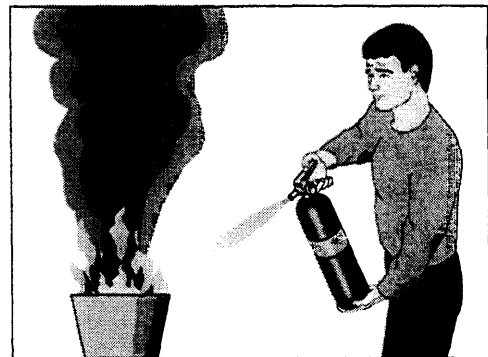
Use of Fire Extinguishers

Observe the following safety considerations when extinguishing a fire with a portable extinguisher:

- ✓ *Never underestimate the fire or overestimate your ability.*
- ✓ Alert other employees. As required get help and call 911.
- ✓ Select a suitable fire extinguisher.
- ✓ If fire is electrical, disconnect from power source.
- ✓ Check the fire extinguisher before approaching the fire.
- ✓ Approach the fire with caution.
- ✓ Maintain a clear path of escape.

Operate fire extinguishers using the following general procedure:

- ✓ **Pull the pin** at the top of the extinguisher that keeps the handle from being pressed.
- ✓ **Point the nozzle** or outlet toward the fire.
- ✓ **Press the handle** to discharge the extinguishing agent.
- ✓ **Sweep the nozzle back and forth** at the base of the flames to disperse the extinguishing agent. Extinguish the fire and make sure that it is completely out.



Special Note: Lay used fire extinguishers on their sides. Replace with a charged extinguisher. Do *not* rehang used fire extinguishers. Arrange for recharging.

CUSTOMIZING THE MANUAL

Adding Additional Information

As applicable, employers may customize the manual by adding the following information:

- √ Policies and procedures that pertain to the inspection, use and maintenance of emergency equipment.
- √ Information on the location of emergency equipment (e.g., list, floor plan or diagram).
- √ Emergency equipment inspection checklist.

RECORD OF EMPLOYEE TRAINING FORM

SUMMARY OF APPLICABLE REGULATIONS

Applicable OSHA Regulations

Occupational Safety and Health Administration (OSHA) *General Industry Standards* applicable to this section include, but may not be limited to:

- √ CFR 1910.151 Medical and First Aid.
- √ CFR 1910.151 Medical Services and First Aid.
- √ CFR 1910.156 Fire Brigades.
- √ CFR 1910.157 Portable Fire Extinguishers.
- √ CFR 1910.158 Standpipe and Hose Systems.
- √ CFR 1910.159 Automatic Sprinkler Systems.
- √ CFR 1910.160 Fixed Extinguishing Systems, General.
- √ CFR 1910.161 Fixed Extinguishing Systems, Dry Chemical.
- √ CFR 1910.162 Fixed Extinguishing Systems, Gaseous Agent.
- √ CFR 1910.163 Fixed Extinguishing Systems, Water Spray and Foam.
- √ CFR 1910.164 Fire Detection Systems.
- √ CFR 1910.165 Employee Alarm Systems.

Section 15

Guidelines for Workplace Emergencies

GUIDELINES FOR WORKPLACE EMERGENCIES

(Emergency Action Plan)



Section 15 establishes action guidelines for all reasonably foreseeable workplace emergencies. Because each emergency situation involves unique circumstances, the guidelines provide general guidance only. Thoughtful actions based on situation assessment are always required when responding to an emergency. It is also important to note that emergency guidelines do *not* necessarily represent a sequential series of steps.

Special Note: Employee safety and health is the overriding priority in all emergency situations. Always think before you act. You're *not* going to help the situation if you become part of the problem.

Employer Duties

The Occupational Safety and Health Administration (OSHA) requires employers to prepare for fires and other workplace emergencies by establishing an Emergency Action Plan. A minimal plan must include:

- √ Emergency escape procedures and emergency escape route assignments.
- √ Procedures to be followed by employees who remain to operate critical plant operations before they evacuate.
- √ Procedures to account for all employees after emergency evacuation has been completed.
- √ Rescue and medical duties for those employees who are to perform them.
- √ The preferred means of reporting fires and other emergencies.
- √ The names or titles of individuals that can be contacted for further information on emergency procedures.



Photograph by David Ballard

Fire extinguisher training at the Iowa Fire Service Institute, Iowa State University. OSHA requires annual fire extinguisher training when fire extinguishers are installed for employee use. Specific OSHA regulations also apply to first aid/CPR training and the training of industrial fire brigades confined space rescue teams and HAZMAT teams.

General Information

Agencies Designated to Respond to an Emergency

The following local emergency response services respond to emergencies:

Instructions: Customize manual by identifying the local fire department.	
Instructions: Customize manual by identifying local emergency medical services.	
Instructions: Customize manual by identifying the local law enforcement agency.	

Special Note: Employers should invite local emergency response service providers to tour their facility and assist them in the preparation of a pre-incident emergency response plan.
--

Lines of Authority

Emergency Coordinator

In the event of a workplace emergency, the following person (or position) has the authority to direct all reasonable and prudent actions until the arrival of emergency response services.

Instructions: Customize manual by identifying the person (or position) designated to act as the employer's emergency coordinator.	
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Incident Command

Upon arrival of emergency response services, the ranking officer on the first arriving unit will assume command and control as per their department's standard operating procedures.

Liaison to Emergency Response Services

The following person (or position) shall act as liaison to emergency response services in the event of a workplace emergency.

Instructions: Customize manual by identifying the person (or position) designated to act as the employer's liaison to emergency response services.	
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Public Information Officer

The following person (or position) has been designated as public information officer. Only the public information officer shall release information to the media and public in the event of a workplace emergency.

Instructions: Customize manual by identifying the person (or position) designated to act as the employer's public information officer.	
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Reporting Emergencies

Employees should use the following to report workplace emergencies:

Instructions: Customize manual by identifying the preferred method for employees to report workplace emergencies.	
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Alerting Employees

The following will be used to alert employees to fires and other workplace emergencies:

Instructions: Customize manual by identifying the method that will be used to alert employees to a fire or other workplace emergency.	
--	--

Additional Information

Employees should contact the following person (or position) for additional information on emergency procedures:

Instructions: Customize manual by identifying the person (or position) that employees should contact for additional information on emergency procedures.	
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INSTRUCTIONS FOR REPORTING EMERGENCIES



- √ Summon emergency assistance by calling 911 (or emergency number).
- √ Be prepared to provide the following information to the emergency operator:
 - Your name and location.
 - Phone number from which the call is being made.
 - Location of the emergency, including facility name and address.
 - Type of emergency:
 - Fire.
 - Medical.
 - Confined space rescue.
 - Hazardous material.
 - Criminal act.
 - Bomb threat.
 - Other important information:
 - Number and condition of victims.
 - Location and extent of fire.
 - Involvement of hazardous materials (as available communicate product name and/or describe any markings, labels or placards).
 - What is needed.
- √ Do *not* hang up first. Let the emergency operator hang up first.
- √ After making the call, station someone to direct emergency response vehicles to the scene of the emergency.

MEDICAL EMERGENCIES

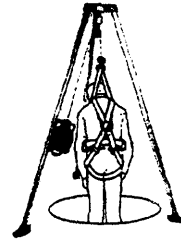


- √ Survey the scene; evaluate personal safety issues.
- √ Request assistance (shout for help).
- √ Call 911 (or emergency number).
- √ Assess person's condition. Check:
 - Airway
 - Breathing
 - Circulation
- √ Provide aid and comfort in accordance with your training and ability while observing universal precautions.

Infection Control

- √ Observe universal precautions when providing aid and comfort:
 - Limit contact with blood and other body fluids.
 - Avoid contact when possible.
 - Wear “exam” gloves and eye protection.
 - Use a pocket shield or mask when administering CPR.
 - Do *not* pick up contaminated sharp objects with bare hands.
 - Clean surfaces contaminated with small amounts of blood (or other body fluids) with a 10 percent chlorine bleach/water solution. Wear appropriate personal protective equipment (e.g., “exam” gloves and eye protection).
 - Place all contaminated waste in a biohazard bag. Contact your supervisor for instructions concerning disposal of contaminated waste.
 - Wash hands as soon as possible with a germicidal soap.
 - Report exposure incidents to your supervisor as soon as possible.

CONFINED SPACE EMERGENCIES



Unresponsive Entrant (Overcome by a Hazardous Atmosphere)

- √ Attendant must *not* enter the space to perform an unassisted internal rescue.
- √ Call 911(or emergency number).
- √ If entrant is attached to a retrieval line, attempt to extricate without entering the confined space.
 - If entrant is *not* attached to a retrieval line, use a blower to introduce fresh air into the space.
- √ When victim has been extricated provide aid and comfort in accordance with training and ability while observing universal precautions.
- √ Be prepared to provide pertinent information about the space to emergency response personnel.

Entrant with Physical Injuries or Entrapped/Engulfed Entrant

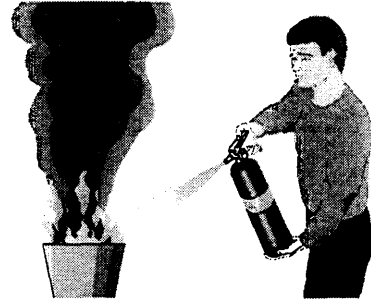
- √ Attendant must *not* enter the space to perform an unassisted internal rescue.
- √ Call 911 (or emergency number).
- √ If entrant is attached to a retrieval line, attempt to extricate (only if action will *not* result in further injuries).
 - If entrant is engulfed, turn off material handling equipment and remove all slack from retrieval line. Tie opposite end of retrieval line to a secure object.
- √ Provide aid and comfort in accordance with your training and ability while observing universal precautions.
- √ Be prepared to provide pertinent information about the space to emergency response personnel.

FIRES



Incipient Stage Fire

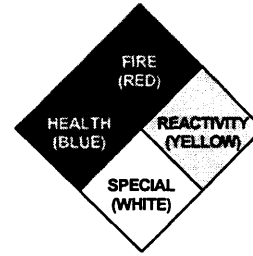
- √ Alert other employees.
 - Based on the situation get help and/or call 911 (or emergency number).
- √ If fire is electrical, disconnect power source.
- √ Extinguish with a suitable fire extinguisher.
- √ Protect your health and safety.
 - *Never underestimate the fire or overestimate your ability.*
 - Check fire extinguisher before approaching fire.
 - Approach fire with caution.
 - Maintain a clear path of escape.



Major Fire

- √ Alert other employees.
- √ Call 911 (or emergency number).
- √ Evacuate fire area/building.
 - Assist any injured to escape (if this can be done without entering dangerous areas).
 - Close doors and secure ventilation equipment (when practical).
 - Provide aid and comfort to injured in accordance with your training and ability while observing universal precautions.
- √ As dictated by the situation, take appropriate actions to maintain vital operations and/or secure equipment.

HAZARDOUS MATERIAL EMERGENCIES



A hazardous material emergency is a chemical spill or release that has the potential to cause serious injury or harm to people, property or the environment.

- √ Identify the substance (e.g., from placards, labels or markings) without endangering personal safety and health.
- √ Alert other employees in immediate hazard area.
- √ Evacuate to a safe distance.
 - It is best to go uphill/upwind.
 - Assist any injured to escape (if this can be done without entering contaminated or dangerous areas).
 - Provide aid and comfort to injured in accordance with your training and ability while observing universal precautions. Take precautions to avoid being contaminated with hazardous chemicals.
- √ Isolate hazard area.
 - Warn others of hazard and ward off intruders.
 - Close doors and secure ventilation equipment (when feasible).
 - As dictated by the situation, take appropriate actions to maintain vital operations and/or secure equipment.
- √ Call 911 (or emergency number).
 - Communicate situation and substance information to the emergency operator (e.g., identity of substance from placards, labels or markings and what the substance is doing/where it is going).
- √ Be prepared to provide applicable material safety data sheets (MSDSs) to emergency response personnel.

TORNADOES



When a Tornado Is Spotted or When the Warning Siren Sounds

- √ Alert other employees.
- √ Seek shelter under a substantial object in the lowest level of a building away from windows, dangerous equipment or hazardous materials.

Special Note:

If in a vehicle in open country, drive at right angles to the tornado's path (if you can do so safely). Do *not* try to outrun the storm. If you cannot avoid the tornado, get out of the vehicle and lie flat in the nearest depression (e.g., ditch, culvert or ravine). Protect your head and stay low to the ground.

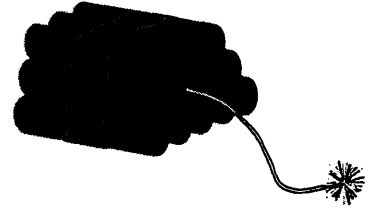
If driving a vehicle in an urban area and you spot a tornado, get out of the vehicle and seek shelter in a nearby building.

- √ Do *not* leave shelter until danger has passed.

After the Danger Has Passed

- √ Assess situation and account for all personnel.
- √ Evacuate if building may collapse or if gas lines are broken. Assist injured to escape (if this can be done without entering dangerous areas).
- √ Provide aid and comfort to injured in accordance with your training and ability while observing universal precautions.
- √ Call 911 (or emergency number) to summon emergency assistance (if required).
- √ As dictated by the situation, take appropriate actions to maintain vital operations and/or secure equipment.

BOMBS



If a Bomb or Suspected Bomb is Found

- √ Do *not* touch or disturb the device.
- √ Alert other employees and isolate immediate hazard area.
- √ Call 911 (or emergency number).
- √ Inform other employees of situation and prepare to evacuate.
- √ As dictated by the situation, take appropriate actions to maintain vital operations and/or secure equipment.

Telephone or Letter Bomb Threat

- √ When listening to caller, record pertinent information (e.g., exact wording of threat, caller's voice, background sounds and threat language).
- √ Inform supervisor.
- √ Call 911 (or emergency number).
- √ Inform other employees of situation and prepare to evacuate.
- √ As dictated by the situation, take appropriate actions to maintain vital operations and/or secure equipment.

If a Bomb Explodes

- √ Alert other employees.
- √ Call 911 (or emergency number).
- √ Evacuate and assist any injured to escape (if this can be done without entering dangerous areas).
- √ Provide aid and comfort to injured in accordance with your training and ability while observing universal precautions.
- √ As dictated by the situation, take appropriate actions to maintain vital operations and/or secure equipment.

CRIMINAL ACTS/WORKPLACE VIOLENCE



Upon witnessing a serious criminal act or workplace violence:

- √ Alert other employees (if possible).
- √ Observe pertinent details (e.g., description of suspect, make and model of vehicle and/or license plate number).
- √ Call 911 (or emergency number).
 - Communicate pertinent details to emergency operator.
- √ Take prudent actions to protect yourself and others (e.g., evacuate to a safe location or lock doors).
- √ Provide aid and comfort to injured in accordance with your training and ability while observing universal precautions.

EVACUATION PROCEDURES



- √ The following will be used to instruct employees of the need to perform a precautionary, partial or total evacuation:

Instructions: Customize manual by identifying the method that will be used to alert employees of the need to evacuate.	
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- √ As dictated by existing conditions, instructions will be provided concerning securing equipment and/or maintaining vital operations. Emergency shutdown procedures are listed below:

Machine/System That Must Be Secured/Maintained	Position Designated to Secure/Operate Machine
Do Not Endanger Personal Safety To Operate/Secure Machinery	
Instructions: Customize manual by listing machines/vital operations that must be maintained or secured before an evacuation and the position designated to perform the task.	

- √ When required to evacuate, exit by the nearest safe exit.

- √ Upon exiting, employees are to gather at:

Instructions: Customize manual by identifying the location where employees are to gather at following an evacuation.	
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- √ Upon exiting, the following person (or position) will account for employees:

Instructions: Customize manual by identifying the person (or position) designated to account for employees following an evacuation.	
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CUSTOMIZING THE MANUAL

Adding Additional Information

As applicable, employers may customize the manual by adding the following information:

- √ Action guides for other workplace-specific emergencies.
- √ List of employees trained in emergency response skills (e.g., first aid/CPR, fire extinguishers, chemical spills and/or confined space rescue).
- √ Facility floor plan showing exit routes and special hazards.
- √ Policies and procedures that pertain to workplace emergencies.
- √ Facility pre-incident emergency response plan as prepared by local emergency response services.
- √ Documentation of annual Emergency Action Plan review.

Sample Forms

This section contains the following sample form:

- √ Pre-Incident Emergency Response Plan.

PRE-INCIDENT EMERGENCY RESPONSE PLAN

Facility		
Address		
Approach, Staging and Entry		
Type of Facility		
Construction		
Predicted Fire Behavior		
Predicted Strategies		
Exposures		
Occupants-Day	Occupants-Night	Occupants-Special

Special Hazards						
Hazardous Substance	Quantity	NFPA Hazard Rating				NAERG Guide #
		H	F	R	O	
Other Hazards						

Emergency Contacts		
Name	Position or Organization	Telephone Number

Locations	
Item	Location
Fire Hydrant(s)	
Fire Alarm	
Standpipe	
Sprinkler	
Electric Service Cut-Off	
Gas Service Cut-Off	

Instructions: This form may be used to develop a facility pre-incident plan with the local fire department. Attach a facility site plan to the form. Completed forms should be retained by both the local fire department and the facility owner/operator. Prepare copies as required.

RECORD OF EMPLOYEE TRAINING

SUMMARY OF APPLICABLE REGULATIONS

Applicable OSHA Regulations

Occupational Safety and Health Administration (OSHA) *General Industry Standards* applicable to this section include, but may not be limited to:

- | | | |
|---|------------------|--|
| √ | CFR 1910.38 | Employee Emergency Plans and Fire Prevention Plans. |
| √ | CFR 1910.151 | Medical Services and First Aid. |
| √ | CFR 1910.156 | Fire Brigades. |
| √ | CFR 1910.157 | Portable Fire Extinguishers. |
| √ | CFR 1910.164 | Fire Detection Systems. |
| √ | CFR 1910.165 | Employee Alarm Systems. |
| √ | CFR 1910.119 | Process Safety Management of Highly Hazardous Chemicals. |
| √ | CFR 1910.120 | Hazardous Waste Operations and Emergency Response. |
| √ | CFR 1910.269 | Electric Power Generation, Transmission, and Distribution. |
| √ | CFR 1910.272 | Grain Handling Facilities. |
| √ | 29 CFR 1919.1030 | Bloodborne Pathogens. |

SARA Title III Reporting and Planning

Certain employers may be subject to SARA Title III reporting and planning contained in:

- | | | |
|---|------------|---|
| √ | 40 CFR 300 | Emergency Planning and Community Right-To-Know Act. |
|---|------------|---|

Section 16

Office Safety

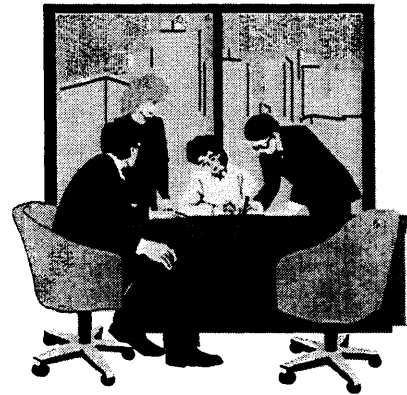
OFFICE SAFETY



Section 16 provides information on office safety. Although most people consider offices to be safe working environments in comparison to industrial workplaces, offices can contain hazards that are capable of causing serious injury or illness. It is therefore equally important to identify and correct office safety and health hazards.

General Office Safety

Offices contain more safety and health hazards than are commonly realized. Personal injuries in office environments frequently result from falls, overexertion, falling objects, contact with sharp or stationary objects, and repetitive motion.



Accident Prevention

The following actions and behaviors can eliminate many office hazards.

Back Injuries

- √ Back injuries can be prevented by observing proper lifting practices when lifting or moving heavy objects. Refer to section 6 of this manual for proper lifting techniques.

Slips, Trips and Falls

- √ Aisles must be maintained free of slip, trip and fall hazards at all times.
 - Supplies, equipment and trash receptacles should be placed so as *not* to create slip, trip and fall hazards or to impede pedestrian traffic.
 - Extension cords, computer cables and communication lines should *not* be placed across normal working and walking surfaces.
 - Worn or warped mats that pose slip, trip and fall hazards should be replaced.

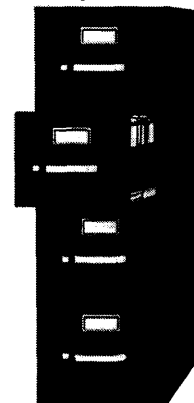
- √ Suitable ladders must be used when required. Chairs and other office furniture must *never* be used in place of a ladder. Appropriate ladder safety must also be observed.

Office Equipment

- √ Office equipment should *not* be placed near the edge of tables or desks. Heavy equipment, including computers and monitors, should be secured to prevent it from falling over.
- √ Desk drawers and table drawers should be kept closed when not in use.
- √ Blades of paper cutters should be in the closed position when not in use.
- √ Electrical appliances, including paper shredders, computers and electric typewriters, must be grounded or double insulated.
- √ Electrical devices, especially cord-and-plug-connected equipment and extension cords, must be routinely inspected for damage and defects. Damaged or defective equipment must be immediately removed from service for repair or replacement.
- √ Extension cords are designed for temporary use only and their use should be avoided. Extension cords must be placed so as *not* to create a slip, trip and fall hazard.
- √ Paper clips, thumb tacks, and pins should be kept in a safe place. Razor blades and knives should be kept covered.

File Cabinets

- √ To prevent four-drawer filing cabinets from becoming top-heavy and falling over, the bottom drawers should be filled before the top drawers.
- √ Return drawers to the closed position when *not* in use to prevent bumping and tipping hazards.
- √ Files should be placed so drawers do *not* open into narrow aisles.
- √ File cabinets should be bolted together or fastened to the floor or wall.
- √ Do *not* store heavy materials on top of file cabinets.



Housekeeping

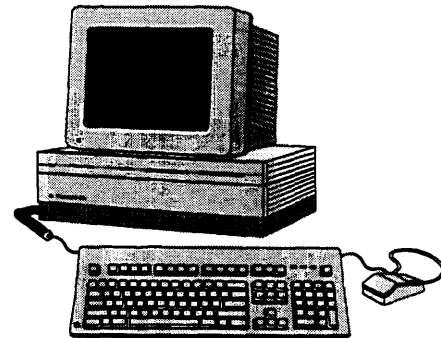
- √ Each employee is responsible for keeping their work area clean and free from recognizable hazards.

Emergency Exits

- √ Emergency exits and exitways must be kept free of obstructions at all times.

Video Display Terminals

With the increasing presence of micro-computers in the workplace, many workers have raised concerns about the possible safety and health hazards associated with video display terminals (VDTs). The concerns include:



- √ Electrical hazards.
 - VDTs must comply with all applicable electrical standards promulgated by OSHA.
- √ Radiation.
 - The National Institute for Occupational Safety and Health (NIOSH), the U.S. Army Environmental Hygiene Agency, and others have measured radiation emitted by VDTs. The tests show that levels for all types of radiation are below those allowed in current standards. In fact, some measurements show radiation levels so low that they cannot be distinguished from background radiation.
- √ Effects of exposure to low and high-frequency electromagnetic fields.
 - Currently there is no reliable information that birth defects have ever resulted from a pregnant woman working at a video display terminal. However, the possible effects of radiation and extreme low and high-frequency fields from VDTs on pregnancies continue to be investigated by NIOSH.

√ Ergonomic issues.

- Video display operators sometimes report eye fatigue and irritation, blurred vision, headaches, dizziness and/or pain or stiffness in the neck, shoulders and back. Repetitive motion injuries in the hand and wrist are also common. VDT ergonomic issues are discussed below.

VDT Ergonomic Issues

Ergonomic problems can usually be corrected by adjusting the physical and environmental setting where VDT users work. The relation of the operator to the keyboard and the screen, the operator's posture, the lighting, and the background noise should be carefully examined to prevent discomfort. Repetitive motion injuries can be minimized with frequent rest breaks and appropriately designed keyboards.



Work Station Design and Layout

Many ergonomic problems can be addressed by proper VDT workstation design and layout. VDT workstations should be designed and arranged to:

- √ Give the operator flexibility to reach, use and observe the screen, the keyboard and the document.
- √ Provide the operator with maximum flexibility to adjust sitting position, arm and shoulder position and height of work surfaces.
- √ Provide posture support.
 - The seat and backrest of the chair should support a comfortable posture permitting occasional variations in the sitting position. Chair height and backrest angle should be easily adjustable. A footrest may be necessary for short individuals.
 - When the operator's hands are resting on the keyboard, the upper arm and forearm should form a right angle approximately parallel with the floor. The hands should be in a reasonably straight line with the forearm. Unusually high or long reaches should be avoided. Armrests should be provided to permit periodic support as needed.

- The chair height is correct when the entire sole of the foot can rest on the floor or footrest and the back of the knee is slightly higher than the seat of the chair. This allows blood to circulate freely in the legs and feet.

√ Provide for operator adjustment of screen position.

- Screens should be adjusted so that the topmost line of the display is not higher than the user's eyes. The screen and document holder should be the same distance from the eye (to avoid constant changes of focus) and close together so the operator can look from one to the other without excessive movement of the neck or back. The incline of the document holder should be adjustable. Legibility is a prime consideration in selecting a display screen.

√ Provide adequate and even lighting. Light should be directed so it does not shine into the operator's eyes when viewing the screen.

√ Prevent VDT screen glare.

- Careful screen placement in relation to strong light sources and anti-reflective screen treatments can be used to reduce glare.

√ Provide an adequate work surface.

- The work station should suit the kind of task to be done. It should be large enough for any reference books, files, telephone, or text and also permit different positions of the screen and keyboard.
- Operators should have control over the placement of screen and keyboard, and other task-related articles.

Job Control

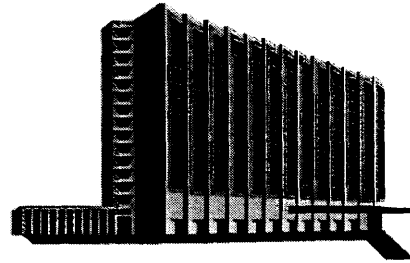
Fatigue can lead to more serious ergonomic problems and reduce productivity. To avoid fatigue, employers should allow VDT operators to have individual job control (e.g., the ability to pace the work, add mini-breaks, or change positions).

Indoor Air Pollution

Energy-efficient heating, ventilation and air-conditioning (HVAC) systems are installed in modern office buildings.

Modern HVAC systems are designed to reduce energy costs while providing air at comfortable temperature and humidity levels, free of harmful concentrations of pollutants. HVAC systems typically

operate by bringing in outdoor air, conditioning and mixing the outdoor air with some portion of indoor air, distributing this mixed air throughout the building, and exhausting some portion of the indoor air outside. Exhaust air and outside supply air are closely regulated in modern HVAC systems to reduce energy costs. Operating under such parameters, HVAC systems must be properly designed and maintained in order to prevent the accumulation of nuisance odors and harmful pollutants.



Sources of Indoor Air Pollution

Indoor air pollution is caused by an accumulation of contaminants that come primarily from inside the building, although some can originate outdoors. These pollutants may be generated by a specific, limited source or several sources over a wide area. In addition, these contaminants may be generated periodically or continuously. Common sources of indoor air pollution include:

- √ Carbon dioxide (CO₂) — a gas that is produced when people breathe. CO₂ may accumulate in building spaces if sufficient amounts of outdoor air are not supplied and dispersed throughout the building.
- √ Biological organisms. Bacteria, mold, and fungus may grow in humidification and dehumidification equipment and be circulated throughout the building.
- √ Tobacco smoke. Second-hand tobacco smoke is recognized as a serious health hazard, and many states have enacted “smoke free” workplace laws.
- √ Building materials and furnishings. For example, insulation products and carpeting can emit irritating vapors and gases.
- √ Chemicals and equipment. When used within a building, these sources can cause odors, irritating gases, or vapors.

- √ Outside air can also be a source of indoor pollution when air supply vents are located too close to exhaust vents, loading docks, roads, parking areas, and trash receptacles.

Health Effects

Indoor air pollution can cause a variety of physical symptoms such as:

- √ Fatigue.
- √ Headache.
- √ Dryness of the eyes and nasal passages.
- √ Respiratory tract irritation.

Such vague symptoms may have a variety of causes and may or may not be related to indoor air pollution. However, clusters of such symptoms (e.g., many individuals with similar complaints within an office or building) are frequently an indication of indoor air pollution.

Indoor air pollution can also aggravate existing respiratory conditions such as allergies and asthma. Individuals with existing respiratory conditions are frequently more sensitive to indoor air pollutants.

Prevention and Correction of Indoor Air Quality Problems

Employers and employees must work together to prevent and correct indoor air quality problems.

- √ Employers should:
 - Evaluate indoor air quality on a periodic basis. Such evaluations should be performed by a qualified person using appropriate test equipment.
 - Promptly investigate employee observations and complaints concerning indoor air quality.
 - Install source-removal ventilation devices on equipment or processes that produce harmful indoor air pollution.
 - Ensure that ventilation rates are increased during periods of increased pollution (e.g., during painting, renovation activities, and/or pesticide use).
 - Re-examine energy conservation practices with regard to indoor air quality considerations, employee health and productivity costs.

- Ensure that records are maintained on indoor air quality problems and corrective actions. Such records will be helpful in resolving future problems.

√ Building maintenance personnel should ensure that HVAC equipment is:

- Operated in a manner that is consistent with its design.
- Inspected and maintained on a regular basis as prescribed by the manufacturer. Particular attention must be paid to air filters, humidification and dehumidification equipment, and control systems.

√ All building occupants should take an active role in preventing and correcting indoor air pollution by:

- Observing policies and procedures that have been implemented to prevent or control indoor air pollution.
- Reporting HVAC deficiencies or problems.
- Reporting any signs or symptoms of indoor air pollution.
- Completing appropriate indoor air quality surveys and cooperating with the people investigating the problem.

CUSTOMIZING THE MANUAL

Adding Additional Information

As applicable, employers may customize the manual by adding the following information:

- √ Policies and procedures that pertain to office safety.
- √ Policies and procedures that pertain to the prevention and control of indoor air pollution.

RECORD OF EMPLOYEE TRAINING FORM

SUMMARY OF APPLICABLE REGULATIONS

Applicable OSHA Regulations

At the current time, the Occupational Safety and Health Administration (OSHA) does *not* have a specific office safety standard. All *General Industry Standards* do, however, apply to office environments. Standards applicable to office environments include, but may not be limited to:

- √ 29 CFR 1910.22 Walking-Working Surfaces — General Requirements.
- √ 29 CFR 1910.1200 Hazard Communication.
- √ 29 CFR 1910.25 Portable Wood Ladders.
- √ 29 CFR 1910.26 Portable Metal Ladders.
- √ 29 CFR 1910.147 The Control of Hazardous Energy (lockout/tagout).
- √ 29 CFR 1910 Subpart E Means of Egress.
- √ 29 CFR 1910 Subpart L Fire Protection.
- √ 29 CFR 1910 Subpart K Medical and First aid.
- √ 29 CFR 1910 Subpart S Electrical.
- √ 29 CFR 1910 Subpart Z Toxic and Hazardous Substances.

Section 17

Glossary of Terms

GLOSSARY OF TERMS

Section 17 provides a glossary of safety and health-related terms. Information contained in Section 17 is derived from *MSDS Glossary*, Occupational Safety and Health Administration, and *Dictionary of Terms Used in the Safety Profession, Third Edition*, American Society of Safety Engineers.

Acid — Any chemical that undergoes dissociation in water with the formation of hydrogen ions. Acids have pH values of 0 to 6 and may cause severe skin burns.

Accident — An unplanned and sometimes injurious or damaging event which interrupts the normal progress of an activity and is invariably preceded by an unsafe act or unsafe condition or some combination thereof. An accident may be seen as resulting from a failure to identify a hazard or from some inadequacy in an existing system of hazard controls.

Accident Investigation — A determination by one or more qualified persons of the significant facts and background information relating to an accident, based upon statements taken from involved persons and inspection of the accident site, vehicles, machinery, or equipment involved, etc.

Accountable — Liable to be called to account for the accomplishment or lack thereof of an assigned function or task according to designated performance standards.

Acute Effect — Adverse effect on a human or animal that has severe symptoms developing rapidly and coming quickly to a crisis.

Acute Exposure — A single, brief exposure to a toxic substance whose effects become evident soon after the exposure.

Acute Toxicity — Any poisonous effect, produced by a single short-term exposure, that results in severe biological harm or death.

Air Contamination — The result of introducing foreign substances into the air so as to make the air impure.

Air-Line Respirator — A respirator that is connected to a compressed breathable air source by a hose of small inside diameter. The air is delivered continuously or intermittently in a sufficient volume to meet the wearer's breathing requirements.

Air-Purifying Respirator — A respirator that uses chemicals to remove specific gases and vapors from the air or that uses a mechanical filter to remove particulate matter. An air-purifying respirator must only be used when there is sufficient oxygen to sustain life and the air contaminant level is below the concentration limits of the device.

Air Sampling — Determining quantities and types of atmospheric contaminants by measuring and evaluation of a representative sample of air. The most numerous environmental hazards affecting air are chemical and can be conveniently divided into (a) particulates and (b) gases and vapors. Particulates are mixtures or dispersions of solid or liquid in air and include dust, smoke, mist, and similar materials.

Alkali or Base — Any chemical substance that forms soluble soaps with fatty acids. Alkalis have pH values from 8 to 14 and may cause severe burns to the skin.

Approved — Said of a code, standard, device, or item of equipment that is sanctioned, endorsed, accredited, certified, listed, labeled, or accepted by a duly constituted and nationally recognized authority or agency as satisfactory for use in a specified manner.

Asphyxiation — Suffocation resulting from being deprived of oxygen. Simple asphyxiants (e.g., nitrogen, hydrogen, carbon dioxide) when breathed in high concentrations act mechanically by excluding oxygen from the lungs. Chemical asphyxiants (e.g., carbon monoxide, hydrogen cyanide, aniline) act chemically to prevent oxygen from reaching the tissue, or else prevent the tissue from using it even though the blood is well oxygenated.

Assigned Protection Factor (APF) — A number assigned to any of various classes of respirators in order to determine the maximum concentration of a toxic substance in which they could be used safely. Multiplying the number for a particular respirator by the permissible exposure limit (PEL) for a given toxic substance yields the maximum concentration for which that respirator would provide adequate protection.

Audio Dosimeter — An instrument designed to monitor or measure the noise to which workers are exposed; may have a readout unit which shows noise exposure as a percentage of the daily limits set by the Occupational Safety and Health Administration (OSHA) and the Mine Safety and Health Administration (MSHA), as well as a means of calibrating the instrument during field use. Also called noise dosimeter.

Audiogram — A record of hearing loss or hearing level measured at several different frequencies, usually 500 to 6,000 hertz. The audiogram may be presented graphically or numerically. Hearing level is shown as a function of frequency. A baseline audiogram is the one against which future audiograms are compared.

Audiometric Testing — Objective measuring of a person's hearing sensitivity. By recording the response to a measured signal, a person's level of hearing sensitivity can be expressed in decibels, as related to an audiometric zero, or no-sound base.

Authorized Person — A person designated or assigned by an employer or supervisor to perform a specific type of duty or duties, to use specified equipment or vehicles, and/or to be present in a given location at specified times.

Auto-Ignition Temperature — The lowest temperature at which flammable gas or vapor-air mixture will ignite from its own heat source or a contacted heated surface without the necessity of spark or flame. Vapors and gases will spontaneously ignite at a lower temperature in oxygen than in air, and their auto-ignition temperatures may be influenced by the presence of catalytic substances.

Backup Alarm — A device used on some trucks and buses and required on some off-road vehicles that automatically sounds a continuous or intermittent signal whenever the vehicle is backing up.

Barrier Guard — A device designed to protect operators and other individuals from hazard points on machinery and equipment. Major types are:

- **Adjustable** — An enclosure attached to the frame of the machinery or equipment, with adjustable front and side sections.
- **Fixed** — A point-of-operation enclosure attached to the machine or equipment by fasteners.
- **Gate or movable** — A device designed to enclose the point of operation completely before the clutch can be engaged.
- **Interlocking** — An enclosure attached to the frame of the machinery or equipment and interlocked with the power switch so that the operating cycle cannot normally be started unless the guard, including its hinged or movable sections, is in its proper position. In some applications, movement of the guard will interrupt the machine cycle.

Bonding — Electrically connecting the elements of an installation to each other, utilizing the conductive, non-current-carrying parts (metal conduit, fixture shells, etc.) or special bonding cable, so as to minimize differences in the electrical potential between such elements. Also, connecting items of mechanical apparatus together and grounding them to prevent accumulations of static electricity.

C — Centigrade, a unit of temperature.

Carcinogen — Any substance which, under certain quantified exposures, produces cancer in animals or humans.

Central Nervous System — The portion of the nervous system consisting essentially of the brain and spinal cord.

Chemical — An element (e.g., chlorine) or a compound (e.g., sodium bicarbonate) produced by chemical reaction.

CFR — Code of Federal Regulations. A collection of the regulations that have been promulgated under United States Law.

Chock — A wedge-shaped device made of wood or metal, used to block drums, barrels, or the wheels of parked vehicles to ensure that they do not move, especially on inclined surfaces.

Chronic Effect — An adverse effect on a human or animal body, with symptoms that develop slowly over a long period of time or that recur frequently.

Chronic Exposure — Repeated exposure to or contact with a toxic substance over a period of time, the effects of which become evident only after multiple exposures.

Chronic Toxicity — Adverse chronic effects resulting from repeated doses of or exposures to a substance over a relatively prolonged period of time. Ordinarily used to denote effects in experimental animals.

Combustible Liquid — Any liquid that has a flash point at or above 100° F (37.8° C).

Combustion — Any chemical process that involves oxidation sufficient to produce light or heat.

Competent Person — As defined by the Occupational Safety and Health Administration (OSHA), one who is capable of recognizing and evaluating employee exposure to hazardous substances or to unsafe conditions and is capable of specifying the necessary protective and precautionary measures to be taken to ensure the safety of employees as required by particular OSHA regulations under the conditions to which such regulations apply.

Compressed Gas —

- (a) A gas or mixture of gases having, in a container, an absolute pressure exceeding 40 pounds per square inch (psi) at 70°F (21.1° C); or
- (b) A gas or mixture of gases having, in a container, an absolute pressure exceeding 104 psi at 130°F (54.4° C) regardless of the pressure at 70°F (21.1° C); or
- (c) A liquid having a vapor pressure exceeding 40 psi at 100°F (37.8° C) as determined by American Society for Testing and Materials (ASTM) D-323-72.

Corrosive — A chemical that causes visible destruction of, or irreversible alterations in, living tissue by chemical action at the site of contact.

Cryogenics — The science that deals with the production of very low temperatures and their effects on the properties of matter.

Cumulative Trauma Disorder — A disorder caused by the highly repetitive motion required of one or more parts of a worker's body, which, in some cases, can result in moderate to total disability (e.g., carpal tunnel syndrome).

Danger Zone — A physical area or location within which a danger exists. Often indicated by signs, lines painted around or through the zone, or barricades. Also any area in or about a machine or piece of equipment where an employee or other person may be struck by or caught between moving parts, caught between moving and stationary objects or parts of the machine, caught between the material and a moving part of the machine, burned by hot surfaces, or exposed to electric shock.

Decibel (Db) — A measure of sound expressed as the logarithmic ratio of two amounts of pressure, power, or intensity between a measured quantity and a reference quantity.

Dermal Toxicity — The ability of a toxic chemical or pesticide to poison people or animals by coming into contact with their skin.

Dust — Suspended particles of solid matter (such as pollen or soot) in such a fine state of subdivision that they may be inhaled, swallowed, or absorbed in the body. Dusts do not diffuse in air but settle under the influence of gravity. Dust is a descriptive term for airborne solid particles that range in size from 0.1 to 25 microns (1 micron equals 1/25,000th inch equals 1/10,000th centimeter). Dusts above 5 microns in size usually will not remain airborne long enough to present an inhalation problem.

Electrical Grounding — Precautionary measures designed into an electrical installation to eliminate dangerous voltages in and around the installation and to operate protective devices in case of current leakage from energized conductors to their enclosures

Emergency Plan — A comprehensive document to guide managers on actions to be taken under various emergency conditions. Includes responsibilities of individuals and departments, organization resources available for use, sources of aid outside the organization, general methods or procedures to follow, authority to make decisions, requirements for implementing procedures within departments, training and practice of emergency procedures, communications, and reports required.

Employee — General term for an employed wage earner or salaried worker.

Employee Involvement — In relation to safety, any of a variety of practices wherein employees take part in reaching decisions that affect their daily work experience. Among common approaches are (a) job enrichment or enlargement, (b) employee autonomy, (c) employee consultation, (d) employees as a source of information and ideas, and (e) problem-solving activities; plus distribution of financial rewards associated with increased productivity stemming from worker input.

Employer — General term for any individual, corporation, or other operating group, who hires workers (employees). The terms 'employer' and 'management' are often used interchangeably when there is no intent to draw a distinction between owners and managers.

Enforcement — The exercising of executive power or the use of authority, direct or delegated, to require the adherence to prescribed standards, policies, laws, rules, and regulations.

Engineering Control — Any physical means of controlling hazards, such as through equipment design or redesign (e.g., machine guards), environmental system (e.g., ventilation, lighting, nonslip stair treads), or altered process routine.

Evaporation Rate — The rate at which a material will vaporize (evaporate) when compared to the known rate of vaporization of a standard material. The evaporation rate can be useful in evaluating the health and fire hazards of a material. The designated standard material is usually normal butyl acetate (NBUAC or n-BuAc), with a vaporization rate designated as 1.0. Vaporization rates of other solvents or materials are then classified as:

- Fast — evaporation rate greater than 3.0.
- Medium — evaporation rate between 0.8 to 3.0.
- Slow — evaporation rate less than 0.8.

Explosive — A chemical that causes a sudden, almost instantaneous release of pressure, gas, and heat when subjected to sudden shock, pressure, or high temperature.

Explosive Range/Flammable Range — The difference between the lower and upper flammable (explosive) limits, expressed in terms of percentage by volume of vapor or gas in air.

Extinguishing Media — The fire fighting substance to be used to control a material in the event of a fire. It is usually identified by its generic name, such as fog, foam, water, etc.

F — Fahrenheit, a scale for measuring temperature.

First-Aid — The emergency care of a person who is injured or ill, to prevent death or further injury, to relieve pain, and to counteract shock, until medical aid can be obtained.

Flammable Liquid — A liquid having a flash point below 100° F and having a vapor pressure not exceeding 40 pounds per square inch absolute at 100° F.

Flash Point — The lowest temperature of a flammable liquid at which it gives off sufficient vapor to form an ignitable mixture with the air near the surface of the liquid or within the vessel used. The flash point can be determined by the closed cup method (commonly used to determine the classification of liquids that flash in the ordinary temperature range), or the open cup method (which usually gives a somewhat higher flash point).

Floor Hole — An opening in a floor, roof, or platform through which small tools or materials, but not persons, may fall.

Floor Loading — The weight and distribution of loads on a floor. The relationship between design load capacity and actual flooring load will indicate accurately whether a floor is safely loaded or overloaded.

Floor Opening — An opening in a floor, roof, or platform through which persons or materials may fall.

Fume — A solid condensation particle of extremely small diameter, commonly generated from molten metal as metal fume.

g — Gram, a metric unit of weight. One ounce U.S. is about 28.4 grams.

g/kg — Grams per kilogram, an expression of dose used in oral and dermal toxicology testing to denote grams of a substance dosed per kilogram of animal body weight.

General Exhaust — A system for exhausting air containing contaminants from a general work area.

Ground-Fault Circuit Interrupter — A sensitive device, intended for shock protection, which functions to de-energize an electrical circuit or portion thereof within a fraction of a second, in case of leakage to ground of current sufficient to be dangerous to persons but less than that required to operate the overcurrent protective device of the circuit. Also called shock protector.

Guardrail — A device consisting of posts and rail members, (or wall sections), erected to mark points of major hazard, and to prevent individuals from coming in contact with the hazard.

Hazard — A condition or changing set of circumstances that presents a potential for injury, illness, or property damage. The potential or inherent characteristics of an activity, condition, or circumstance that can produce adverse or harmful consequences.

Hazard Control — A means of reducing the risk due to exposure to a hazard. Such means may include: ergonomic design of work tasks, stations, and equipment; arrangement, guarding, and interlocking of machinery; barricading of pedestrian and vehicular traffic routes; process controls to limit exposure to toxic materials; ventilation and exhaust fans; prescribed work practices, including the wearing of personal protective equipment; and visible and/or audible warning devices.

Hazardous Chemical — Any chemical whose presence or use is a physical hazard or a health hazard.

Health Hazard — A chemical for which there is significant evidence, based on at least one study conducted in accordance with established scientific principles, that acute or chronic health effects may occur in exposed employees. The term "health hazard" includes chemicals that are carcinogens, toxic or highly toxic agents, reproductive toxins, irritants, corrosives, sensitizers, hepatotoxins, nephrotoxins, neurotoxins, agents that act on the hematopoietic system, and agents that damage the lungs, skin, eyes, or mucous membranes.

Ignition Temperature — The minimum temperature to which a substance in air must be heated in order to initiate or cause self-sustaining combustion independent of the heating source.

Incompatible — Materials that could cause dangerous reactions by direct contact with one another.

Industrial Truck — Any powered truck used to carry, push, pull, lift, stack, or tier material. Industrial trucks may be classified by power source, operator position, and means of engaging the load.

Injury Rate — Frequency or severity of occupational accident experience expressed in terms of a base unit of measure (e.g., number of disabling injuries, fatal injuries, etc., per 1,000,000 employee-hours of exposure).

Irritant — Any substance which on immediate, prolonged, or repeated contact with normal living tissue induces a local inflammatory reaction. A primary irritant is one that produces an irritating effect at the area of skin contact. Although a given irritant may affect everyone, it does not produce the same degree of irritation in all persons.

Job Hazard Analysis — The breaking down into its component parts of any method or procedure to determine the hazards connected therewith and the requirements for performing it safely. A method for studying a job in order to (a) identify hazards or potential accidents associated with each step or task and (b) develop solutions that will eliminate, nullify, or prevent such hazards or accident potential. Also called job safety analysis.

Joint Safety and Health Committee — A committee consisting of non-supervisory and supervisory representatives appointed to consider safety and health matters; such committees are frequently required by law.

LC_{Lo} — Lethal concentration, low. Lowest concentration of a gas or vapor capable of killing a specified species over a specified time.

LC₅₀ — Lethal concentration, fifty percent. The concentration of a material in air that will kill 50 percent of a group of test animals with a single exposure (usually in 1 to 4 hours).

LD_{Lo} — Lethal dose, low. Lowest administered dose of a material capable of killing a specified test species.

LD₅₀ — Lethal dose, fifty percent. A single dose of a material expected to kill 50 percent of a group of test animals. The LD₅₀ dose is usually expressed as milligrams or grams of material per kilogram of animal body weight (mg/kg or g/kg). The material may be administered by mouth or applied to the skin.

LEL, or LFL — Lower explosive limit, or lower flammable limit, of a vapor or gas; the lowest concentration (lowest percentage of the substance in air) that will produce a flash of fire when an ignition source (heat, arc, or flame) is present. At concentrations lower than the LEL, the mixture is too "lean" to burn.

Local Exhaust — A system for capturing and exhausting contaminants from the air at the point where the contaminants are produced (e.g., welding, grinding, sanding, other processes or operations).

Medical Evaluation — An assessment of the results of a physical examination to determine the possible relationships between physical defects, physiological malfunctions, or disease and involvement in accidents. Visual acuity and blood pressure illustrate the variables studied.

mg — Milligram, a metric unit of weight that is one-thousandth of a gram.

mg/kg — Milligrams of substance per kilogram of body weight, an expression of toxicological dose.

mg/m³ — Milligrams per cubic meter, a unit for expressing concentrations of dusts, gases, or mists in air.

Mist — Suspended liquid droplets generated by condensation from the gaseous to the liquid state, or by breaking up a liquid into a dispersed state, such as splashing, foaming or atomizing. Mist is formed when a finely divided liquid is suspended in air.

MSDS — Material Safety Data Sheet.

Mutagen — Any substance that is capable of reacting with genes and chromosomes to produce mutations (inheritable genetic alterations) in future generations of animals or humans.

Noise — Unwanted sound.

Noise-Induced Hearing Loss — The slowly progressive inner ear hearing loss that results from exposure to continuous noise over a long period of time, as contrasted with acoustic trauma or immediate physical injury to the hearing mechanism.

Noise-Induced Permanent Threshold Shift (NIPTS) — In relation to quantifying the effects of noise, a method used to predict the actual shift in a worker's hearing level, or the amount of hearing loss in decibels, that is expected to result from given levels and durations of noise exposure, after correcting for presbycusis.

Occupational Health Program — A program, often provided by an employer, that deals constructively with the health of employees in relation to their work; included is medical care for work-induced injuries as well as for occupational diseases. Earlier concepts of curative medicine have been broadened to include health maintenance through the prevention of injuries and diseases.

Olfactory — Relating to the sense of smell.

Organic Peroxide — An organic compound that contains the bivalent -O-O structure and may be considered a structural derivative of hydrogen peroxide where one or both of the hydrogen atoms has been replaced by an organic radical.

Overexposure — Exposure to a hazardous material beyond the allowable exposure limits.

Oxidizer — A chemical other than a blasting agent or explosive that initiates or promotes combustion in other materials, causing fire either by itself or through the release of oxygen or other gases.

Outriggers — In relation to cranes, extendable or fixed members (usually four) attached to the base on which a crane is mounted and used to enlarge the operating area of the crane and prevent it from tipping over.

PEL — Permissible Exposure Limit, an occupational exposure limit established by OSHA's regulatory authority. It may be a time-weighted average (TWA) limit or a maximum concentration exposure limit.

Permanent Threshold Shift (PTS) — Permanent loss of hearing that usually occurs over a long period of time (unless it results from a single traumatic exposure to noise, such as an explosion or blast). Varies among persons according to noise level, duration of exposure, hearing acuity, and susceptibility to hearing loss. Permanent threshold shift is typically a gradual loss of hearing of an insidious nature that may go unnoticed for several years because the actual loss may not be more than 1 decibel (dB) per year.

Personal Protective Equipment — Any material or device worn to protect a worker from exposure to or contact with any harmful substance or force.

pH — The symbol relating the hydrogen ion (H^+) concentration to that of a given standard solution. A pH of 7 is neutral. Numbers increasing from 7 to 14 indicate greater alkalinity. Numbers decreasing from 7 to 0 indicate greater acidity.

Physical Hazard — A chemical or other substance for which there is scientifically valid evidence that it is a combustible liquid, a compressed gas, explosive, flammable, an organic peroxide, an oxidizer, pyrophoric, unstable (reactive) or water-reactive.

Platform — A space for workers elevated above the surrounding floor or ground level, such as a balcony for the operation of machinery or equipment.

Polymerization — A chemical reaction in which one or more small molecules combine to form larger molecules. A hazardous polymerization is such a reaction that takes place at a rate that releases large amounts of energy.

ppm — The concentration of a gas or vapor in air in parts per million. Also describes the concentration of a particulate in a liquid or solid in parts per million.

Procedure — A series of logical steps by which all repetitive action is initiated, performed, controlled, and finalized. A procedure establishes what action is required, who is required to act, and when the action is to take place. Also, a medium for communicating, to all parties concerned, managerial policy decisions applying to routine or repetitive areas of operations.

psi — Pounds per square inch, (for MSDS purposes) the pressure a material exerts on the walls of a confining vessel or enclosure. For technical accuracy, pressure must be expressed as psig (pounds per square inch gauge) or psia (pounds per square inch absolute; that is, gauge pressure plus sea level atmospheric pressure, or psig plus approximately 14.7 psi).

Pyrophoric — A chemical that will ignite spontaneously in air at a temperature of 13° F (54.4° C) or below.

Qualitative Fit Testing (QLFT) — A procedure that relies on the subjective reaction of a respirator wearer to an irritant fume or to a substance with a characteristic odor or taste, in order to determine whether the respirator is adequate.

Quantitative Fit Testing (QTFT) — A procedure that measures the concentrations of a test air contaminant both inside and outside a respirator in order to assign a numerical value to the protection afforded the respirator wearer.

Respiratory Hazard — Any toxic gas, vapor, organic or inorganic mist, dust, or fumes that can produce harmful effects if breathed by humans.

Respiratory Protection — Devices that will protect the wearer's respiratory system from overexposure by inhalation of airborne contaminants. Respiratory protection is used when a worker must work in an area where he/she might be exposed to concentration in excess of the allowable exposure limit.

Respiratory System — The human breathing system; includes the lungs and air passages (trachea or windpipe, larynx, mouth, and nose) to the air outside the body.

Risk — A measure of both the probability and the consequence of all hazards of an activity or condition. A subjective evaluation of relative failure potential. In risk assessment, the amount or degree of potential danger perceived by a given individual when determining a course of action to accomplish a given task.

Rollover Protective Structure (ROPS) — A structure attached to the frame of mobile power equipment and designed to prevent the operator from being crushed if the equipment overturns or rolls over; used on farm tractors, earth-moving machines, industrial trucks, and similar equipment. The operator of a ROPS-equipped vehicle must fasten the seat belt to be properly protected.

Routes of Entry — The means by which material may gain access to the body; for example, inhalation, ingestion, and skin contact.

Safe — Relatively free from danger, injury, or damage or from the risk of danger, etc.

Safety Audit — A periodic, methodical, in-depth examination of an organization, performed by one or more trained persons using a predetermined checklist of items that reflect good safety practice, to provide the basis for management decisions affecting the organization's safety program. The audit, for example, could (a) review the record of accidents, injuries, and illnesses sustained by employees since the previous audit; (b) analyze the time and money devoted to identifying and controlling hazards, to training, and to safety motivation; (c) ascertain the extent to which various levels of management are involved in accident prevention; and (d) include the results of a physical inspection of the premises and observations of personnel performing operations that accident records show were hazardous in the past.

Safety Can — An approved closed container, of not more than 5 gallons capacity, that has a flash-arresting screen and a spring-closing lid and spout cover, and is so designed that it will safely relieve internal pressure when exposed to fire.

Safety Education, or Safety Training — Learning experiences enabling workers, supervisors, managers, and others to gain knowledge, skills, attitudes, and motivations concerning the safety requirements of operations, processes, environments, etc. The objective of safety education is behavior change.

Safety Observer — An employee chosen to receive special training in recognizing hazards within his/her work area; in stimulating on-the-job communication among fellow employees about the hazards and how to control or counteract them; and in helping to identify obscure, hidden, or rarely encountered hazards that could be high-potential risks. The use of employees trained as safety observers is said to enhance the effectiveness of a risk control program.

Safety Program — An administrative and procedural plan for placing loss prevention and hazard control systems into operation and maintaining their effectiveness. An orderly arrangement of interdependent activities and related procedures that facilitates the safe performance of tasks and processes and maintains control of risk due to hazardous exposure, including human error.

Safety Rule — A rule prescribing procedural or safeguarding requirements, personal protective equipment, or safe behavior on the job.

Safety Standard — A set of criteria specifically designed to define a safe product, practice, mechanism, arrangement, process, or environment, produced by a body representative of all concerned interests and based upon currently available scientific and empirical knowledge concerning the subject or scope of the standard. Safety standards meeting the requirements for due process and the criteria of the American National Standards Institute are designated American National Standards. Note: In some cases government agencies have adopted various American National Standards, thus making them mandatory and enforceable. In other cases government agencies, to implement legislation, have developed their own standards. In both instances such safety standards may be more properly termed safety regulations.

Self-Contained Breathing Apparatus — A respiratory protection device that consists of a supply or a means of respirable air, oxygen, or oxygen-generating material carried by the wearer.

Sensitizer — A chemical which, after extended or repeated exposure, produces in some individuals an allergic type of skin irritation called “sensitization dermatitis.”

Signal Word — The word on a hazardous chemical label that indicates the relative degree of severity of the hazard in this diminishing order: Danger!, Warning! , Caution! If a product is hazardous at more than one level of severity, only the signal word indicating its highest severity level is used.

Sound Attenuation — The reduction, expressed in decibels, of the sound intensity at a designated first location as compared with the sound intensity at a second location that is acoustically farther from the source or is blocked by intervening material.

Sound Level Meter — An instrument for use in measuring sound pressure levels in decibels referenced to 0.0002 microbars. Readings can also be made in specific octave bands, usually beginning at 75 hertz and continuing through 10,000 hertz.

Specific Gravity — The ratio of the weight or mass of a given volume of a substance, at a specified temperature, to that of an equal volume of another substance used as a standard. Water at 39.2° F (4° C) is the usual standard for liquids and solids; dry air (at the same temperature and pressure as the gas) is often taken as the standard substance for gases.

Supervisor — Any individual held responsible for the behavior and production of a group of workers.

Supervisory Management — The group directly responsible to the middle management group for final execution of policies and the implementing of directives by rank-and-file employees, and for attaining objectives in assigned organizational units through practices and procedures approved and issued by top or middle management.

Systemic Toxicity — Adverse effects caused by a substance that affects the body in a general rather than local manner.

Target Organ Toxin — A toxic substance that attacks a specific organ of the body. For example, overexposure to carbon tetrachloride can cause liver damage.

Teratogen — A substance that is capable of causing changes in the offspring of any species by acting directly on the fetus

TLV — Threshold Limit Value, a term used by American Conference of Governmental Industrial Hygienists (ACGIH) to express the airborne concentration of material to which nearly all persons can be exposed day after day without adverse effects. ACGIH expresses TLVs in three ways:

- TLV-TWA — The allowable Time-Weighted Average concentration for a normal 8-hour workday or 40-hour workweek.
- TLV-STEL — The Short-Term Exposure Limit, or maximum concentration for a continuous 15-minute exposure period (maximum of four such periods per day, with at least 60 minutes between exposure periods, and provided the daily TLV-TWA is not exceeded).
- TLV-C — The ceiling exposure limit is the concentration that should not be exceeded even instantaneously.

Toolbox Safety Meeting, or Tailgate Safety Meeting — A meeting of a few workers held in or very close to their workplaces during which the foreperson or supervisor discusses a particular topic, such as a recent accident or near-accident, a unique hazard at the work site, the safe operation of equipment, new work procedures, or any other subject germane to safe performance by the workers assembled. Such meetings are usually of short duration and may be held daily, weekly, or at the call of a foreperson or supervisor.

Toxic — Descriptive of any substance (other than a radioactive substance) which can produce injury or illness to humans through ingestion, inhalation, or absorption through any body surface.

UEL, or UFL — Upper explosive limit or upper flammable limit of a vapor or gas; the highest concentration (highest percentage of the substance in air) that will produce a flash of fire when an ignition source (heat, arc, or flame) is present. At higher concentrations, the mixture is too "rich" to burn.

Unsafe Act — A behavioral departure from an accepted, normal, or correct procedure or practice which, in the past, has produced injury or property damage or which has the potential for doing so in the future; an unnecessary exposure to a hazard; conduct that reduces the degree of safety normally present in an activity.

Unsafe Condition — Any physical state which deviates from that which is acceptable, normal, or correct in terms of its past production or potential future production of personal injury and/or damage to property; any physical state which results in a reduction in the degree of safety normally present.

Unstable, or Reactive — A chemical that, in the pure state, or as produced or transported, will vigorously polymerize, decompose, condense, or become self-reactive under conditions of shocks, pressure, or temperature.

Vapor — The gaseous form of a solid or liquid substance as it evaporates.

Vapor Density — The weight of a vapor or gas compared to the weight of an equal volume of air; an expression of the density of the vapor or gas. Materials lighter than air have vapor densities less than 1.0. Materials heavier than air have vapor densities greater than 1.0.

Vapor Pressure — The pressure exerted by a saturated vapor above its own liquid in a closed container. When quality control tests are performed on products, the test temperature is usually 100° F, and the vapor pressure is expressed as pounds per square inch (psig or psia), but vapor pressures reported on MSDS's are in millimeters of mercury (mm Hg) at 68° F (20° C), unless stated otherwise. Three facts are important to remember:

- Vapor pressure of a substance at 100° F. will always be higher than the vapor pressure of the substance at 68° F. (20° C.).
- Vapor pressures reported on MSDS's in mm Hg are usually very low pressures; 760 mm Hg is equivalent to 14.7 pounds per square inch.
- The lower the boiling point of a substance, the higher its vapor pressure.

Volatility — A measure of how quickly a substance forms a vapor at ordinary temperatures.

Work Practice — A set of guidelines for performing a specific work assignment properly (efficiently, safely, productively).

Working Surface — Any surface or plane on which an employee walks or works.

Workplace — An establishment at one geographical location containing one or more work areas.

Zero Energy State — The state of equipment in which every power source that can produce movement of a part of the equipment, or the release of energy, has been rendered inactive.

Section 18

Summary of Relevant OSHA Standards

INDEX OF GENERAL INDUSTRY SAFETY AND HEALTH STANDARDS IN 29 CFR 1910

Section 18 provides a list of OSHA General Industry Standards in 29 CFR 1910. Current copies of the standards can be printed and downloaded from the OSHA website (<http://www.osha.gov>).

Subpart A — General

- 1910.1 Purpose and scope.
- 1910.2 Definitions.
- 1910.3 Petitions for the issuance, amendment, or repeal of a standard.
- 1910.4 Amendments to this part.
- 1910.5 Applicability of standards.
- 1910.6 Incorporation by reference.
- 1910.7 Definition and requirements for a nationally recognized testing laboratory.
- 1910.8 OMB control numbers under the Paperwork Reduction Act.

Subpart B — Adoption and Extension of Established Federal Standards

- 1910.11 Scope and purpose.
- 1910.12 Construction work.
- 1910.15 Shipyard employment.
- 1910.16 Longshoring and marine terminals.
- 1910.17 Effective dates.
- 1910.18 Changes in established Federal standards.
- 1910.19 Special provisions for air contaminants.

Subpart C — [Removed and Reserved]

- 1910.20 [Redesignated as 1910.1020]

Subpart D — Walking/Working Surfaces

- 1910.21 Definitions.
- 1910.22 General requirements.
- 1910.23 Guarding floor and wall openings and holes.
- 1910.24 Fixed industrial stairs.
- 1910.25 Portable wood ladders.

- 1910.26 Portable metal ladders.
- 1910.27 Fixed ladders.
- 1910.28 Safety requirements for scaffolding.
- 1910.29 Manually propelled mobile ladder stands and scaffolds (towers).
- 1910.30 Other working surfaces.

Subpart E — Means of Egress

- 1910.35 Definitions.
- 1910.36 General requirements.
- 1910.37 Means of egress, general.
- 1910.38 Employee emergency plans and fire prevention plans.

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Subpart F — Powered Platforms, Manlifts, and Vehicle-Mounted Work Platforms

- 1910.66 Powered platforms for building maintenance.
- 1910.67 Vehicle-mounted elevating and rotating work platforms.
- 1910.68 Manlifts.

Subpart G — Occupational Health and Environmental Control

- 1910.94 Ventilation.
- 1910.95 Occupational noise exposure.
- 1910.96 [Redesignated as 1910.1096]
- 1910.97 Nonionizing radiation.
- 1910.98 Effective dates.

Subpart H — Hazardous Materials

- 1910.101 Compressed gases (general requirements).
- 1910.102 Acetylene.
- 1910.103 Hydrogen.
- 1910.104 Oxygen.
- 1910.105 Nitrous oxide.
- 1910.106 Flammable and combustible liquids.
- 1910.107 Spray finishing using flammable and combustible materials.
- 1910.108 Dip tanks containing flammable or combustible liquids.
- 1910.109 Explosives and blasting agents.
- 1910.110 Storage and handling of liquified petroleum gases.
- 1910.111 Storage and handling of anhydrous ammonia.
- 1910.112 [Reserved]
- 1910.113 [Reserved]
- 1910.119 Process safety management of highly hazardous chemicals.

1910.120 Hazardous waste operations and emergency response.

Subpart I — Personal Protective Equipment

- 1910.132 General requirements.
- 1910.133 Eye and face protection.
- 1910.134 Respiratory protection.
- 1910.135 Head protection.
- 1910.136 Foot protection.
- 1910.137 Electrical protective devices.
- 1910.138 Hand Protection.

Subpart J — General Environmental Controls

- 1910.141 Sanitation.
- 1910.142 Temporary labor camps.
- 1910.143 Nonwater carriage disposal systems. [Reserved]
- 1910.144 Safety color code for marking physical hazards.
- 1910.145 Specifications for accident prevention signs and tags.
- 1910.146 Permit-required confined spaces.
- 1910.147 The control of hazardous energy (lockout/tagout).

Subpart K — Medical and First-Aid

- 1910.151 Medical services and first aid.
- 1910.152 [Reserved]

Subpart L — Fire Protection

- 1910.155 Scope, application and definitions applicable to this subpart.
- 1910.156 Fire brigades.
- 1910.157 Portable fire extinguishers.
- 1910.158 Standpipe and hose systems.
- 1910.159 Automatic sprinkler systems.
- 1910.160 Fixed extinguishing systems, general.
- 1910.161 Fixed extinguishing systems, dry chemical.
- 1910.162 Fixed extinguishing systems, gaseous agent.
- 1910.163 Fixed extinguishing systems, water spray and foam.
- 1910.164 Fire detection systems.
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- Appendix A to Subpart L Fire Protection.
- Appendix B to Subpart L National Consensus Standards.
- Appendix C to Subpart L Fire Protection References for Further Information.

- Appendix D to Subpart L Availability of Publications Incorporated by
Reference in Section 1910.156 Fire Brigades.
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- 1910.331 Scope.
- 1910.332 Training.
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- 1910.336 – 1910.360 [Reserved]

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- 1910.361 – 1910.380 [Reserved]

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- 1910.1000 Air contaminants.
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- 1910.1006 Methyl chloromethyl ether.
- 1910.1007 3,3'-Dichlorobenzidine (and its salts).
- 1910.1008 bis-Chloromethyl ether.
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- 1910.1016 N-Nitrosodimethylamine.
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- 1910.1020 Access to employee exposure and medical records.
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- 1910.1096 Ionizing radiation.
- 1910.1200 Hazard communication.
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