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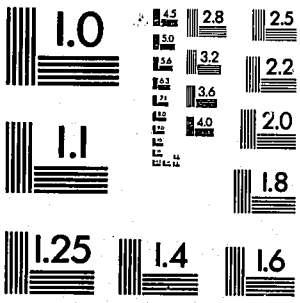

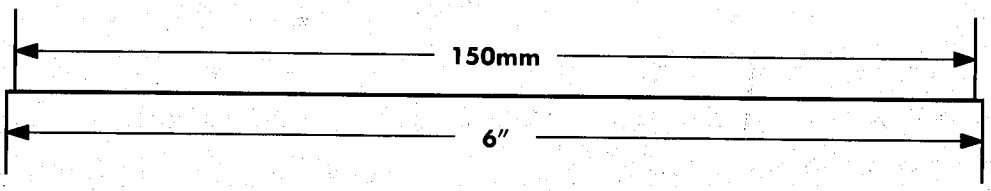

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HEALTH AND SAFETY GUIDE FOR SIGN & ADVERTISING DISPLAY MANUFACTURERS

U.S. DEPARTMENT OF HEALTH, EDUCATION, AND WELFARE
Public Health Service
Center for Disease Control
National Institute for Occupational Safety and Health
Division of Technical Services
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INTRODUCTION

The Williams-Steiger "Occupational Safety and Health Act of 1970" was passed into law "to assure safe and healthful working conditions for working men and women . . ." This Act established the National Institute for Occupational Safety and Health (NIOSH) under the Department of Health, Education, and Welfare (DHEW) and the Occupational Safety and Health Administration (OSHA) under the Department of Labor (DOL). The Act provides for research, information, education, and training in the field of occupational safety and health and authorizes enforcement of the standards. As part of these activities, surveys have been made by NIOSH to determine the most common health and safety problems in small businesses. This Guide includes a "Guidelines" section and a section on "Frequently Violated Regulations"; it is being distributed throughout the industry.

While the aim of this Guide is to assist in providing a safe and healthful workplace by describing safe practices and helping to correct some of the more frequently encountered violations of the safety and health standards, it is not intended to provide total information in all areas of compliance. Additional information can be found in "General Industry Standards" Title 29 Code of Federal Regulations Part 1910 and "Construction Industry Standards" Part 1926.

Words such as "must," "required," "necessary," and "shall" appearing in the text indicate requirements under the Federal Regulations. Procedures indicated by "should," "suggested," etc., constitute generally accepted good practices.

In some states, the federal government has delegated enforcment authority for occupational safety and health to the state government. Although state standards sometimes differ, they must be at least as effective as the federal standards.

On the last few pages of the Guide are listed addresses of NIOSH and OSHA regional offices where additional information and materials can be obtained. Consultation resulting from requests for assistance will not precipitate a compliance visit by OSHA.

HEALTH AND SAFETY GUIDELINES

GENERAL PHILOSOPHY FOR HEALTH AND SAFETY COMPLIANCE

Through the use of a health and safety program and actively supported employee training, existing unsafe acts or conditions should become apparent. For many of these there may not be specific standards. Nevertheless, it is important to find a solution to these recognized problems.

During the analysis of the workplace for health and safety problems, it may also become apparent that "the letter of the law" is not being met. This may be particularly noticeable where dimensions are given for ladders, stairs, railings, etc. If it is apparent to all concerned that the "intent" of the law is being met, instead of making changes, a variance may be requested. Considerable discretion must be exercised in this area and the decision not to make changes should be made with the concurrence of OSHA.

When new buildings are being constructed, renovations are being made, or new equipment is obtained, the standards must be followed.

Even where a citation is issued, it is desirable that the employer have demonstrated his willingness to comply with the intent of the law by operating effective, on-going safety and health programs, by correcting imminent dangers in the workplace, by maintaining records of purchases, installations, and other compliance-promoting activities. Therefore, after an OSHA compliance visit and a citation, the manager can substantiate his intent to provide a safe and healthy workplace for his employees by demonstrating records which document his purpose, and may be given the benefit of having shown "good faith" when penalties are being determined.

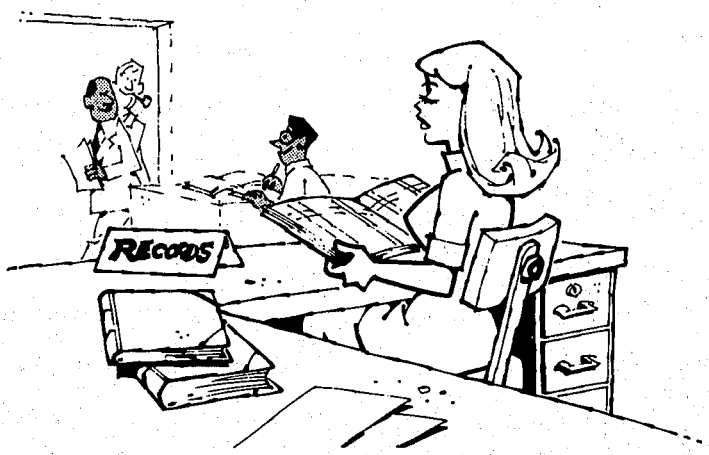
HEALTH AND SAFETY GUIDELINES

HEALTH AND SAFETY PROGRAM

Hazardous conditions or practices not covered in the OSHA standards are covered under the general duty clause of the Act which 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."

A health and safety program is an effective method to assist in providing for a safe working environment. The purpose of such a program is to recognize, evaluate, and control hazards and potential hazards in the workplace.

Hazards may be identified by performing self-inspections, soliciting employee input (interviews, suggestions, and complaints), promptly investigating accidents, reviewing injury and illness records, using material in this Guide, and other information sources. Typical examples of hazards are unsafe walking surfaces, unguarded machinery, electrical hazards, improper lifting, and air contaminants. The "Checklist" in the back of this book is of particular importance in identifying hazards. It should be customized to fit the needs of your program.



Identifying hazards by reviewing injury and illness records.

HEALTH AND SAFETY GUIDELINES

Situations which occur more frequently or cause the most severe problems should be given priority for corrective action. This Guide contains many of the requirements and good practices needed to correct the hazards that have been identified.

For more complex problems, such as those requiring engineering controls to reduce noise or airborne contamination, outside consultants may be needed.

Management may want to assign safety and health responsibilities in the areas of both program development and implementation. Regular meetings or informal discussions can be held to discuss safety promotions, hazards, injury and illness records, etc. To ensure program success, management leadership is necessary. The person assigned responsibility, for instance the supervisor, must be delegated the authority and have management support to carry out the part of the program assigned. Likewise, everyone in the establishment should be aware of the activities of the program through a systematic interchange of information. Employees cannot take an interest in the program if they are unaware of what is occurring. Conversely, well informed employees will likely show interest and a desire to participate.

HEALTH AND SAFETY GUIDELINES

REDUCING UNSAFE ACTS AND PRACTICES EMPLOYEE TRAINING

A safe operation depends largely upon employees who are properly informed and aware of potential hazards. Training needs will vary according to the complexity of the operation. Some suggestions are to:

1. Impress upon the worker the need for constant awareness — even during automatically controlled operations.
2. Be sure all employees know when and how to use appropriate personal protective equipment, if needed.
3. Develop and maintain check points to be observed as a part of standard and emergency procedures during each shift.
4. Post appropriate warning signs and operating procedures.
5. Instruct employees in the use of portable fire extinguishers (refer to fold-out chart in this booklet and post in a conspicuous place).
6. Have at least one person trained in first aid on each shift.
7. Be sure that employees who are authorized to use motorized equipment are thoroughly instructed in its operation and potential hazards.
8. Develop a "good housekeeping" awareness to reduce accidents and to develop the employees' sense of pride in their surroundings. An individual should be assigned responsibility for clean up.
9. Instruct employees in safe lifting practices. Such instruction may prevent many injuries. An easily understood chart, "How to Lift Safely," is included in the back of this book for posting where it may be seen by employees.

HEALTH AND SAFETY GUIDELINES

MACHINE GUARDING

It is generally recognized that machine guarding is of the utmost importance in protecting the employee. In fact, it could be said that the degree to which machines are guarded in an establishment is a reflection of management's interest in providing a safe workplace.

Personnel cannot always be relied upon to act safely enough around machinery in motion to avoid accidents. From time to time, people will react differently to the same environment because of physical, mental, or emotional changes — sometimes reacting safely, sometimes not. It follows that even the well-coordinated and highly trained individual may at times perform unsafe acts which could lead to injury and death, and, therefore, machine guarding is important.

GOOD HOUSEKEEPING HELPS PREVENT FIRES

Maintaining a clean and orderly workplace reduces the danger of fires. Combustible material of any type should be kept only in places which are isolated by fire-resistant construction.

Rubbish should be disposed of regularly. If it is necessary to store combustible waste materials, a covered metal receptacle is suggested.

The materials used for cleaning can create hazards. Combustible sweeping compounds such as oil-treated sawdust can be a fire hazard. Floor coatings containing low flash point solvents can be dangerous, especially near sources of ignition. All oily mops and rags must be stored in closed metal containers.

HEALTH AND SAFETY GUIDELINES

Some common causes of fires in all businesses are:

1. Electrical malfunctions
2. Friction
3. Open flames
4. Sparks
5. Hot surfaces
6. Smoking.

Proper maintenance and awareness of these conditions through a safety program can reduce these hazards.

SAFETY RULES FOR OPERATING POWER TOOLS

Employees should be instructed to:

1. Know the application, limitations and potential hazards of the tool used.

2. Select the proper tool for the job.

3. Remove adjusting keys and wrenches before turning on tools.

4. Not use tools with frayed cords or loose or broken switches.

5. Keep guards in place and in working order.

6. Have ground prongs in place.
7. Maintain working areas free of clutter.
8. Keep alert to potential hazards in the working environment, such as damp locations or the presence of highly combustible materials.
9. Dress properly to prevent loose clothing from catching in moving parts.
10. Use safety glasses, dust or face masks or other protective clothing and equipment when necessary.
11. Not surprise or distract anyone using a power tool.

GENERAL INFORMATION ABOUT THE INDUSTRY

Employees in the sign and advertising display manufacturing and installation industry are subject to a number of potentially hazardous conditions. The major causes of injury in this industry are:

1. Improper use of tools
2. Improperly guarded machinery
3. Trips and falls
4. Electrical hazards
5. Improper lifting.

Perhaps the highest risk of injury to employees in the sign industry involves the installation and maintenance of electric signs. Industrial wiring and the use of intricate moving equipment at relatively great heights are two problem areas. Manufacturers of installation equipment have built in such safety measures as insulated booms, control locks, over-rides, and safety harnesses, but management still has the responsibility of making sure employees use the prescribed safety equipment and are adequately trained in its use. Additionally, other OSHA regulations may still apply in spite of equipment safety devices. For example, minimum clearance distance of equipment from overhead high voltage transmission lines must be adhered to regardless of the use of insulated equipment.

When installing or servicing signs, management must make sure that applicable construction safety and health regulations are adhered to by on-site employees. The more important requirements include:

1. Safety belts, lifelines, and lanyards

2. Safety nets
3. Scaffolding and ladders
4. Signs, signals, and barricades
5. Head, eye, and face protection
6. Welding.

AUTOMATIC SPRINKLER SYSTEMS

When automatic sprinkler systems are provided, they must meet design requirements of the National Fire Protection Association's Standard for the Installation of Sprinkler Systems NFPA No. 13-1969 as well as OSHA requirements.

1. Every automatic sprinkler system must have at least one automatic water supply of adequate pressure, capacity, and reliability.

2. One or more fire department connections through which the fire department can pump water is required. No shut-off valve is allowed in these connections.

3. The employer is responsible for the condition of the sprinkler system and must keep it in good operating order. At least annual functional tests are required.

4. The clearance between sprinkler deflectors and the top of combustible storage must be at least 36 inches unless the material is in solid piles less than 15 feet high or in piles less than 12 feet high with horizontal channels, in which case a minimum clearance of 18 inches is allowed. Commodities containing only small amounts of combustible material may be stored up to 18 inches from the sprinkler deflectors.

5. Alarm systems, audible to all employees, must be provided on all automatic sprinkler installations.

These requirements are covered more fully in later sections of this Guide.

HEALTH AND SAFETY GUIDELINES

In addition to the major causes of injury, potentially toxic substances which may cause occupational health problems are used in the manufacturing of signs and displays. One of these is mercury, which is added to glass tubing in neon signs to brighten the lettering. Since mercury is highly toxic, workers should be protected against excess exposure to its vapors. Other substances which may present occupational health problems are asbestos, epoxy resins, and industrial solvents. Epoxy resins are used in conjunction with plastic materials in the sign industry and can cause dermatitis (inflammation of the skin). Various solvents are also used in the sign industry with plastics, paints, lacquers, and as cleaning agents. Solvents can cause dermatitis and other adverse effects associated with inhalation of the vapors. Sheets of asbestos are used in the sign industry to lay out glass tubing patterns for neon signs. Asbestos is highly toxic and employees should be protected against inhalation of asbestos fibers.

After reading this Guide, a "walk-through" inspection of your plant should be made using either the checklist in the back or a customized list for your facility. For maintenance and installation of signs, consult the appropriate sections of this guide.

WALKING AND WORKING SURFACES

GENERAL REQUIREMENTS

1. The workplace must be maintained clean, orderly, sanitary, and as far as possible, in a dry condition. Spills and sheet metal scraps should be cleaned up promptly.

2. Areas which are constantly wet should have nonslip surfaces where personnel normally walk or work.

3. Every floor, working place, and passageway must be maintained free from protruding nails, splinters, holes, and loose boards.

4. Where mechanical handling equipment such as lift trucks is used, sufficient safe clearances must be provided wherever turns or passage must be made. Aisles must not be obstructed.

5. All permanent aisles must be easily recognizable. Usually aisles are identified by painting or taping lines on the floor.

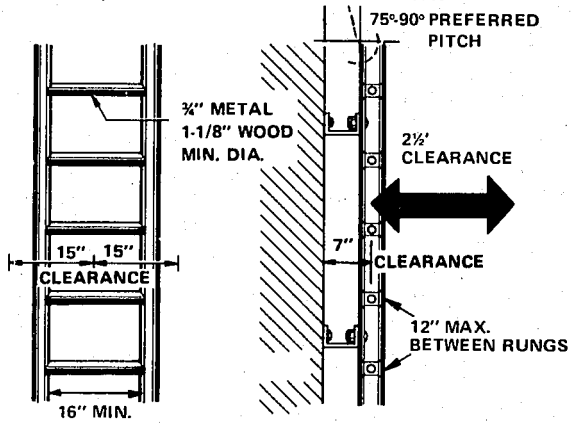
6. The floor-load capacity is the maximum weight which can be safely supported by the floor, expressed in pounds per square foot. When this information is not available and when floor-load capacity is in doubt, it is suggested that a competent engineer be consulted. These floor-load capacities must be posted in a readily visible location (except for slab floors with no basements).

WALKING AND WORKING SURFACES (cont.)

FIXED LADDERS MUST:

1. be designed to withstand a single concentrated load of at least 200 pounds.

2. have rungs with a minimum diameter of ¾ inches for metal ladders, or 1⅛ inches for wood ladders.



3. have rungs at least 16 inches wide and spaced no more than 12 inches apart.

4. be painted (if metal), or otherwise treated to resist deterioration when location demands.

5. have a preferred pitch of 75°-90° for safe descent.

6. have 2½ foot clearance for ladders with 90° pitch and three feet for 75° pitch on the climbing side of ladder (unless caged).

7. have at least seven inches clearance in back of the ladder to provide for adequate toe space.

8. be equipped with cages if they are longer than 20 feet.

9. have landing platforms if they are more than 30 feet long. A platform every 30 feet for caged ladders and every 20 feet for unprotected ladders is required.

10. have side rails extend 3½ feet above landings.

11. have a clear width of 15 inches on each side of the center line of the ladder (unless with cages or wells).

WALKING AND WORKING SURFACES (cont.)

PORTABLE LADDERS

1. Must be maintained in good condition at all times.

2. Should be kept coated with a suitable protective material.

3. Must be inspected frequently. Those which have developed defects must be tagged, "DANGEROUS — DO NOT USE" and be removed from service for repair or destruction.

4. Wood ladders should be stored where they will not be exposed to the elements, and where there is good ventilation.

5. Metal ladders should not be used near energized electrical equipment.

6. Must be placed so that the side rails have a secure footing. They may not be placed on boxes, barrels or other unstable bases to obtain additional height. Nonslip bases should be used.

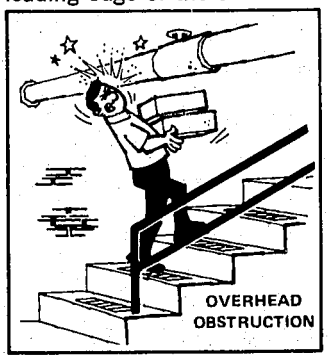
7. Any purchase order for ladders should include the requirement that they meet OSHA standards.

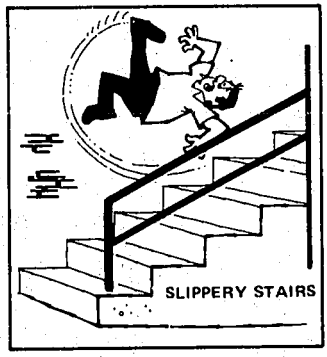
FIXED INDUSTRIAL STAIRS

1. Riser height and tread width must be uniform throughout any flight of stairs.

2. · All treads must be reasonably slip resistant.

3. Vertical clearance above any stair tread to any overhead obstruction must be at least seven feet, measured from the leading edge of the tread.





4. The minimum permissible width is 22 inches (if a means of exit access, at least 28 inches).

WALKING AND WORKING SURFACES (cont.)

5. The angle to the horizontal made by the stairs must be between 30° and 50°.

6. All stairs should be adequately lighted.

7. If the tread is less than nine inches wide, the risers should be open.

8. If the flight of stairs has four or more risers:

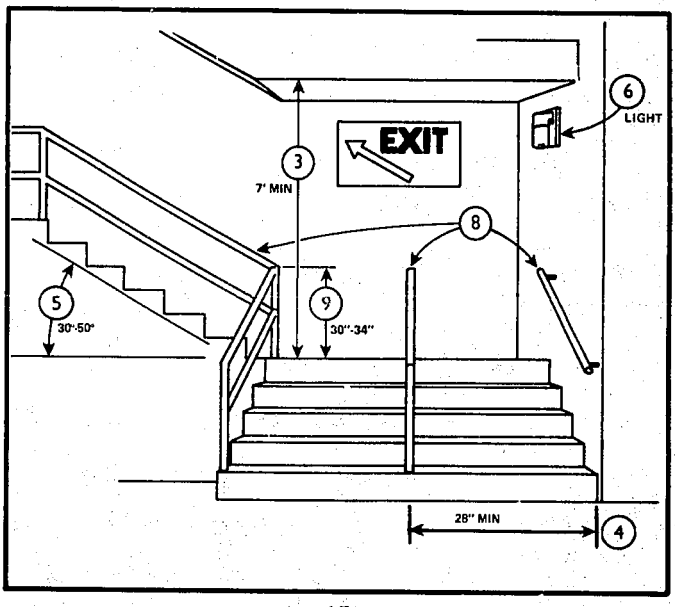
a. a stair railing on each open side is required.

b. a handrail on each enclosed side is required if greater than 44 inches wide.

c. and both sides are enclosed on a stairway less than 44 inches wide, at least one handrail is required, preferably on the right side descending.

d. and if the stairway is 88 or more inches wide, an intermediate stair railing located midway is required.

9. The vertical height of the railing must be 30 to 34 inches and of construction similar to the standard railing described later in this section.



WALKING AND WORKING SURFACES (cont.)

THE STANDARD RAILING AND TOEBOARD

A standard railing consists of a top rail, intermediate rail, and posts. The distance from the upper surface of the top rail to the floor, platform, runway, or ramp must be 42 inches. The intermediate rail must be approximately halfway between the top rail and the floor.

A standard railing can be of any configuration and construction that meets the basic dimension requirements (42 inches high with midrail) and can withstand 200 pounds applied in any direction at any point on the top rail. For wood railings, the rails and posts must be of at least 2 x 4-inch stock with posts spaced not more than six feet.

For pipe railings, rails and posts must be at least 1½-inch outside diameter pipe with posts spaced not more than eight feet.

For structural steel railings, posts and rails must be of 2 x 2 x ⅜-inch angles or other metal shapes of equivalent strength with posts spaced not more than eight feet.

The standard toeboard must be approximately four inches in height from the floor to its top edge, with no more than a quarter inch gap between the toeboard and the floor. It may be constructed of any substantial material either solid or perforated, as long as the openings are smaller than one inch.

WHERE A STANDARD RAILING IS REQUIRED

1. Every open-sided floor or platform four feet or more above the adjacent floor or ground level must be railed on all open sides, except where there is entrance to a ramp, stairway, or fixed ladder.

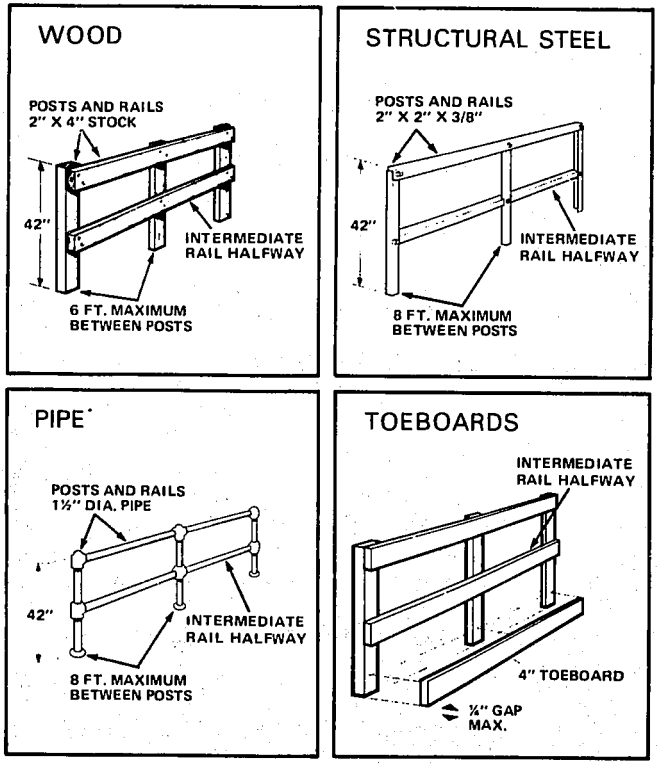
2. Every stairway floor opening must be guarded on all exposed sides except the entrance to the stairway.

3. Every ladderway floor opening must be guarded by a standard railing and toeboard on all sides, with passage through the railing so constructed as to prevent a person from walking directly into the opening.

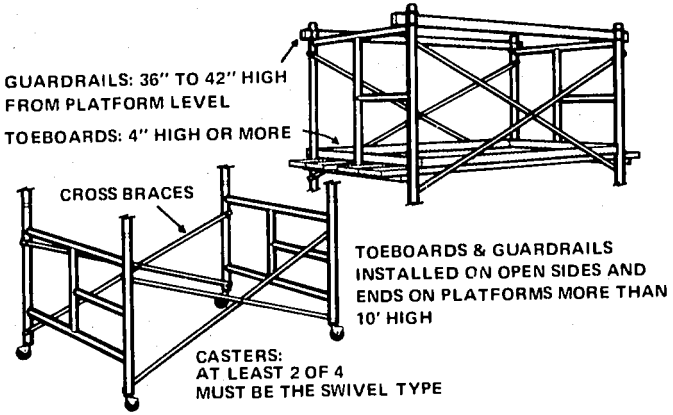
4. Every runway or catwalk must have railings on all open sides four feet or more above ground or floor level.

WALKING AND WORKING SURFACES (cont.)

As a general condition, a standard toeboard and railing are required wherever people walk beneath the open sides of a platform or under similar structures or where things could fall from the structure (for example, into machinery below).



WALKING AND WORKING SURFACES (cont.)



SCAFFOLDING

GENERAL REQUIREMENTS FOR ALL SCAFFOLDS USED IN THE INSTALLATION OR MAINTENANCE OF SIGNS

1. All scaffolding must have solid footing or anchoring capable of holding the intended load without settling or displacement. Unstable objects such as boxes, barrels, loose brick, or concrete blocks must not be used to support scaffolds or planks.

2. Scaffolds must not be erected, moved, or dismantled except under the supervision of a competent person.

3. Guardrails and toeboards must be used on all open sides and ends of platforms which are over 10 feet above the ground or floor (except needle beam scaffolds and floats). Scaffolds 4 to 10 feet high which have a length or width less than 45 inches must have guardrails on all open sides and ends of the platform.

4. Guardrails must be 2×4 inches, or the equivalent, approximately 42 inches high, with a midrail, when required. Supports must be at intervals not to exceed 8 feet. Toeboards must be a minimum of 4 inches in height.

5. If persons are required to pass or work under a scaffold, a screen consisting of No. 18 gauge U.S. Standard wire ½ inch mesh or equivalent must be installed between the toeboard and guardrail along the entire opening.

WALKING AND WORKING SURFACES (cont.)

6. Scaffolds must be capable of supporting without failure at least 4 times the maximum intended load.

7. All planking must be scaffold grades, or equivalent, as recognized by the approved grading rules for the species of wood used.

8. All planking of platforms must be overlapped a minimum of 12 inches, or secured from movement.

9. Scaffold planks must extend over their end supports not less than 6 inches nor more than 12 inches.

ROLLING SCAFFOLDS

1. When free-standing mobile scaffolds are used, the height must not exceed 4 times the minimum base dimension.

2. Rolling scaffolds must be properly braced by cross bracing and horizontal bracing.

3. Casters must be properly designed for strength and have locking devices.

4. Platforms must be tightly planked for the full width of the scaffold (except for entrance opening) and must be secured in place.

5. A ladder or stairway which is built into or affixed to a rolling scaffold must be provided for proper access and exit and a landing platform must be provided at intervals not to exceed 35 feet.

6. Rolling scaffolds when in use must rest upon suitable footing with the locking devices on casters in the locked position.

7. As a general rule, the employer should not allow employees to ride on manually propelled scaffolds.

LADDER JACK SCAFFOLDS

1. All ladder jack scaffolds must be limited to light duty work and the height must not exceed 20 feet from the ground.

2. All ladders used in connection with ladder jack scaffolds must be heavy-duty ladders. Cleated ladders must not be used.

WALKING AND WORKING SURFACES (cont.)

3. The ladder jack must be designed so that it will bear either on the side rails plus ladder rungs or if bearing on the rungs only, the bearing area must be at least 10 inches on each rung.

4. Ladders must be properly fastened, held, or equipped to prevent slipping.

5. Wood or metal platform planks must overlap the bearing surface by at least 12 inches and the platform width must be at least 18 inches wide.

6. Wood platforms must be supported at least every 8 feet and not more than 2 employees can occupy any given 8-foot span.

SWINGING SCAFFOLDS (TWO-POINT SUSPENSION).

1. Two-point suspension scaffolds must not be less than 20 inches or more than 36 inches wide overall. The platform must be securely fastened to the hangers by U-bolts or equivalent means.

2. The hangers of two-point suspension scaffolds must be made of mild steel or other equivalent material having a cross-sectional area capable of sustaining 4 times the maximum intended load, and shall be designed with a support for guardrail, intermediate rail and toeboard.

3. The roof irons or hooks must be: of mild steel or equivalent; and must be securely installed and anchored with tiebacks of ¾ inch manila rope or equivalent, which must serve as secondary means of anchorage; and installed at right angles to the face of the building whenever possible.

4. The suspending cables must be capable of supporting at least 6 times the rated load. Other components must be capable of supporting 4 times the rated load.

5. Inspections of components must be made prior to each use and periodically during use.

6. Each employee must be protected by an approved safety life belt attached to a lifeline. The lifeline must be securely attached to substantial members of the structure (**not** scaffold), or to securely rigged lines, which will safely suspend employee in case of fall.

WALKING AND WORKING SURFACES (cont.)

7. Two-point suspension scaffolds must be securely lashed to the building to prevent swaying. Window cleaners' anchors cannot be used for this purpose.

BOATSWAIN'S CHAIRS

1. The chair seat must not be less than 12×24 inches and 1-inch thick. The seat must be reinforced on the underside by cleats securely fastened to prevent the board from splitting.

2. The two fiber rope seat slings must be of ⅝ inch diameter, reeved through the four seat holes so as to cross each other on the underside of the seat.

3. Seat slings must be at least ⅜ inch **wire** rope when a heat producing process such as welding is being done.

4. Workmen must be protected by a safety belt and lifeline. The lifeline must be attached to a structure and not the scaffold.

AERIAL LIFTS (extensible boom platforms, aerial ladders, articulating boom platforms)

1. Aerial lifts must meet the applicable requirements of the American National Standard for "Vehicle Mounted Elevating and Rotating Work Platforms," ANSI A 92.2—1969.

2. Aerial ladders must be secured in the lower traveling position with locking devices prior to highway travel.

3. Lift controls must be tested each day prior to use to determine that such controls are safe.

4. Only authorized persons are permitted to operate an aerial lift.

5. Employees must always stand firmly on the floor of the basket and not sit or climb on its edge or use planks, ladders, or other devices for a work position. A body belt must be worn and a lanyard attached to the boom or basket when working from an aerial lift. Belting off to adjacent poles, structures, or equipment while working from an aerial lift is prohibited. Climbers must not be worn while working from an aerial lift.

6. Articulating boom and extensible boom platforms, designed primarily as personnel carriers, must have dual (upper

WALKING AND WORKING SURFACES (cont.)

and lower) controls. Upper controls must be in or beside the platform **and** clearly marked as to their function. Lower controls must provide for overriding the upper controls.

7. Aerial lifts must be secured (brakes set) before use and wheel chocks must be installed prior to use on an incline. When outriggers are used, they must be positioned on pads or a solid surface.

SAFETY BELTS, LIFELINES, LANYARDS, AND NETS

1. Safety belt lanyards must be a minimum of one-half inch nylon, or equivalent, with a maximum length to provide for a fall no greater than six feet. The rope must have a nominal breaking strength of 5,400 pounds.

2. All safety belt and lanyard hardware, except rivets, must be capable of withstanding a tensile loading of 4,000 pounds without cracking, breaking, or taking a permanent deformation.

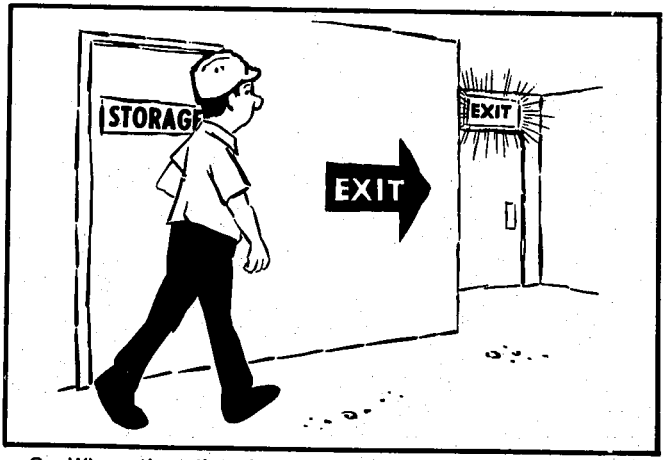
3. Lifelines must be secured above the point of operation to an anchorage or structural member capable of supporting a minimum dead weight of 5,400 pounds.

4. Safety nets must be provided when workplaces are more than 25 feet above the ground or water surface, or other surfaces where the use of ladders, scaffolds, catch platforms, temporary floors, safety lines, or safety belts is impractical.

EXITS AND EXIT MARKINGS

1. Every exit must have the word "EXIT" in plain legible letters not less than six inches high with the strokes of the letters not less than ¾ inches wide.

2. Doors, passageways, or stairways which are neither exits nor ways to an exit, but may be mistaken for an exit, must be clearly marked "NOT AN EXIT" or must be marked by a sign indicating their actual use, e.g., "STORAGE ROOM," "TO BASEMENT," etc.



3. When the direction to the nearest exit may not be apparent to an occupant, an exit sign with an arrow indicating direction must be used.

4. Exit access must be arranged so that it is unnecessary to travel toward any area of high hazard potential in order to reach the nearest exit (unless the path of travel is effectively shielded by suitable partitions or other physical barriers).

5. Nothing may impair the visibility of the exit sign, such as decorations, furnishings, or other signs.

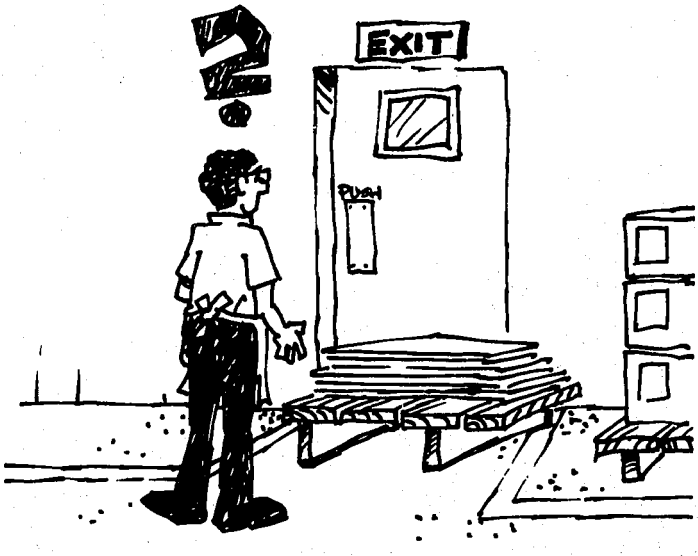
6. A door from a room to an exit or to a way of exit access must be of the side-hinged swinging type. It must swing out in the direction of travel if:

   a. 50 or more persons occupy a room or

   b. the exit is for an area of high hazard potential.

EXITS AND EXIT MARKINGS (cont.)

7. Areas around exit doors and passageways leading to and from the exit must be free of obstructions. The exit route must lead to a public way.



8. If occupancy is permitted at night, or if normal lighting levels are reduced at times during working hours, exit signs must be suitably illuminated by a reliable light source.

9. No lock or fastening may be used to prevent escape from inside the building.

10. Where occupants may be endangered by the blocking of any single exit due to fire or smoke, there must be at least two means of exit remote from each other.

OCCUPATIONAL HEALTH AND ENVIRONMENTAL CONTROL

Employees working in the sign manufacturing industry may be exposed to harmful levels of air contaminants. It is the responsibility of the employer to ensure that employees are not exposed to toxic levels of airborne contaminants (OSHA has standards for over 400). In the sign manufacturing industry, harmful gases, mists, and vapors may be generated while such processes as welding, brazing, paint spraying, silk screening, etc. are being conducted. Some examples of these are as follows:

SOLVENTS

Health Problems

Several solvents are used in the plastics departments of sign manufacturing plants. The common ones are methylene chloride, methyl ethyl ketone, and methanol. In painting and silk screening processes common solvents are xylene and methyl ethyl ketone. All organic solvents have some effect on the central nervous system and the skin. The principal modes of exposure are inhalation of vapors and skin contact. Excessive solvent vapor inhalation may cause impairments which have no discernible effects on health, such as lack of coordination and drowsiness, but which may increase the risk of accidents. In other cases, exposure may result in serious damage to the blood, lungs, liver, kidneys, or gastrointestinal system.

Skin contact may cause dermatitis, ranging in severity from simple irritation to actual damage to the skin. Even the most inert solvents can dissolve the natural protective barrier of fats and oils, leaving skin unprotected. When these natural lubricants are removed, the skin becomes subject to disabling and possibly disfiguring dermatitis and serious infection.

Control of Exposures

Measures to control industrial exposures to solvents include the substitution of a less toxic solvent, local exhaust ventila-

OCCUPATIONAL HEALTH AND ENVIRONMENTAL CONTROL (cont.)

tion, and the use of protective clothing.

Substitution of a less toxic or less volatile solvent has been effective in controlling solvent exposure and in reducing the hazard potential. For example, the substitution of methyl chloroform for carbon tetrachloride has worked efficiently and effectively in many cleaning and degreasing operations. The substitution of a less toxic solvent does not imply that a health hazard has been eliminated; it only means that a worker is less likely to suffer adverse effects.

The use of closed systems and local exhaust ventilation is an effective way of preventing solvent vapors from entering the breathing zone of the worker. Containers of flammable solvents must be covered when not in use. Local exhaust ventilation can remove vapors at their point of origin and thus prevent toxic concentrations in the workplace.

Good personal hygiene is essential whenever solvents are used. The skin should always be protected from contact with solvents. Gloves, face shields, goggles, and other protective clothing may be used. Similarly, barrier creams may offer some degree of protection. The skin should never be washed with any raw organic solvent. Although some solvents are less toxic than others, good safety practices dictate that care be exercised in the use of any or all organic industrial solvents.

EPOXY RESINS

Wet or uncured epoxy resins and the chemicals used to harden, thin, strengthen, or make resin flexible should be regarded and handled as hazardous materials. Dermatitis, an inflammation of the skin, is the disease that most often attacks workers handling epoxy resins and the chemicals used to manufacture them. Some of the symptoms of dermatitis are: redness, itching, swelling, and blisters. Oozing, crusting, and scaling of the skin can also occur.

Respiratory, nose, and throat irritation, headache, nausea, intestinal upsets, and other conditions may result from breathing the vapors or dusts from the various epoxy manufacturing processes. The eyes may also be affected by vapors or by direct contact.

OCCUPATIONAL HEALTH AND ENVIRONMENTAL CONTROL (cont.)

Outbreaks of dermatitis and other diseases can be avoided by following these basic rules:

1. Informing workers of possible hazards.
2. Providing ventilation to control vapors produced while mixing the resins and hardeners as well as to control the glass and epoxy particulates during tooling.
3. Maintaining plant and personal hygiene through good housekeeping procedures, appropriate hand cleansers, protective clothing, and where needed, protective creams.

MERCURY

Mercury is highly toxic and employee exposures to mercury should be kept to a minimum. In chronic mercury poisoning, psychic and emotional disturbances are characteristic. Fine tremors may affect the hands, head, lips, or jaw. Additionally, excess salivation, gingivitis, and digestive disturbances are common. Although inhalation is the main route of absorption, mercury can also be absorbed through skin contact and ingestion. Additionally, mercury and its salts are skin irritants.

To keep employee exposures to mercury at a minimum, the following precautions should be taken:

1. The most important control measure is good housekeeping. All spills should be cleaned up immediately and workers should be instructed to prevent mercury spills and to avoid skin or eye contact.
2. Waste mercury should be stored in airtight (nonmetallic) containers until disposed of.
3. Workers should be instructed on proper personal hygiene when using mercury, i.e., washing hands prior to eating and smoking (which should be done away from work areas).

ASBESTOS

Inhalation of excess asbestos fibers over a prolonged period of time can result in the development of a form of pneumoconiosis known as asbestosis. Primary symptoms of advanced asbestosis include variable cough, dyspnea, substernal chest

OCCUPATIONAL HEALTH AND ENVIRONMENTAL CONTROL (cont.)

pains, decreased chest expansion, weakness, clubbed finger tips, and curved fingernails. Additionally there is some evidence that workers exposed to asbestos for long periods have an increased incidence of lung and other cancers.

Prevention of asbestosis-related diseases depends upon preventing exposure to concentrations of dust. Employees should not wear contaminated work clothing home and should never clean their clothes with compressed air. Clean-up of dust should be conducted in a manner which prevents dust from becoming airborne.

OCCUPATIONAL HEALTH AND ENVIRONMENTAL CONTROL (cont.)

OCCUPATIONAL NOISE EXPOSURE

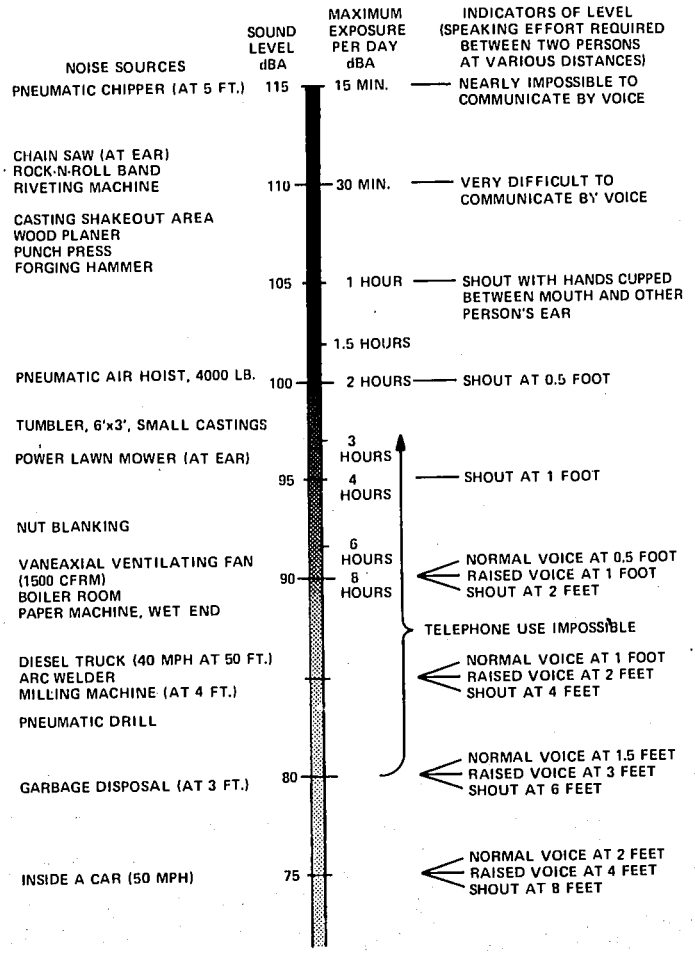
Excessive noise is one of the most commonly violated standards and can cause permanent hearing damage. To protect employees it is management's responsibility to make sure they are not exposed to noise levels in excess of the standards. The current standard is 90 decibels, A-weighted (dBA), for an 8-hour exposure. Even at this noise level, hearing damage can be expected in some individuals. It may soon be a requirement, and it is considered good practice, to have hearing checked (audiometric testing) on an annual basis, for all employees exposed to 85-90 dBA noise levels for 8 hours daily. If no hearing loss is observed, ear protection is not required.

At greater than 90 dBA exposure (8 hours per day) or for higher noise levels in excess of the allowable time (e.g. 100 dBA for more than 2 hours) a continuing, effective hearing conservation program must be administered. Reference to the following table gives estimates of noise levels and the maximum allowable exposure times. It is required that either engineering controls such as enclosing noisy equipment, or administrative controls, such as limiting time of exposure, be utilized to reduce noise level or the exposure time to comply with the standard. If these control measures are not feasible, then effective personal protective equipment is required. There are many forms and types of ear protection that can be considered from ear muffs to ear plugs. Some are more useful than others, depending on the noise level, the frequency of the noise, and how well they fit the individual. It is necessary to provide protection that is effective and reasonably comfortable to the wearer.

The following table is provided to assist in the evaluation of the noise levels in the workplace. If referral to the table indicates that levels and time of exposure are such that corrective action is needed, it is recommended that professional help be sought to correct the problem. A noise survey by adequately equipped and trained personnel should be made before implementing engineering and administrative controls, and/or setting up a hearing conservation program.

OCCUPATIONAL HEALTH AND ENVIRONMENTAL CONTROL (cont.)

PERMISSIBLE NOISE EXPOSURES



***Exposure for remainder of day must be less than 90dBA.**

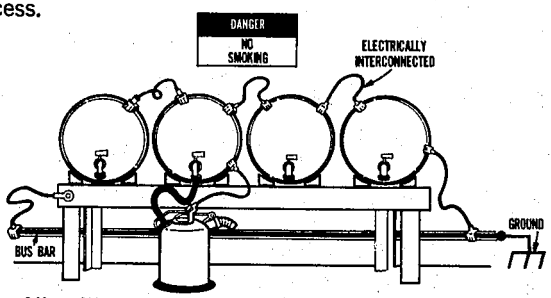
HAZARDOUS MATERIALS

FLAMMABLE AND COMBUSTIBLE LIQUIDS

Flammable and combustible liquids are categorized by their ease of ignition. Flammable liquids are more easily ignited than combustible ones. Examples of flammables are gasoline, acetone, and lacquer thinner; and examples of combustibles are kerosene, fuel oil, and Stoddard solvent.

1. Connections on all drums and piped systems of flammable and combustible liquids must be vapor-and-liquid tight.

2. When flammable liquids are transferred from one container to another, (e.g. from a bulk container to a portable container) they must be effectively bonded and grounded. This practice prevents electrical discharge (i.e. sparks) from the accumulation of static charge because of the transfer process.



3. All spills of flammable or combustible liquids must be cleaned up promptly. With major spills remove ignition sources, ventilate the area, and provide respirators if needed. These liquids must not be allowed to enter a confined space, such as a sewer, because of the possibility of an explosion.

4. Supplies of flammable and combustible liquids must be stored in approved fire-resistant safety containers equipped with flash screens and self-closing lids. These containers can be purchased from an industrial supply house.

5. All flammable liquids must be kept in closed containers when not in use.

6. Combustible waste materials, such as oily shop rags, paint rags, etc., must be stored in covered metal containers and be disposed of daily.

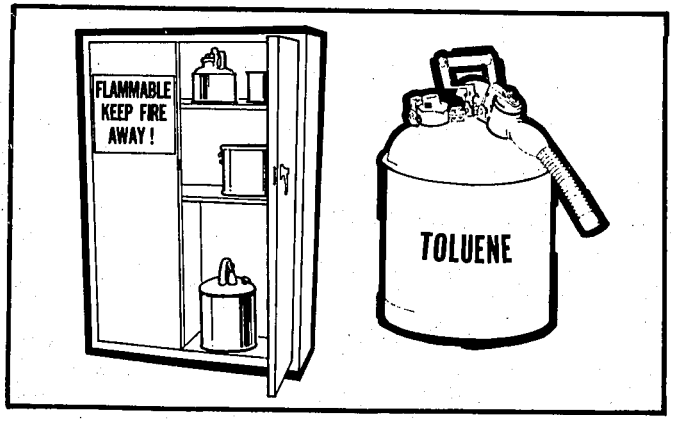
HAZARDOUS MATERIALS (cont.)

STORAGE CABINETS

Cabinets must be distinctly labeled "FLAMMABLE — KEEP FIRE AWAY". Storage cabinets must meet National Fire Protection Assn. test requirements. Cabinets constructed in the following manner will meet these requirements:

Metal cabinets must be constructed of at least No. 18 gauge sheet iron, double-walled with a 1½-inch air space between. Doors must have three-point locks with the sill raised at least two inches above the cabinet.

Wooden cabinets must be constructed of at least one-inch plywood with rabbetted joints fastened two-directionally with flathead screws.



INSIDE STORAGE

Flammable storage areas must be prominently posted as a "NO SMOKING" area and openings to other rooms or buildings must be provided with non-combustible, liquid-tight, raised sills or ramps at least four inches in height. A permissible alternative to a sill or ramp is an open-grated trench inside of the room which drains to a safe location. General exhaust ventilation (either gravity or mechanical) which provides for a complete change of air within a room at least six times each hour is required for inside storage rooms.

HAZARDOUS MATERIALS (cont.)

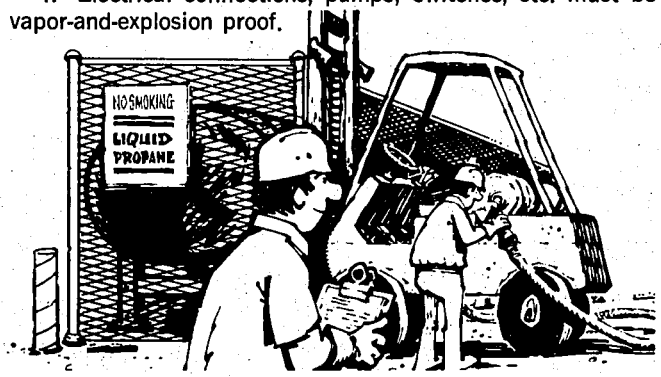
OUTSIDE STORAGE

If flammable and combustible liquids are stored outside, the area must be graded so that spills are diverted away from the building. The storage area should be kept free of combustible material not necessary for storage such as weeds and other debris. Smoking must be prohibited.

For construction areas — driveways between and around open area storage for combustible materials must be at least 15 feet wide; no combustible materials shall be stored outdoors within 10 feet of a building or structure. Combustible materials must not be stacked more than 20 feet high and must be in stable piles. Outdoor storage of containers (less than 60 gallons) must not exceed 1,100 gallons in any one pile or area; piles must be separated by five feet and not be nearer than 20 feet from a building. The storage area must be graded or diked in a manner to divert spills away from buildings or other exposures; and such areas must be free of weeds, debris and other combustible materials not necessary to storage.

LP STORAGE

1. "NO SMOKING" signs must be present on the storage tank.
2. Units to be fueled must be turned off while filling.
3. The LP Tank must be guarded to protect it from vehicular damage.
4. Electrical connections, pumps, switches, etc. must be vapor-and-explosion proof.



HAZARDOUS MATERIALS (cont.)

GENERAL SPRAY OPERATIONS

1. Portable lamps must be removed during spraying.
2. Low flash-point thinners (less than 100°F) may be used for cleaning purposes only in a well-ventilated area such as a spray booth.
3. The fire control sprinkler heads must be kept clean and free of paint build-up.
4. "NO SMOKING" signs must be posted wherever flammable liquids are sprayed or stored.
5. Parts to be painted should be arranged so that overspray and fumes are not drawn through the breathing zone.
6. Protective clothing such as gloves, apron, and a cloth cap should be worn.
7. Respirators must be cleaned and maintained regularly.
8. There should never be over one day's supply of paint outside of storage rooms or cabinets.

SPRAY AREAS

1. The spray area must be at least 20 feet from flames, sparks, spark-producing electric motors or other ignition sources.
2. The spray area must be free from hot surfaces such as heat lamps.
3. Electric lights in the spray area must be covered and guarded from accidental breakage.
4. The spray area must be kept clean of combustible residue.
5. Mechanical ventilation must be provided and operating to remove vapors during the painting.

SPRAY BOOTHS

1. Spray booths must be made of metal, masonry, or other suitable noncombustible material and be smooth on the inside to aid in cleaning.
2. Floors and baffles must be noncombustible and easily cleaned.

HAZARDOUS MATERIALS (cont.)

3. Spray booth lights must be explosion-proof or enclosed in sealed panels with lights located outside the booth.

4. Ventilation:

a. Mechanical ventilation must be installed and operating during spraying.

b. The ventilation rate must be at least 100 linear feet per minute.

c. Electric motors for the exhaust fans must be outside the booth or ducts and the belts and pulleys fully enclosed.

d. Air exhausted from the paint booth must be discharged outside where it cannot reenter the building.

e. Ducts connected to the booth must have access doors to allow for cleaning.

5. Air supply for paint booths —

a. Plugged overspray filters need replacement.

b. When temperatures are below 55°, the make-up air must be heated to at least 65°.

PERSONAL PROTECTIVE EQUIPMENT

GENERAL

Personal protective equipment is not to be used as a substitute for feasible administrative or engineering controls. If these control methods are not feasible, personal protective equipment is required whenever there are hazards that can do bodily harm through absorption, inhalation or physical contact. This equipment includes respiratory and protective hearing devices, clothing, and protective devices for the eyes, face, head, and extremities. All personal protective equipment must be of safe design and construction for the work to be performed and maintained in a sanitary and reliable condition.

EYE PROTECTION

Eye protection is required where there is a possibility of an eye injury from flying particles, chips, caustic materials, splashes of solvent, etc. Employees must wear eye protection when using grinders, power drills, handling solvents, etc.

HEARING PROTECTION

Appropriate hearing protection must be available to personnel, and used, where noise levels are in excess of 90 dBA. Such sound intensity is likely to occur around powerful motors or high speed tools.

PERSONAL PROTECTIVE CLOTHING

GLOVES

When handling hazardous liquids, resins, or other hazardous materials, employees must wear gloves which are impervious to such materials. The gloves must be long enough to protect the forearms.

APRONS

When aprons are used as protection from caustics and other hazardous materials, the apron must be impervious to such material.

PERSONAL PROTECTIVE EQUIPMENT (cont.)

HEAD PROTECTION

Hard hats are required in situations where workers may be subjected to impact or penetration from falling or flying objects.

FOOT PROTECTION

Foot protection is required to prevent injury from falling objects. Particularly in receiving and transferring inventory, experience has shown that precautions are needed against falling items.

RESPIRATORY PROTECTION

NIOSH-approved respirators must be provided by the employer when air is contaminated with excessive concentrations of harmful dusts, fumes, mists, gases, or vapors. Respirators are acceptable only when engineering or administrative controls are not feasible or while they are being implemented. When respirators are used, a respirator program must be established and include the following requirements:

1. Respirators must be selected which are designed to protect against the specific hazards to which the worker is exposed.
2. Written instructions covering selection and use of respirators must be available.
3. Employees must be trained in the use of respirators, their limitation, proper fitting, and maintenance.
4. Respirators should be cleaned at the end of each day's use. They should be taken apart, washed, dried, and defective parts replaced.
5. Two people cannot wear the same respirator unless it has been cleaned and disinfected between use.
6. All straps must be tied and adjusted when worn.
7. A good face seal is necessary — beards, sideburns, glasses may interfere.
8. Filters must be replaced when the respirator has been used for the specified lifetime of the cartridge, when an employee can smell vapors in the mask, or when breathing becomes difficult.

GENERAL ENVIRONMENTAL CONTROLS

SANITATION

1. Safe drinking water must be provided in all places of employment. The use of a common drinking cup is forbidden.

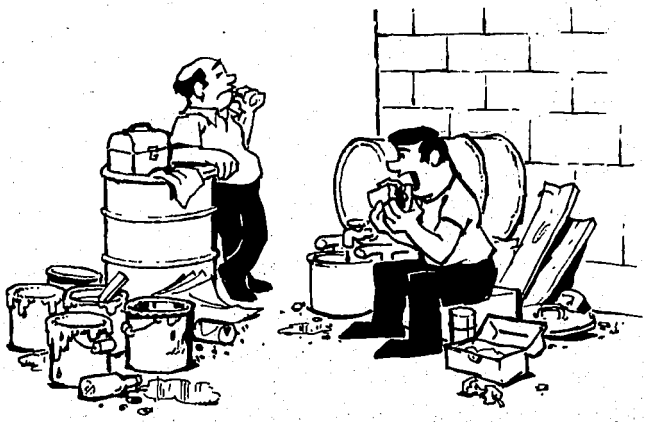
2. Receptacles for waste food are to be covered and kept in a clean and sanitary condition.

3. Restrooms are to be kept in a clean and sanitary condition, including covered containers for sanitary napkins.

4. Separate toilet facilities must be provided for each sex. The exception to this is if only one person at a time uses a toilet room and the door can be locked from the inside.

5. One toilet and one lavatory must be provided for approximately every 15 employees.

6. Each lavatory must have hot and cold or tepid running water, hand soap, individual hand towels, or warm air blowers.

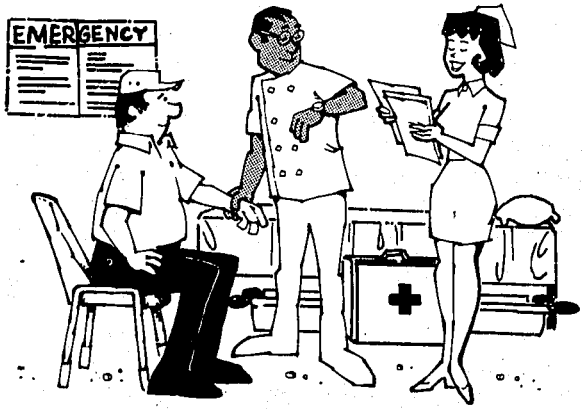


7. Beverages or food must not be stored or consumed in a toilet room or in an area exposed to toxic materials.

8. Employees working with toxic substances should wash and remove contaminated clothing before eating, drinking, or smoking.

MEDICAL AND FIRST AID

The employer interested in maintaining production, preventing loss of work time, receiving efficient employee performance, and achieving good morale should adopt ways of preserving employees' health. A good practice is to require preplacement medical examinations to insure that prospective employees are physically able to do the specific work. Periodic health evaluations for hazardous jobs and early treatment of any illness or injury should also be encouraged. On matters of health, medical personnel must be readily available by phone or on-site for advice and consultation.



Emergency phone numbers should be posted near telephones (see "Emergency Information Chart" on the back cover). Stretchers and blankets should be available for prompt transportation of injured or ill employees to a hospital.

In the absence of an infirmary, clinic, or hospital in near proximity to the workplace which is used for treatment of injured or ill employees, the following are required:

1. At least one and preferably more employees on each shift must be adequately trained to render first aid. The American Red Cross, the U.S. Bureau of Mines, some insurance carriers, local safety councils, and others with OSHA approved programs provide acceptable training.

MEDICAL AND FIRST AID (cont.)

2. First-aid supplies must be readily available and approved by a consulting physician. These supplies should be in sanitary containers with individually sealed packages for material such as gauze, bandages, and dressings that must be sterile. Other items often needed are adhesive tape, triangular bandages (to be used as slings), inflatable plastic splints, scissors, and mild soap for cleansing of wounds or cuts.

3. Suitable facilities for quick drenching or flushing of the eyes and body must be provided within the work area when a person may be exposed to injurious corrosive materials.

Some states have laws concerning first aid requirements including supplies (kits), training, and instructions on first aid given by the lay person. Trained employees should understand where first aid ends and treatment by a physician begins.

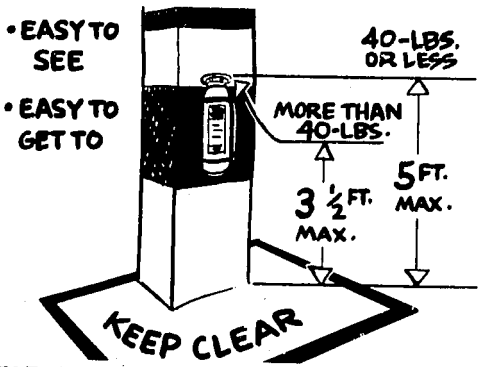
NOTE: *First aid is immediate, temporary treatment given in the event of accident or illness — before the doctor arrives. Immediate first aid (within four minutes) may be the difference between complete recovery, permanent impairment, or DEATH.*

Reference to RECORDKEEPING REQUIREMENTS toward the back of this Guide gives a discussion of records which must be maintained for occupational injuries and illnesses.

FIRE PROTECTION

Most plastics are combustible and, when conditions permit, can be sources of explosions. The sources of plastics fires include faulty electrical equipment, open flames, runaway self-polymerization, overheating in molding or melting, and build-up of residue.

FIRE PROTECTION (cont.)



PORTABLE FIRE EXTINGUISHERS MUST:

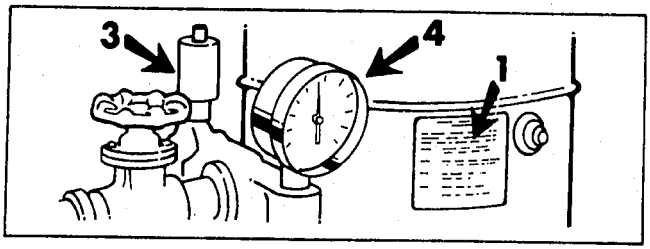
1. Be kept fully charged and in their designated places.
2. Be located along normal paths of travel.
3. Not be obstructed or obscured from view.
4. Not be mounted higher than five feet (to the top of the extinguisher) if 40 pounds or less, or 3½ feet if heavier.
5. Be inspected by management or a designated employee at least monthly to insure that they:
   a. are in their designated places
   b. have not been tampered with or activated
   c. do not have corrosion or other impairments.
6. Be examined at least yearly and/or recharged or repaired to insure operability and safety — a tag must be attached to show the maintenance or recharge date and signature or initials of the person performing the service.
7. Be hydrostatically tested — extinguisher sales representative usually will perform this service at appropriate intervals.
8. Be selected on the basis of type of hazard, degree of hazard, and area to be protected.
9. Be placed so that the maximum travel distances, unless there are extremely hazardous conditions, do not exceed 75 feet for Class A or 50 feet for Class B.

A chart showing fire extinguishers by class and how to use them, is located in the back of this booklet.

COMPRESSED AIR EQUIPMENT

Employees should be familiar with the air compressor's operating and maintenance instructions.

1. New air tanks must be constructed in accordance with the American Society of Mechanical Engineers (A.S.M.E.) Boiler and Pressure Vessel Code, Section VIII. The A.S.M.E. Code requires this information to be permanently stamped on the air tank.



2. The drain valve on the air tank should be opened frequently to prevent excessive accumulation of liquid.

3. Air tanks must be protected by adequate safety-relief valve(s). These valves must be tested at regular intervals to be sure they are in good operating condition.

4. The pressure controller and gauge must be maintained in good operating condition.

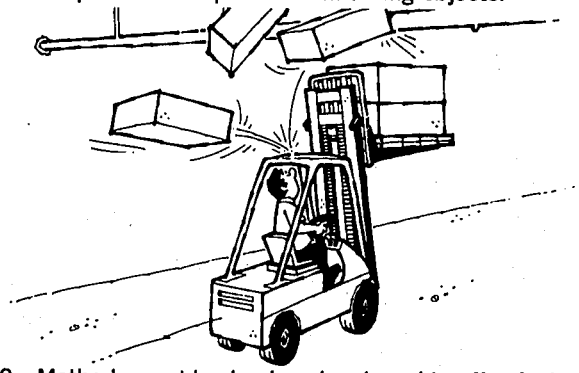
5. There must be no valves between the air tank and safety valve.

MATERIALS HANDLING AND STORAGE

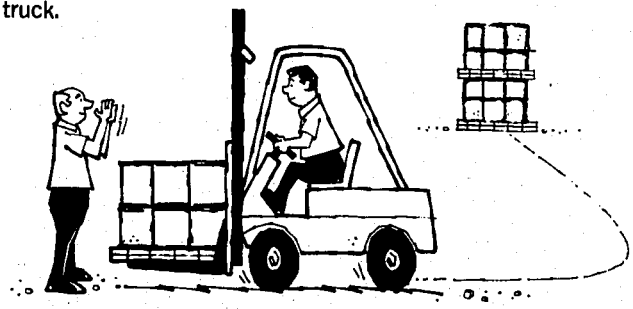
POWERED INDUSTRIAL TRUCKS

Powered industrial trucks are classified into categories for the purpose of determining what type of truck may be used in a certain location. The type of hazard in a location determines whether diesel, electric, gasoline, or LP-gas powered trucks may be used and what additional safeguards must be present. Suppliers can assist in the proper selection.

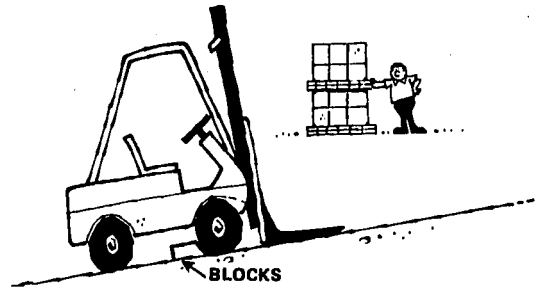
1. High-lift rider trucks must be fitted with an overhead guard to protect the operator from falling objects.



2. Methods must be developed and used to effectively train operators in the safe operation of powered industrial trucks, and only trained and authorized operators may operate the truck.



MATERIALS HANDLING AND STORAGE (cont.)



3. When a powered industrial truck is left unattended (operator 25 feet or more away or truck is not in view), the forks must be fully lowered, the control lever positioned in neutral, the power shut off and the brakes set. The wheels must be blocked if parked on an incline.

4. Industrial trucks must be examined daily for any conditions adversely affecting the safety of the vehicle before being placed into service. If the truck is used around the clock, it must be inspected after each shift.

5. If the load being carried obstructs forward view, the operator is required to travel with the load trailing.

6. When unloading or loading from trucks, trailers, or railroad cars with forklift trucks, provision must be made for securing the truck, trailer, or railroad car by setting the brakes and placing wheel chocks under the rear wheels. Portable dock boards must be secured in position with devices which will prevent their slipping during loading and unloading.

7. If battery-operated equipment is used, the battery charging area is to be designated with a "NO SMOKING" sign due to the hydrogen gas emitted during the charging process.

MATERIALS HANDLING AND STORAGE (cont.)

HOISTS

Although the information provided in this section on hoists pertains specifically to cranes, these requirements should be applied to all hoisting equipment.

1. The rated load must be legibly marked on each side of the hoist. Employees should be made aware of the weight of the load.

2. The hoist must be equipped with a self-setting brake, applied to the motor shaft or some part of the gear train.

3. For powered hoists, holding brakes must be applied automatically when the power is off.

4. Hooks, chains, and all functional operating mechanisms must be visually inspected daily for any indication of damage and wear, and monthly records maintained.

5. Loads must not be carried over the heads of people.

6. The operator must test the brakes each time a near-capacity load is handled. This test is done by raising the load a few inches and applying the brakes.

7. The hoist rope or chain must be free from kinks or twists and not be wrapped around the load.

MATERIALS HANDLING AND STORAGE (cont.)

CRANES

1. Only personnel designated as qualified by the employer shall be permitted to operate cranes.

2. The rated load of the crane must be plainly marked on each side of the crane, and be clearly legible to the operator.

3. Employees should be made aware of the weight of the load.

4. Hooks, ropes, chains, brakes, and all functional operating mechanisms must be inspected daily for indications of damage and excessive wear.

5. Written and signed inspection reports must be made monthly on critical items such as brakes, hooks, and ropes and be readily available.

6. Hand signals to operators should be those prescribed by the applicable ANSI standard for the type of crane in use (see foldout in back of guide).

7. The hoist chain or rope must be free from kinks or twists and must not be wrapped around the load.

8. Hoisting, lowering, swinging, or traveling is not permitted while anyone is on the load or hook.

9. Loads must not be carried over the heads of people.

10. The operator must test the brakes each time a near capacity load is handled, by raising it a few inches and applying the brakes.

11. The operator must not leave his position at the controls while the load is suspended.

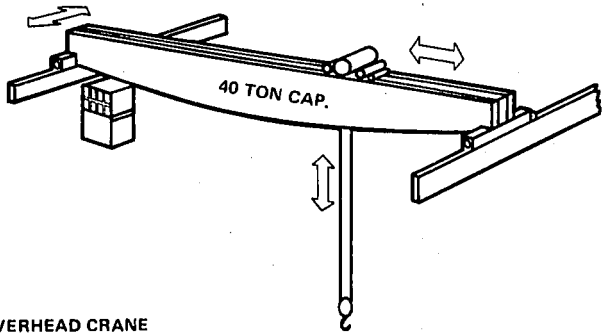
12. All cranes using a lifting magnet must have a switch in the magnet circuit with provisions for locking the switch in the open position.

13. When the hook is in the extreme low position at least two complete wraps of rope must remain on the drum. Rope ends must be safely and securely attached to the drum by means of a clamp or socket arrangement approved by the crane or rope manufacturer.

14. When making a hook-up, the hook must be centered over the load to prevent swinging.

MATERIALS HANDLING AND STORAGE (cont.)

15. The trip-setting of hoist limit switches must be determined by tests with an empty hook.



OVERHEAD CRANE

OVERHEAD AND GANTRY CRANES

OSHA requirements also include:

1. Access to the cab and/or bridge walkway must be by a conveniently placed fixed ladder, stairway, or platform requiring stepping over no gap exceeding 12 inches.

2. Exposed moving parts such as gears, set screws, projecting keys, chains, chain sprockets, and reciprocating components which might constitute a hazard under normal operating conditions must be guarded.

3. If a service receptacle is provided in the cab or on the bridge of cab-operated cranes, it must be a grounded three-prong type permanent receptacle.

4. A carbon dioxide, dry-chemical, or equivalent hand fire extinguisher should be kept in the cab.

5. Each independent hoisting unit must be equipped with at least one self-setting holding brake applied directly to the motor shaft or some part of the gear train which is applied automatically when power is removed.

MATERIALS HANDLING AND STORAGE (cont.)

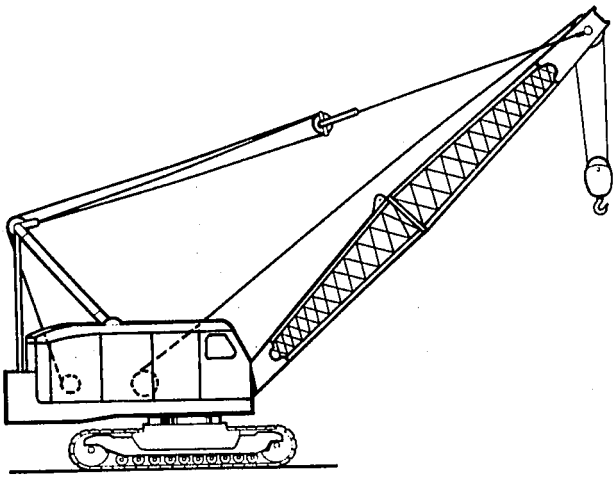
SLINGS

Each day before use, the sling and all fastenings and attachments must be inspected by a competent person designated by the employer. A thorough inspection of alloy steel chain slings must be made at regular intervals not to exceed 12 months and a record kept. Each new, repaired, or reconditioned alloy steel chain sling must be proof tested before use and a certificate of the proof test must be kept.

Whenever a sling is used, the following safe practices must be observed:

1. Slings that are damaged or defective must not be used.
2. Slings must not be shortened with knots, bolts, or other makeshift devices.
3. Sling legs must not be kinked.
4. Slings must be securely attached to their loads and must not be loaded in excess of their rated capacities.
5. Slings must be padded or protected from the sharp edges of their loads.
6. Suspended loads must be kept clear of all obstructions and all employees must be kept clear of loads about to be lifted or already suspended.
7. Shock loading is prohibited.
8. A sling must not be pulled from under a load while the load is resting on the sling.

MATERIALS HANDLING AND STORAGE (cont.)



CRAWLER, LOCOMOTIVE AND TRUCK CRANES

OSHA requirements also include:

1. A substantial and durable rating chart with clearly legible letters and figures must be provided with each crane and securely fixed to the crane cab in a location easily visible to the operator while seated at his control station.

2. A carbon dioxide, dry chemical, or equivalent fire extinguisher must be kept in the cab or vicinity of the crane.

3. The minimum clearance between cranes and powerlines must be 10 feet except where the powerlines have been deenergized and visibly grounded at the point of work, or where separate insulating barriers have been erected.

4. Any overhead wire must be considered to be an energized line unless and until the electrical utility authorities indicate that it is not an energized line.

MACHINERY AND MACHINE GUARDING

GENERAL REQUIREMENTS FOR MACHINE GUARDING

One or more methods of machine guarding must be provided to protect the operator and other employees in the machine area from hazards such as those created by point of operation, in-running nip points, rotating parts, flying chips, and sparks. All such hazards located seven feet or less above the ground, floor, or working platform, must be guarded to prevent accidental contact. Guards must be attached to the machine if possible and secured elsewhere if attachment to the machine is not possible. The guard must not offer an accident hazard in itself. Machines designed for fixed locations must be securely anchored to prevent "walking" or tipping.

A booklet entitled "The Principles and Techniques of Mechanical Guarding," OSHA 2057, can be obtained by writing to OSHA Regional Offices listed in the back of this book. Many equipment representatives can assist in obtaining the necessary protective devices.

The following pages contain examples of hazards, methods of guarding, and illustrations of enclosure and barrier guards. This listing is not intended to include all equipment that may require guarding.

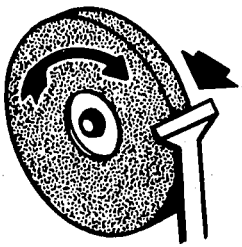
MACHINERY AND MACHINE GUARDING (cont.)

CUTTING ACTIONS

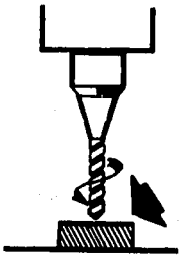
Cutting action results when rotating, reciprocating, or transverse motion is imparted to a tool so that material being removed is in the form of chips. The danger of cutting action exists at the movable cutting edge of the machine as it approaches or comes in contact with the material being cut. Such action takes place at the point of operation in cutting wood, metal, or other materials as differentiated from punching, shearing, or bending by press action.

Typical examples of mechanisms involving cutting action include band and circular saws, milling machines, planing or shaping machines, turning machines, boring or drilling machines, and grinding machines.

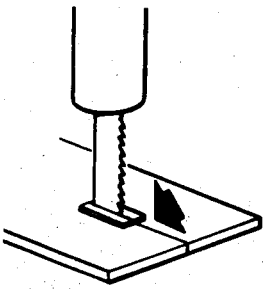
EXAMPLES OF HAZARDS



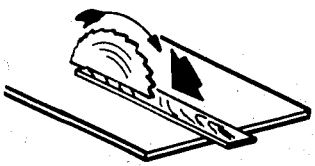
Abrasive wheel



Drill



Band saw



Circular saw

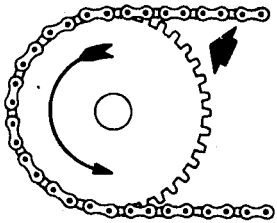
MACHINERY AND MACHINE GUARDING (cont.)

IN-RUNNING NIP POINTS

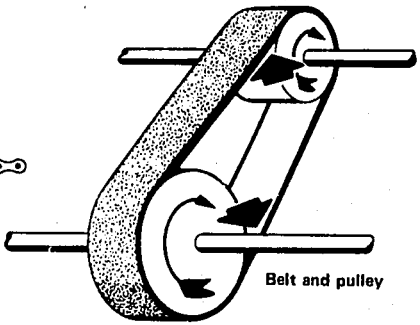
In-running nip points are a special danger which exist through action of rotating objects. Whenever machine parts rotate toward each other, or where one rotates toward a stationary object, an in-running nip point is formed. Objects or parts of the body may be drawn into this nip point and be bruised and crushed.

Typical examples of nip point hazards are the inside of rolling mills and calenders, rolls used for bending or feeding and conveying stock, the in-running side of a chain and sprocket, belt and pulley, a gear rack, a gear and pinion, and a belt conveyor terminal.

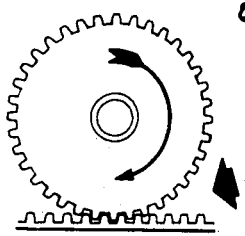
EXAMPLES OF HAZARDS



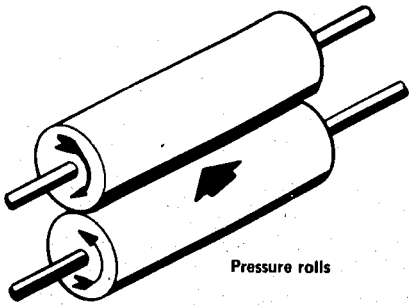
Chain and sprocket



Belt and pulley



Rack and gear



Pressure rolls

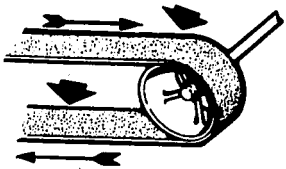
MACHINERY AND MACHINE GUARDING (cont.)

ROTATING, RECIPROCATING, AND TRANSVERSE MOTION

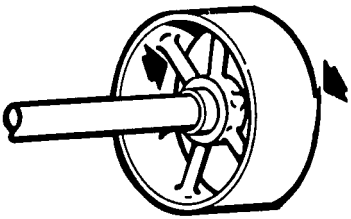
Rotating, reciprocating, and transverse motions create hazards in two general areas — at the point of operation where work is being done and at the point where power or motion is being transmitted from one part of a mechanical linkage to another. Even smooth, slowly rotating shafts can grip clothing or hair, and through mere skin contact force an arm or hand into a dangerous position.

Collars, couplings, cams, clutches, flywheels, shaft ends, spindles, rotating bar stock, lead screws, and horizontal or vertical shafting are typical examples of common rotating mechanisms which are hazardous. The danger increases when bolts, oil cups, nicks, abrasions, and projecting keys or screw threads are exposed when rotating.

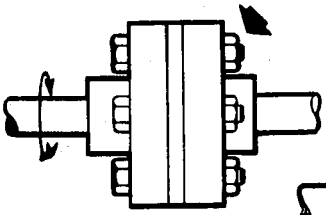
EXAMPLES OF HAZARDS



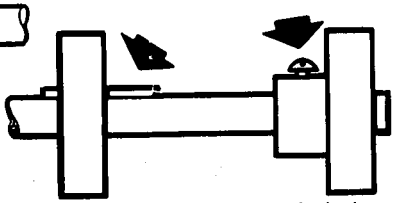
Transverse motion of belt and rotating pulley



Rotating pulley with spokes and projecting burr on face of pulley



Rotating coupling with projecting bolt head



Rotating shaft and pulleys with projecting key and set screw

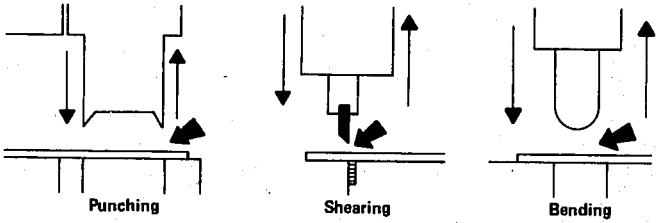
MACHINERY AND MACHINE GUARDING (cont.)

PUNCHING, SHEARING, AND BENDING ACTIONS

Punching, shearing, or bending action results when power is applied to a ram (plunger) or knife for the purpose of blanking, trimming, drawing, punching, shearing, or stamping metal or other materials as differentiated from removing the material in the form of chips. The danger of this type of action lies at the point of operation where stock is actually inserted, maintained, and withdrawn.

Typical examples of equipment involving punching, shearing, or bending action include power presses, foot and hand presses, bending presses or brakes, as well as squaring, guillotine, and alligator shears.

EXAMPLES OF HAZARDS



CLASSIFICATION OF GUARDS

The methods of guarding may be grouped under four main classifications:

Enclosure Guards

Fixed enclosure guards should be used in preference to all other types. They always prevent access to dangerous parts by completely enclosing a hazardous operation, and can be used to restrain bursting machine parts from flying about. Because of limited feed-size opening, enclosure guards admit stock, but will not admit an employee's hand into the danger zone. They may be constructed so as to be adjustable to different sets of tools and dies, but once adjusted, should be fixed. As a general rule, power transmission apparatus can be protected by enclosure guards.

MACHINERY AND MACHINE GUARDING (cont.)

Interlocking Guards

When a fixed enclosure guard is not practicable, an interlocking enclosure or barrier should be considered as the first alternative.

An interlocking enclosure guard is not fixed and may be opened or removed as the operation requires. These guards utilize an electrical or mechanical interlocking connection with the operating mechanism, the operation of the machine is prevented until the guard is returned to an operating position and the operator can no longer reach the point of danger.

Automatic Guards

When neither an enclosure guard nor an interlocking guard is practicable, an automatic guard may be used.

An automatic guard acts independently of the operator, repeating its cycle as long as the machine is in motion. This type of guard removes the operator's hands, arms, or body from the danger zone as a ram, plunger, or other tool closes on the item being worked. It is operated by the machine itself through a system of linkages connected to the operating mechanism.

Common types of automatic guards are sweep and push-away devices which are moving barriers crossing the danger zone when the machine is activated, and pull-away devices consisting of hand and arm attachments which pull the operator away from the danger zone.

Two-Handed Operating Devices

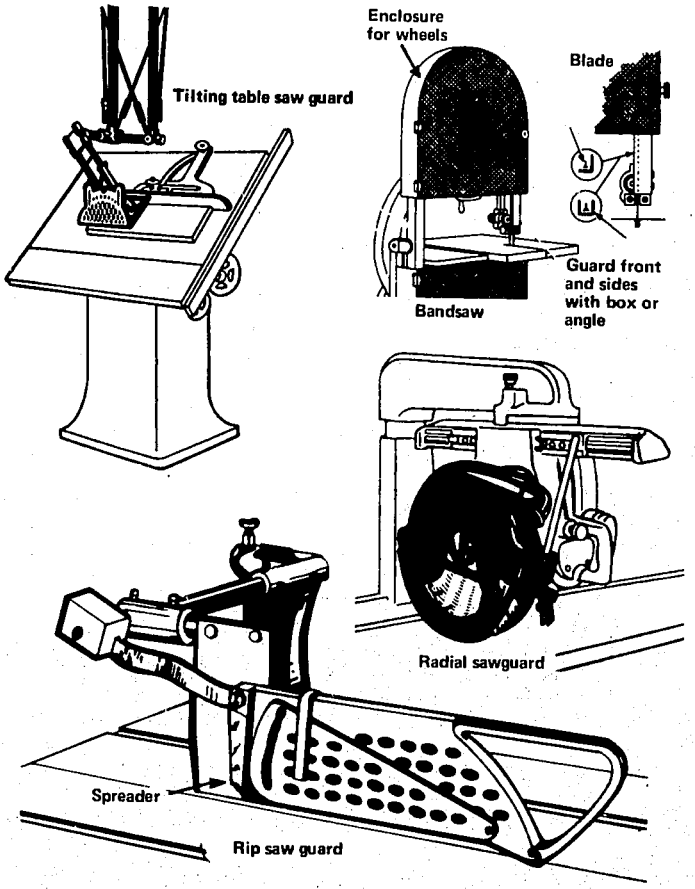
Two-handed operating devices, another category of guarding mechanisms, are also designed to protect a machine operator from point of operation hazards. Although they are not guards in the technical sense, they accomplish the same effect, and can also be used to complement one of the other types of guards.

These devices may be used to activate the machine. They require simultaneous action of the operator's hands on electrical switch buttons, air control valves, mechanical levers, etc. Hand controls may be interconnected with foot controls to permit operation of the machine. The actuating controls

MACHINERY AND MACHINE GUARDING (cont.)

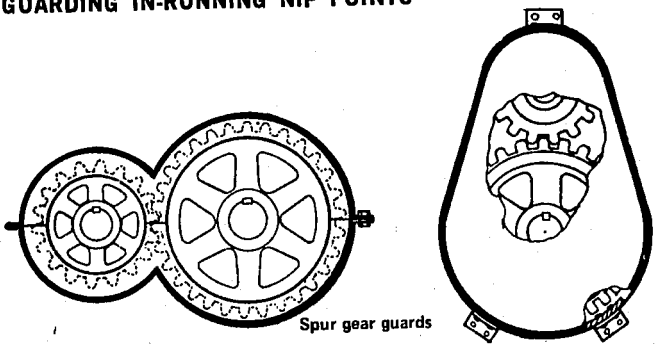
must be so located as to make it impossible for the operator to be able to move his hands from the controls to the danger zone before the machine has completed its closing cycle. The two-handed controls must be so designed as to prevent the blocking, tying down, or holding down of one control to allow one hand free access to the point-of-operation.

GUARDING CUTTING ACTIONS



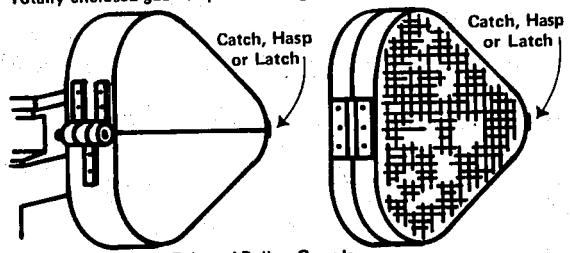
MACHINERY AND MACHINE GUARDING (cont.)

GUARDING IN-RUNNING NIP POINTS

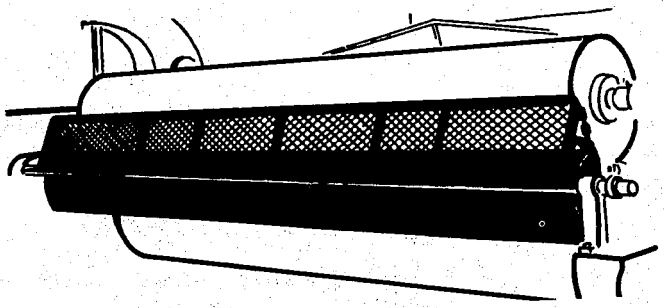


Spur gear guards

Totally enclosed guard. Split and hinged for either top or side opening

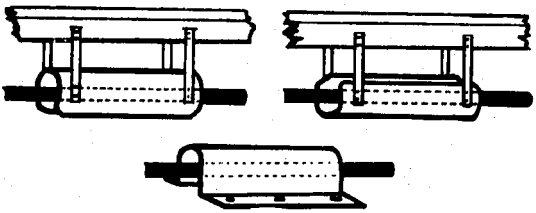


Belt and Pulley Guards

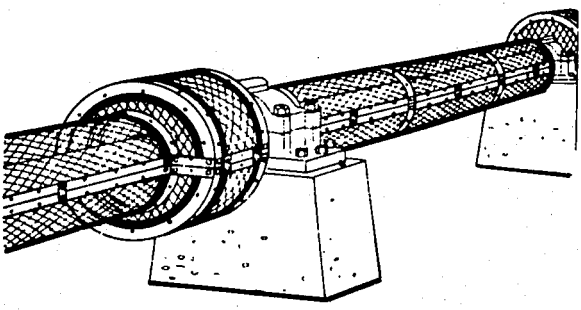


MACHINERY AND MACHINE GUARDING (cont.)

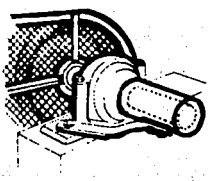
GUARDING ROTATING MOTION



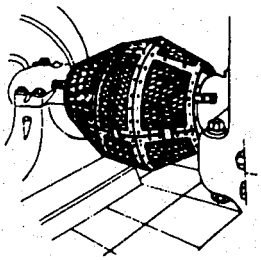
Horizontal shafting



Horizontal shafting



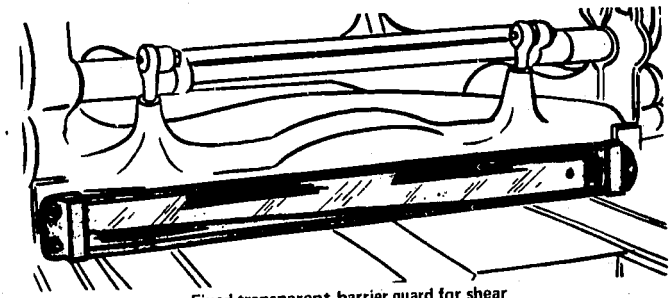
Sleeve for shaft end



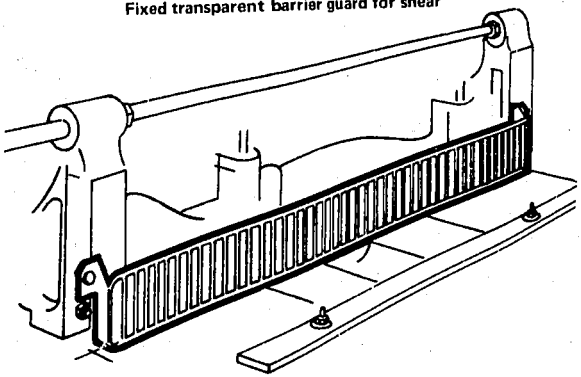
Coupling

MACHINERY AND MACHINE GUARDING (cont.)

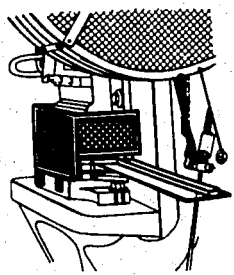
GUARDING PUNCHING, SHEARING OR BENDING ACTIONS



Fixed transparent barrier guard for shear



Adjustable barrier guard for feed side of shear



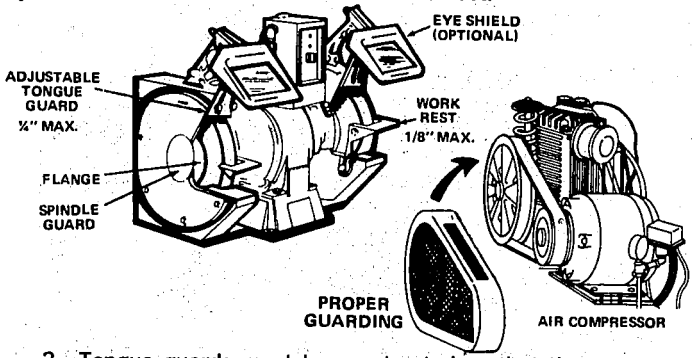
MACHINERY AND MACHINE GUARDING (cont.)

GRINDERS

1. Wheel safety guards must cover the spindle end, nut, and flange projections. The exposed area of the grinding wheel and sides for the safety guards should not exceed more than one-fourth of the entire wheel.

When measuring the guard opening, the visors or other accessory equipment is not included as a part of the guard unless this accessory equipment is as strong as the guard.

2. Work or tool rests must be of strong construction and designed to be adjustable to compensate for wheel wear. Work rests must be closely adjusted to the wheel, with a maximum clearance of ⅛ inch, to prevent the work from becoming jammed between the wheel and the work rest.



3. Tongue guards must be constructed so that the tongue guard can be adjusted to the constantly decreasing diameter of the wheel. The distance between the tongue guard and the wheel must never be more than ¼ inch.

4. Goggles or a face shield must be worn by the operator.

FANS

If fans are located within seven feet of the floor, they must be guarded with grille or mesh, limiting openings to not more than ½ inch (least dimension).

AIR COMPRESSORS

Air compressors must have the flywheel and drive pulley fully enclosed.

HAND AND PORTABLE POWERED TOOLS

The following is a partial list of regulations governing use of hand tools.

1. Each employer is responsible for the safe condition of tools and equipment used by employees, including tools and equipment which may be furnished by employees.

2. Hammers with broken or cracked handles, chisels and punches with mushroomed heads, or bent or broken wrenches should not be used.

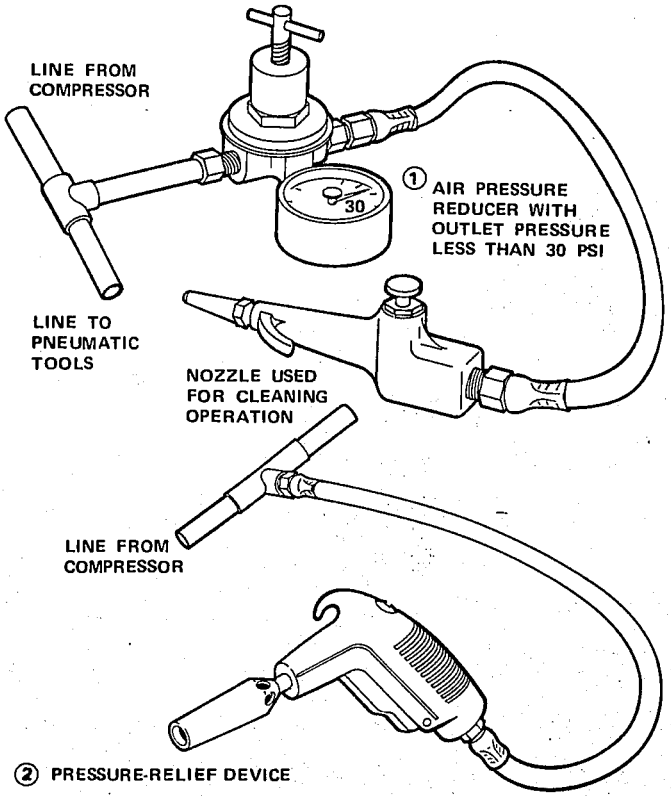
3. Most hand-held powered tools must be equipped with a "dead-man" or "quick release" control so that the power is automatically shut off whenever the operator releases the control.

4. Portable circular saws must be equipped with guards above and below the base plate or shoe. The lower guard must retract when the blade is in use, and automatically return when the tool is withdrawn from the work.

5. All hand-held portable electrical equipment must have its frame grounded or be double-insulated and identified as such.

HAND AND PORTABLE POWERED TOOLS (cont.)

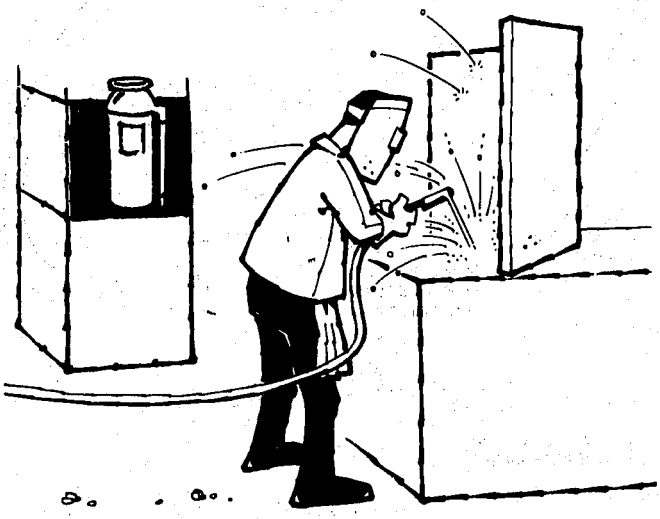
Beware of compressed air, it can be dangerous. Alternate methods of cleaning surfaces should be sought. Compressed air should never be used to blow debris from a person. Compressed air may be used if no alternate method of cleaning surfaces is acceptable. The downstream pressure of compressed air must remain at a pressure level below 30 psi whenever the nozzle is dead-ended and then only when effective chip guarding and personal protective equipment are used. Two acceptable methods of meeting the 30 psi requirement are illustrated below.



WELDING, CUTTING, AND BRAZING

GENERAL

1. Management must establish areas for cutting and welding based on the fire potentials of the plant, and establish procedures for welding and cutting in other areas. Preferably, cutting or welding should be done in an area with no surrounding combustible materials. If combustibles in the immediate vicinity are unavoidable, guards must be used to protect the fire hazards from heat and sparks. Suitable fire extinguishing equipment (pails of water, buckets of sand, hose, or portable extinguisher) must be maintained for instant use.



WELDING, CUTTING, AND BRAZING (cont.)

2. Torch cutters and welders must be suitably trained in the safe operation of their equipment. Printed rules and instructions covering operation of equipment supplied by the manufacturers must be strictly enforced.

3. No welding, cutting, or other hot work shall be performed on used drums, barrels, tanks, or other containers until they have been cleaned so thoroughly as to make absolutely certain that there are no flammable materials present or any substances such as greases, tars, acids, or other materials which when subjected to heat, might produce flammable or toxic vapors.

4. The atmosphere in the welding area must be free of flammable gases, liquids, and vapors.

5. Goggles or other suitable eye protection (helmets, hand shields) must be used during cutting operations as a protection against sparks and debris.

6. Workers adjacent to the welding areas must be protected from ultraviolet rays by noncombustible or flameproof screens or shields or must be required to wear appropriate goggles.

7. Employees exposed to hazards created by cutting and welding must be protected by personal protective equipment. For example:

a. Flameproof gauntlet gloves (except when engaged in light work) should be worn.

b. Flameproof aprons (leather for example) may be desirable as protection against sparks and radiant heat.

c. Fire-resistant leggings or high boots should be worn.

8. The potential health hazard to a welder or cutter from gases or metal fumes depends on the toxicity of the materials involved (types of metals, fluxes, coatings, etc.), duration, location, and ventilation.

9. There are specific requirements concerning ventilation and respirators when welding or cutting on the following:

a. stainless steel, lead, zinc, or cadmium

b. metals coated with lead or mercury containing materials such as paint

c. fluxes or other materials containing fluorides.

WELDING, CUTTING, AND BRAZING (cont.)

REQUIREMENTS FOR VENTILATION AND RESPIRATORS WHEN WELDING OR CUTTING

Welding or Cutting on Materials Containing or Coated With	Location of Operation		
	Confined Spaces	Indoors	Outdoors
Lead	A or B	A	C
Zinc	A or B	A	
Cadmium*	A or B	A or B	C
Beryllium*	A and B	A and B	A and B
Mercury*	A or B	A or B	C
Fluorine*	A or B		
Stainless Steels	A	A	A

*Unless atmospheric tests under the most adverse conditions have established that the workers' exposures are within acceptable concentrations defined by 1910.1000.

A = Mechanical local exhaust ventilation by means of either hoods or booths with sufficient airflow to maintain a velocity, away from the worker, of at least 100 linear feet per minute.

B = NIOSH approved supplied-air respirator.

C = NIOSH approved respiratory protective equipment.

10. Mechanical ventilation must be provided when welding or cutting is done on metals not covered in the table when:

a. there is less than 10,000 cubic feet of volume per welder

b. the ceiling is less than 16 feet high

c. working in confined spaces.

Such mechanical ventilation must be at the minimum rate of 2,000 cubic feet per minute per welder, unless hoods or booths are provided with sufficient airflow to maintain a velocity, away from the worker, of at least 100 linear feet per minute. Alternatively NIOSH approved supplied-air respirators must be used.

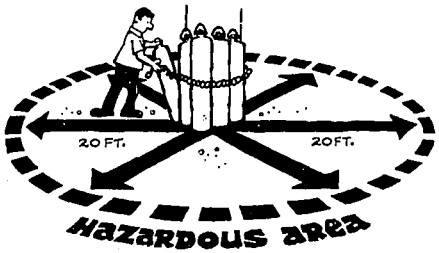
WELDING, CUTTING, AND BRAZING (cont.)

GAS WELDING

It is required that:

1. All cylinders be away from radiators and other sources of heat.

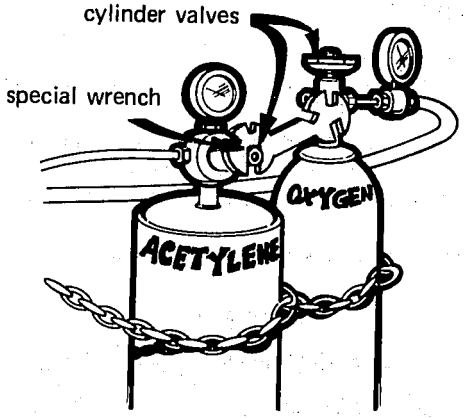
2. All cylinders stored inside buildings be located in a well-protected, well-ventilated, dry location at least 20 feet from highly combustible materials and away from elevators, stairs, or gangways. They are not to be kept in unventilated enclosures such as lockers and cupboards.



3. Valve protection caps be utilized where the cylinder is designed to accept a cap except when cylinders are in use or connected for use.

4. Stored oxygen cylinders be separated from stored fuel gas cylinders or combustible materials (especially oil or grease) by a minimum distance of 20 feet or by a non-combustible barrier at least five feet hign and having a one-half hour fire resistance rating.

WELDING, CUTTING, AND BRAZING (cont.)



5. All cylinder valves must be closed when work is finished. Where a special wrench is required it must be left in position on the stem of the valve while the cylinder is in use so that the fuel-gas flow can be quickly turned off in case of emergency. In the case of manifolded or coupled cylinders, at least one such wrench shall always be available for immediate use.

6. All cylinders must be legibly marked to identify contents.

7. No cylinder should be permitted to stand alone without being secured with lashing or chain to prevent it from toppling over.

8. Acetylene must not be utilized at a pressure in excess of 15 psi gauge (or 30 psi absolute). Above this pressure acetylene may become unstable.

9. Indoor storage of fuel-gas is limited to a total capacity of 2,000 cubic feet or 300 pounds of liquified petroleum gas.

10. Hoses showing leaks, burns, or worn places which render them unfit for service must be replaced or repaired.

WELDING, CUTTING, AND BRAZING (cont.)

ELECTRIC ARC WELDING

1. If the welding machine is wet, it must be thoroughly dried and tested before it is used again.

2. Coiled welding cable is to be spread out; the ground lead must be firmly attached to the work.

3. Cables must be inspected for damage and loss of insulation and be repaired immediately.

4. Ground and electrode cables may be joined together only with connectors specifically designed for that purpose.

5. Cables with splices within 10 feet of the operator may not be used; neither may the operator coil cables around his body.

6. Welding helmets or hand shields must be used by the operator. Persons close-by must wear eye-protection.

7. Shields must protect others in the vicinity from arc welding rays.

8. Arc welders should wear clean, fire-resistant gloves and clothing with collars and sleeves buttoned.

9. Electrode holders which are not in use must be placed in a safe place, for example, away from conducting objects.

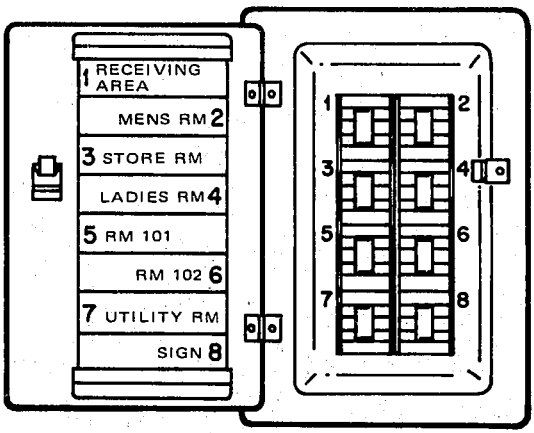
THE NATIONAL ELECTRICAL CODE (NEC)

ELECTRICAL REQUIREMENTS

MORE FIRES ARE CAUSED BY ELECTRICAL MALFUNCTION THAN ANY OTHER CAUSE, and standards pertaining to electrical equipment and its use in all industries have been cited as violations more frequently than any others.

The National Electrical Code, NFPA 70-1971; ANSI C1-1971 has been adopted as a national consensus standard by OSHA (refer to "Information Sources"). The purpose of the NEC is the practical safeguarding of persons and buildings and their contents from hazards arising from the use of electricity. The code contains basic minimum provisions considered necessary for safety. The electrician should be familiar with these requirements.

1. Each disconnecting means (i.e. circuit breaker or fuse boxes) must be legibly marked to indicate its purpose unless its purpose is evident.



Proper labeling of circuit breakers.

THE NATIONAL ELECTRICAL CODE (NEC) (cont.)

2. Frames of electrical motors, regardless of voltage, must be grounded.

3. Exposed noncurrent-carrying metal parts of fixed equipment that may become energized under abnormal conditions must be grounded under any of the following circumstances:

   a. in wet or damp locations.

   b. if in electrical contact with metal.

   c. if operated in excess of 150 volts to ground.

   d. when in a hazardous location.

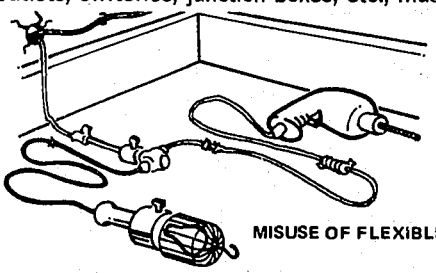
4. Exposed noncurrent-carrying metal parts of the following plug-connected equipment, which are liable to become energized, must be grounded or double-insulated and distinctly marked:

   a. portable hand-held motor-operated tools

   b. appliances

   c. any equipment operated in excess of 150 volts to ground.

5. Outlets, switches, junction boxes, etc., must be covered.



MISUSE OF FLEXIBLE CORDS

6. Flexible cords may not be:

   a. used as a substitute for fixed wiring.

   b. put through holes in walls, ceilings, or floors.

   c. run through doors, windows, etc.

   d. attached to building surfaces.

7. Flexible cords must be:

   a. continuous lengths without splices or taps.

   b. fastened so that there is no pull on joints or terminal screws.

   c. replaced when frayed or insulation has deteriorated.

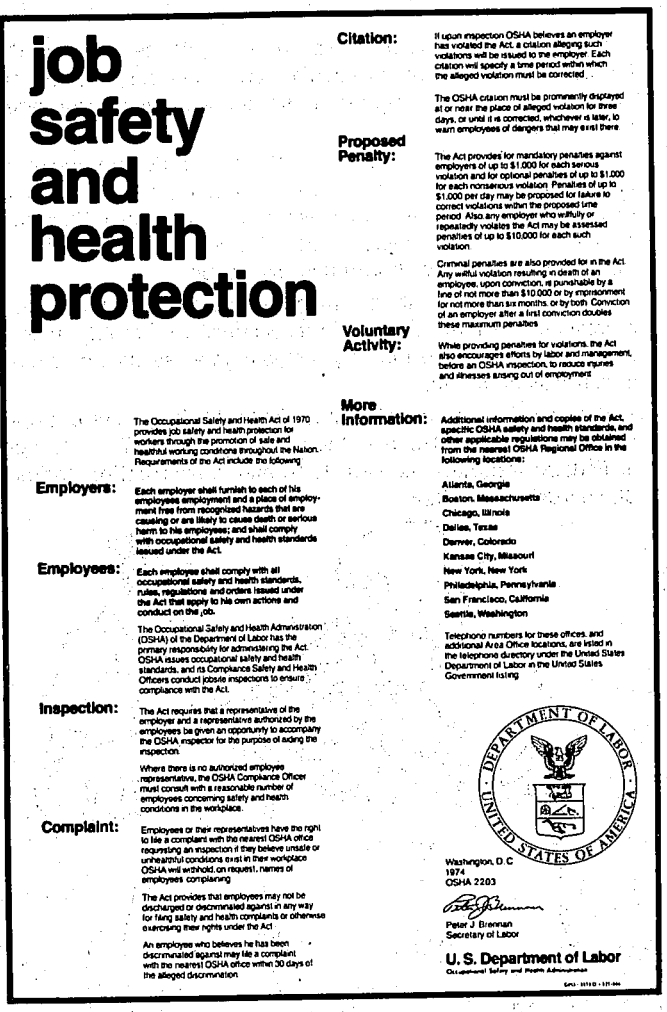
RECORDKEEPING REQUIREMENTS

Recordkeeping requirements under OSHA are intended to compile factual information about accidents that have happened. These records provide employers with a measure for evaluating the success of their health and safety activities and of identifying high risk areas of the business to which attention should be directed. Federal regulations require that employers with 11 or more employees at any time during the previous calendar year are required to complete OSHA Forms 100, 101 (or their equivalent), and 102. These records must be maintained for five years, excluding the current year. Forms 100 and 101 must be kept current to within 6 days.

The types of work-related injuries and illnesses which must be recorded are those involving fatalities, lost workdays, or those which are nonfatal and do not cause lost workdays for the employee, but do require medical treatment, job transfer or termination, or resulted in loss of consciousness. Employers are also required to report within 48 hours to OSHA any occurrence of a work-related fatal accident, or an accident requiring the hospitalization of five or more employees. An annual summary, Form 102, must be posted for the entire month of February.

Employers are required to maintain accurate records of certain potentially toxic or harmful physical agents which must be monitored or measured, and to promptly advise any employee of any excessive exposure and the corrective action undertaken. Examples are asbestos, ionizing radiation, etc.

For more detailed information, the booklet "Recordkeeping Requirements Under the Williams-Steiger Occupational Safety and Health Act of 1970" is available from OSHA.



job safety and health protection

The Occupational Safety and Health Act of 1970 provides job safety and health protection for workers through the promotion of safe and healthful working conditions throughout the Nation. Requirements of the Act include the following:

Employers: Each employer shall furnish to each of his employees employment and a place of employment free from recognized hazards that are causing or are likely to cause death or serious harm to his employees; and shall comply with occupational safety and health standards issued under the Act.

Employees: Each employee shall comply with all occupational safety and health standards, rules, regulations and orders issued under the Act that apply to his own actions and conduct on the job.

The Occupational Safety and Health Administration (OSHA) of the Department of Labor has the primary responsibility for administering the Act. OSHA issues occupational safety and health standards, and its Compliance Safety and Health Officers conduct jobsite inspections to ensure compliance with the Act.

Inspection: The Act requires that a representative of the employer and a representative authorized by the employees be given an opportunity to accompany the OSHA inspector for the purpose of aiding the inspection.

Where there is no authorized employee representative, the OSHA Compliance Officer must consult with a reasonable number of employees concerning safety and health conditions in the workplace.

Complaint: Employees or their representatives have the right to file a complaint with the nearest OSHA office requesting an inspection if they believe unsafe or unhealthful conditions exist in their workplace. OSHA will withhold, on request, names of employees complaining.

The Act provides that employees may not be discharged or discriminated against in any way for filing safety and health complaints or otherwise exercising their rights under the Act.

An employee who believes he has been discriminated against may file a complaint with the nearest OSHA office within 30 days of the alleged discrimination.

Citation: If upon inspection OSHA believes an employer has violated the Act, a citation alleging such violations will be issued to the employer. Each citation will specify a time period within which the alleged violation must be corrected.

The OSHA citation must be prominently displayed at or near the place of alleged violation for three days, or until it is corrected, whichever is later, to warn employees of dangers that may exist there.

Proposed Penalty: The Act provides for mandatory penalties against employers of up to $1,000 for each serious violation and for optional penalties of up to $1,000 for each nonserious violation. Penalties of up to $1,000 per day may be proposed for failure to correct violations within the proposed time period. Also any employer who willfully or repeatedly violates the Act may be assessed penalties of up to $10,000 for each such violation.

Criminal penalties are also provided for in the Act. Any willful violation resulting in death of an employee, upon conviction, is punishable by a fine of not more than $10,000 or by imprisonment for not more than six months, or by both. Conviction of an employer after a first conviction doubles these maximum penalties.

Voluntary Activity: While providing penalties for violations, the Act also encourages efforts by labor and management, before an OSHA inspection, to reduce injuries and illnesses arising out of employment.

More Information: Additional information and copies of the Act, specific OSHA safety and health standards, and other applicable regulations may be obtained from the nearest OSHA Regional Office in the following locations:

Atlanta, Georgia
Boston, Massachusetts
Chicago, Illinois
Dallas, Texas
Denver, Colorado
Kansas City, Missouri
New York, New York
Philadelphia, Pennsylvania
San Francisco, California
Seattle, Washington

Telephone numbers for these offices, and additional Area Office locations, are listed in the telephone directory under the United States Department of Labor in the United States Government listing.

DEPARTMENT OF LABOR · UNITED STATES OF AMERICA

Washington, D.C.
1974
OSHA 2203

Peter J. Brennan
Secretary of Labor

U.S. Department of Labor
Occupational Safety and Health Administration

Employers must post one of the full size versions (10 × 16) of this type of OSHA poster or a state-approved poster where required.

CHECKLISTS

Since safe conditions depend on vigilance for possible hazards and immediate remedial action, periodic inspections are one of the most important aspects of a successful safety and health program.

Management will find a checklist, such as the one presented on the following pages, helpful in performing a self-inspection of its facility. Because businesses vary, it is best that each business develop a customized list from the information in this booklet and a walk-through inspection.

Using this checklist, the manager, supervisor, or employee representative makes periodic inspections (preferably at least once each month) to identify problem areas so that corrective action may be taken.

Reference made in the "Checklist" subtitles refers to appropriate sections of "General Industry Standards", Title 29 Code of Federal Regulations Part 1910 and "Construction Industry Standards" Part 1926.

WALKING AND WORKING SURFACES
AISLES AND FLOORS (29 CFR 1910.22)

	Yes	No
Are all places of employment kept clean and orderly?	☐	☐
Are floors, aisles, and passageways kept clean and dry and all spills cleaned up immediately?	☐	☐
Are pieces of scrap sheet metal promptly cleaned up?	☐	☐
Are floor holes, such as drains, covered?	☐	☐
Are permanent aisles appropriately marked?	☐	☐
Are wet surface areas covered with non-slip materials?	☐	☐

STORAGE LOFTS, SECOND FLOORS, ETC.
(29 CFR 1910.22, .23)

Are signs showing floor-load capacity present?	☐	☐
Are platforms, storage lofts, balconies, etc. that are more than four feet above the floor protected with standard guardrails?	☐	☐
Are all platforms, lofts, and balconies (where people or machinery could be exposed to falling objects) guarded with standard four-inch toeboards?	☐	☐

STAIRS (29 CFR 1910.24)

Are there standard stair rails or handrails on all stairways having four or more risers?	☐	☐

	Yes	No
Are all stairways at least 22 inches wide?	☐	☐
Do stairs have at least a seven-foot overhead clearance?	☐	☐
Do stairs angle no more than 50° and no less than 30°?	☐	☐

LADDERS (29 CFR 1910.25—.27)

Have defective ladders (e.g. broken rungs, side rails, etc.) been tagged as "DANGEROUS, DO NOT USE" and removed from service for repair or destruction?	☐	☐
Is it prohibited to use the top of an ordinary step ladder as a step?	☐	☐
Do fixed ladders have at least 3½ feet of extension at the top of the landing?	☐	☐
Is the distance between the centerline of rungs on a fixed ladder and the nearest permanent object in back of the ladder at least 7 inches or more?	☐	☐
Do all fixed ladders have a preferred pitch of 75°-90°?	☐	☐

EGRESS (29 CFR 1910.36-.38)

Are all exits marked with an exit sign and illuminated by a reliable light source?	☐	☐
Is the lettering at least six inches high with the principal letter strokes at least ¾ of an inch wide?	☐	☐
Is the direction to exits, when not immediately apparent, marked with visible signs?	☐	☐

	Yes	No
Are doors or other passageways, that are neither exits nor access to an exit, and located where they may be mistaken for exits, appropriately marked "NOT AN EXIT", "TO BASEMENT", "STOREROOM", etc.?	☐	☐
Are exit doors side-hinged?	☐	☐
Are all doors that must be passed through to reach an exit or way to an exit, always free to access with no possibility of a person's being locked inside?	☐	☐
Are all exit routes always kept free of obstructions?	☐	☐

SAFETY BELTS, LIFELINES, AND LANYARDS (CFR 29 1926.104)

	Yes	No
Are lifelines and safety belts provided for and used by workmen exposed to a hazard of falling?	☐	☐
Are lifelines secured above the point of operation to an anchorage or structural member capable of supporting a minimum dead weight of 5,400 pounds?	☐	☐
Do lifelines have a minimum breaking strength of 5,400 pounds?	☐	☐
Is the safety belt lanyard of a length to provide a fall of six feet or less?	☐	☐

SAFETY NETS (29 CFR 1926.105)

Are safety nets provided when workplaces are more than 25 feet above ground or water surfaces or other places where the use of ladders, scaffolds, catch platforms, temporary floors, safety lines, or safety belts is impractical?	☐	☐

	Yes	No
Do safety nets extend eight feet beyond the work surface where employees are exposed?	☐	☐
Are nets hung with safe clearances from any objects and is the safe clearance determined by impact load testing?	☐	☐

SCAFFOLDING (29 CFR 1926.451)

Are scaffolds erected, moved, dismantled or altered only under the supervision of a competent person?	☐	☐
Is scaffolding placed on solid footing and are unstable objects such as boxes, barrels, and concrete blocks prohibited for supporting scaffolding?	☐	☐
Are standard guardrails and toeboards installed on all scaffolds when required?	☐	☐
If persons are required to pass or work under a scaffold, is a screen of No. 18 gauge U.S. Standard Wire or its equivalent properly installed?	☐	☐
Is scaffolding planking of approved grades?	☐	☐
Is scaffold planking overlapped a minimum of 12 inches or secured from movement?	☐	☐
Does scaffold planking extend over its end supports between 6-12 inches?	☐	☐
Are scaffolds capable of supporting without failure at least four times the intended load?	☐	☐

ROLLING SCAFFOLDS

Are rolling scaffolds properly braced (cross bracing and horizontal bracing)?	☐	☐

	Yes	No
Are casters for rolling scaffolds properly designed for strength and with locking devices?	☐	☐
Are free-standing mobile scaffolds constructed so that the height does not exceed four times the minimum base dimensi n?	☐	☐
Are platforms for rolling scaffolds tightly planked for the full width of the scaffold (except for entrance opening) and secured in place?	☐	☐

LADDER JACK SCAFFOLDS

When ladder jack scaffolds are used, are they limited to a height of less than 20 feet?	☐	☐
Are cleated ladders prohibited from being used with ladder jack scaffolds?	☐	☐
Do the platform planks on ladder jack scaffolds overlap the bearing surface by at least 12 inches?	☐	☐
Is the platform width on ladder jack scaffolds at least 18 inches?	☐	☐

TWO-POINT SUSPENSION SCAFFOLDS

Are two-point suspension scaffolds (swinging scaffolds) constructed and designed properly?	☐	☐
Are two-point suspension scaffold roof irons or hooks securely installed and anchored with tie-backs of ¾ inch manila rope or its equivalent?	☐	☐

	Yes	No
Are the suspending cables capable of supporting six times the rated load and are other components capable of supporting four times the rated load?	☐	☐
Are employees protected properly with approved safety belts and lifelines?	☐	☐

BOATSWAIN'S CHAIRS

Are chair seats at least 12×24 inches and 1 inch thick?	☐	☐
Are chair seats reinforced on the underside by securely fastened cleats?	☐	☐
Are seat slings made of at least ⅜ inch wire rope when a heat producing process such as welding is being done?	☐	☐
Are two fiber rope seat slings ⅝ inch diameter and reeved through the four seat holes so as to cross each other on the underside of the seat?	☐	☐

CRANES (29 CFR 1926.550)

Are rated load capacities, recommended operating speeds, special hazard warnings, and instructions conspicuously posted on all cranes?	☐	☐
Are illustrations of hand signals to crane operators posted at the job site?	☐	☐
Are regular inspections by competent persons made of equipment and the required records kept?	☐	☐
Are all belts, gears, pulleys, chains, sprockets, etc., properly guarded if exposed to employees?	☐	☐

	Yes	No
Is an accessible fire extinguisher of 5BC or higher rating available at the operator's station?	☐	☐
Are truck cranes operated within the required minimum overhead clearances from power transmission lines?	☐	☐

AERIAL LIFTS (29 CFR 1926.556)

Are only authorized persons allowed to operate an aerial lift (extensible boom platform, aerial ladder, articulating boom platform)?	☐	☐
Are lift controls tested each day prior to use?	☐	☐
Are aerial ladders secured and locked in the lower traveling position prior to highway travel?	☐	☐
Are employees provided with safety belts and lanyards when working from an aerial lift and is belting-off to adjacent poles or structures forbidden?	☐	☐
Do articulating boom and extensible boom platforms, designed primarily as personnel carriers, have dual (upper and lower) controls?	☐	☐
Are controls plainly marked as to function and do lower controls override the upper controls?	☐	☐
Are the brakes set on aerial lifts before use?	☐	☐
Are wheel chocks used on inclines?	☐	☐
Are outriggers positioned on pads or solid surfaces when in use?	☐	☐
Are minimum overhead clearances from power transmission lines observed?	☐	☐

OCCUPATIONAL HEALTH AND ENVIRONMENTAL CONTROL (29 CFR 1910.1000, .94)

	Yes	No
Is management aware of the hazards caused by various chemicals used in the plant?	☐	☐
Is employee exposure to these chemicals kept within the acceptable levels?	☐	☐
Are eye wash fountains and safety showers provided in areas where chemicals, such as caustics, are used?	☐	☐
Are all containers, such as vats, storage tanks, etc. labeled as to their contents?	☐	☐
Are employees required to wear personal protective equipment when handling hazardous materials (gloves, eye protection, respirators, etc.)?	☐	☐
If internal combustion engines are used, is carbon monoxide kept within acceptable levels?	☐	☐
Is employee exposure to welding fumes controlled by ventilation, use of respirators, exposure time or other means?	☐	☐
Is vacuuming used wherever possible rather than blowing or sweeping dust?	☐	☐
Are provisions made to control workers' exposure to asbestos and mercury in the glass letter manufacuring and glass blowing areas?	☐	☐

OCCUPATIONAL NOISE EXPOSURE (29 CFR 1910.95)

If a noise problem is suspected, have noise levels been accurately measured?	☐	☐

	Yes	No
If a noise problem exists, have plans to reduce noise levels by engineering methods been formulated (e.g. enclosure, maintenance, different methods of processing)?	☐	☐
If engineering controls cannot reduce the noise to safe levels have administrative controls, such as limiting worker-exposure in a given area, been started?	☐	☐
Are affected employees given annual audiometric tests if necessary?	☐	☐
Do all employees in high-noise areas wear hearing protection?	☐	☐

HAZARDOUS MATERIALS
FLAMMABLE AND COMBUSTIBLE LIQUIDS (29 CFR 1910.106)

Are all connections on drums and combustible liquid piping vapor and liquid tight?	☐	☐
Are flammable liquids kept in closed containers when not in use (e.g. parts cleaning tanks, pans, etc.)?	☐	☐
Are all spills of flammable or combustible liquids cleaned up promptly?	☐	☐
Is combustible waste material (oily rags, etc.) stored in covered metal receptacles and disposed of daily?	☐	☐
Are bulk drums of flammable liquids grounded and bonded to containers during dispensing?	☐	☐
Are gasoline and other flammable liquids stored in approved containers?	☐	☐

	Yes	No
Do storage rooms for flammable and combustible liquids have explosion-proof lights?	☐	☐
Do storage rooms for flammable and combustible liquids have mechanical or gravity ventilation (at least six air changes per hour)?	☐	☐
Are LP-gas storage tanks guarded to prevent damage from vehicles?	☐	☐
Are "NO SMOKING" signs posted on LP-gas tanks?	☐	☐
Are storage cabinets for flammable liquids labeled "FLAMMABLE — KEEP FIRE AWAY"?	☐	☐
Is there never more than one day's supply of paint outside approved storage cabinets or rooms?	☐	☐

SPRAY OPERATIONS (29 CFR 1910.107)

GENERAL

Are portable lamps removed during spray operations?	☐	☐
Do solvents used for cleaning have high flash points? (Not less than 100°F).	☐	☐
Are fire control sprinkler heads kept clean?	☐	☐
Are "NO SMOKING" signs posted in the spray area, paint room, paint booth and paint storage area?	☐	☐
Are the electric motors for exhaust fans placed outside booths or ducts?	☐	☐
Are belts and pulleys inside the booth fully enclosed?	☐	☐

CHECKLISTS (cont.)

	Yes	No
Do ducts have access doors to allow cleaning?	☐	☐
At low temperatures (below 55°) is make-up air heated to at least 65°?	☐	☐
Is the make-up air heater located outside the spray booth?	☐	☐
Do all drying spaces have adequate ventilation?	☐	☐
Is the spray area at least 20 feet from flame, sparks, electric motors, or other ignition sources?	☐	☐
Is the spray area free of hot surfaces?	☐	☐
Is the spray area kept clean of combustible residue?	☐	☐
Are spray booths constructed of metal, masonry or other substantial noncombustible material?	☐	☐
Are spray booth floors and baffles non-combustible and easily cleaned?	☐	☐
Do spray booths have explosion-proof lights or are they lighted through sealed clear panels?	☐	☐
Is mechanical ventilation on during spray operations?	☐	☐
Is infra-red drying apparatus kept out of the spray area during spraying operations?	☐	☐
Is the spray area completely ventilated before using the drying apparatus?	☐	☐
Is the electric drying apparatus properly grounded?	☐	☐

PERSONAL PROTECTIVE EQUIPMENT (29 CFR 1910.132—.137)

	Yes	No
Is personal protective equipment provided, used, and maintained wherever it is necessary?	☐	☐
Is employee-owned personal protective equipment, such as gloves, protective shoes, etc., adequate, and properly maintained?	☐	☐
Is eye protection available where debris or flying objects could be a hazard?	☐	☐
Are respirators provided and worn during dusty operations, paint spraying, etc.?	☐	☐
Is the proper respirator in use for the hazards present? (For example, dust masks do not protect against solvent vapors.)	☐	☐
Are there written standard operating procedures for the selection and use of respirators?	☐	☐
Is the user instructed and trained in the proper use of respirators?	☐	☐
Where practicable, are respirators assigned for use by employees individually?	☐	☐
Are respirators cleaned and disinfected after use?	☐	☐
Are respirators stored in a convenient, clean, and sanitary location?	☐	☐
Are routinely-used respirators inspected during cleaning?	☐	☐

GENERAL ENVIRONMENTAL CONTROLS SANITATION (29 CFR 1910.141)

Are restrooms and washrooms kept in clean and sanitary condition?	☐	☐

	Yes	No
Are covered receptacles for waste food kept in clean and sanitary condition?	☐	☐
Are covered receptacles for sanitary napkins provided in the women's restroom?	☐	☐
Is all water that is provided for drinking, washing and cooking, suitable for drinking?	☐	☐
Are all outlets for water that is not suitable for drinking, clearly posted as "UNSAFE FOR DRINKING, WASHING OR COOKING"?	☐	☐
Are employees prohibited from eating in areas where toxic materials are present?	☐	☐

MEDICAL AND FIRST AID (29 CFR 1910.151)

Is at least one employee on each shift currently qualified to render first aid in the absence of a nearby clinic or hospital? (Some states require first-aid trained persons regardless of nearby clinics or hospitals.)	☐	☐
Are first-aid supplies readily available, inspected and replenished?	☐	☐
Are first-aid supplies approved by a consulting physician, indicating that they are adequate?	☐	☐
Are medical personnel readily available for advice and consultation on matters of employee health?	☐	☐
Is there a first-aid kit easily accessible to the work area?	☐	☐
Are emergency phone numbers posted?	☐	☐
Where employees may be exposed to injurious corrosive materials, are they provided with quick-drenching and flushing facilities for immediate emergency use?	☐	☐

FIRE PROTECTION (29 CFR 1910.157, .159, .160)

	Yes	No
Are extinguishers selected for the types of combustibles and flammables in the areas where they are to be used? Class A Ordinary combustible material fires. Class B Flammable-liquid, or grease fires. Class C Energized-electrical-equipment fires.	☐	☐
Are extinguishers fully charged and in designated places?	☐	☐
Are extinguishers located along normal paths of travel?	☐	☐
Are extinguisher locations free from obstruction or blockage?	☐	☐
Are extinguishers not mounted too high? If not exceeding 40 pounds, the top must not be higher than five feet above floor; greater than 40 pounds, the top must not be higher than 3½ feet above floor.	☐	☐
Have all extinguishers been serviced, maintained, and tagged at intervals not to exceed one year?	☐	☐
Are all extinguishers checked (by management or designated employee) monthly to see if they are in place or if they have been discharged, etc.?	☐	☐
Have all extinguishers been hydrostatically tested according to schedules set for the type of extinguisher?	☐	☐

AUTOMATIC SPRINKLERS (if applicable)

	Yes	No
Is there at least one automatic water supply of adequate pressure, capacity and reliability?	☐	☐
Are water-flow alarms provided on all sprinklers?	☐	☐
Are the sprinkler systems periodically inspected and continuously maintained?	☐	☐
Is the clearance between sprinkler deflectors and the top of storage at least 18"?	☐	☐

DRY CHEMICAL SYSTEMS (if applicable)

Does a competent inspector make annual inspections and perform tests on all dry chemical systems?	☐	☐
Are the inspector's reports kept on file?	☐	☐
Are visual inspections regularly made?	☐	☐
Are all dry chemical systems continuously maintained?	☐	☐

COMPRESSED AIR (29 CFR 1910.169)

Are pulleys and belts on compressors and motors completely guarded?	☐	☐
Are flexible cords or plugs on electric motors periodically checked and replaced if in a deteriorated condition?	☐	☐
Do the relief valves operate properly?	☐	☐
Are air tanks drained regularly?	☐	☐
Is the pressure-relief device and gauge in good operating condition?	☐	☐

MATERIALS HANDLING AND STORAGE (29 CFR 1910.176—181)

	Yes	No
Is there safe clearance for equipment through aisles and doors?	☐	☐
Is stored material stable and secure?	☐	☐
Are storage areas free from tripping hazards?	☐	☐
Are only trained operators allowed to operate powered lift trucks?	☐	☐
Are appropriate overhead guards installed on powered lift trucks?	☐	☐
Is battery charging on electric units performed only in designated areas?	☐	☐
Are "NO SMOKING" signs posted near electric battery charging units?	☐	☐
On units using internal combustion engines, do the exhaust gases in the room not exceed allowable limits for carbon monoxide?	☐	☐
Are dock boards (bridge plates) used when loading or unloading from dock to truck or dock to rail car?	☐	☐
Are containers of combustibles or flammables, when stacked one upon the other, always separated by dunnage sufficient to provide stability?	☐	☐
Are racks and platforms loaded within the limits of their capacity?	☐	☐
Is all storage secured against sliding or collapsing?	☐	☐
Are all vehicles shut off prior to loading?	☐	☐

	Yes	No
Have aisles been designated and kept clear to allow unhindered passage?	☐	☐
If motorized equipment, such as lift trucks, is used, are aisles permanently marked, providing sufficient clearance for passage of the equipment?	☐	☐
Are specifications posted for maximum loads which are approved for floors (except slabs with no basements), roof of a building, or similar structures?	☐	☐
Are proper procedures being followed when using all hoisting equipment?	☐	☐

SLINGS (29 CFR 1910.184)

Are proper procedures followed whenever slings are used?	☐	☐

MACHINERY AND MACHINE GUARDING (29 CFR 1910.212—.219)

Are belts, pulleys, and rotating shafts (air compressor, drill presses, etc.) properly guarded?	☐	☐
Are chains, sprockets and gears properly guarded?	☐	☐
Are all in-going nip points properly guarded?	☐	☐
Are flywheels located within seven feet of the ground on presses properly guarded?	☐	☐
Are shears properly guarded at the point of operation?	☐	☐
Are press brakes properly guarded at the point of operation?	☐	☐

	Yes	No
Are all pieces of equipment with an electric motor or an electrical connection effectively grounded?	☐	☐
Are sprockets and V-belt drives within reach of platforms and passageways or less than seven feet from the floor completely enclosed?	☐	☐
Are fans less than seven feet above floor guarded, having openings ½ inch or less?	☐	☐

WOODWORKING MACHINERY (29 CFR 1910.213)

Are all saws properly guarded and are spreaders, jigs, and combs used where appropriate?	☐	☐
Are all saw blades and other cutting tools regularly inspected for sharpness and other conditions affecting safe operation?	☐	☐
Have swing cut-off saws and radial saws been properly designed or modified to return automatically to the back of the table when released?	☐	☐
Does every woodworking machine have a master switch to keep it inoperative during repairs and adjustments?	☐	☐
Do band saws have a tension control device?	☐	☐

COMPRESSED AIR USED FOR CLEANING (29 CFR 1910.242)

Is air pressure reduced to less than 30 psi when the nozzle, used for cleaning, is dead ended?	☐	☐

	Yes	No
Have employees been instructed that the use of compressed air to blow debris from clothing or body is prohibited because it can enter the body and cause serious harm?	☐	☐

ABRASIVE WHEEL MACHINERY (Grinders) (29 CFR 1910.215)

Is the work rest used and kept adjusted to within ⅛ inch of wheel?	☐	☐
Is the adjustable tongue on top side of grinder used and kept adjusted to within ¼ inch of wheel?	☐	☐
Do side guards cover the spindle, nut and flange and 75% of the wheel diameter?	☐	☐
Are bench and pedestal grinders permanently mounted?	☐	☐
Are goggles or face shields always worn when grinding?	☐	☐

HAND AND PORTABLE POWER TOOLS (29 CFR 1910.242—.244)

Are tools and equipment (both company and employee-owned) in good condition?	☐	☐
Have mushroomed heads on chisels, punches, etc. been reconditioned or replaced if necessary?	☐	☐
Have broken hammer handles been replaced?	☐	☐
Have worn or bent wrenches been replaced?	☐	☐
Have deteriorated air hoses been replaced?	☐	☐

	Yes	No
Are portable abrasive wheels appropriately guarded?	☐	☐
Have employees been made aware of the hazards caused by faulty or improperly used hand tools?	☐	☐

WELDING, CUTTING AND BRAZING (29 CFR 1910.252)

Are fuel gas cylinders and oxygen cylinders separated by 20 feet or a barrier 5 feet high having a ½-hour fire resistance rating?	☐	☐
Are cylinders secured and stored where they cannot be knocked over?	☐	☐
Are cylinder protective caps in place except when the cylinder is connected for use?	☐	☐
Are compressed gas cylinders kept away from sources of heat, elevators, stairs, or gangways?	☐	☐
Are only instructed employees, who are judged competent by the employer, allowed to use oxygen or fuel gas equipment?	☐	☐
Do all cylinders (except those with fixed hand wheels) have non-adjustable wrenches, keys, or handles in place on valve stems while cylinders are in use?	☐	☐
Is welding always conducted at a safe distance from flammable liquids?	☐	☐
Are all compressed gas cylinders legibly marked for identifying the content?	☐	☐
Are the valves shut off when the cylinder is not in use?	☐	☐
Are flash shields provided to protect nearby workers from the welding flash?	☐	☐

OTHER WELDING, CUTTING AND BRAZING OPERATIONS (29 CFR 1926.350)

	Yes	No
When transporting or moving compressed gas cylinders (e.g. on aerial lift trucks), are the cylinders secured in an upright position and valve caps in place?	☐	☐

ARC WELDING AND CUTTING (29 CFR 1926.351)

Are appropriate manual electrode holders designed for arc welding being used?	☐	☐
Are arc welding cables of the flexible type and completely insulated?	☐	☐
When electrode holders are left unattended, are the electrodes removed and placed away from employees or conducting objects?	☐	☐
Are arc welding and cutting operations properly shielded?	☐	☐
Is adequate ventilation provided to employees who are arc welding or cutting?	☐	☐

NATIONAL ELECTRICAL CODE ELECTRICAL WIRING (29 CFR 1910.308 & .309)

Have exposed wires, frayed cords and deteriorated insulation been repaired or replaced?	☐	☐
Are junction boxes, outlets, switches, and fittings covered?	☐	☐
Is all metal fixed electrical equipment grounded?	☐	☐
Does all equipment connected by cord and plug have grounded connections?	☐	☐
Are electrical appliances such as vacuums, polishers, vending machines, etc. grounded?	☐	☐

CHECKLISTS (cont.)

	Yes	No
Are all portable electrical hand tools grounded? (Double-insulated tools are acceptable without grounding.)	☐	☐
Are breaker switches identified as to their use?	☐	☐
Do flexible cords and cables not run through holes in wall or ceiling or through doorways or windows?	☐	☐
Are flexible cords and cables free from splices or taps?	☐	☐

INFORMATION SOURCES

AMERICAN NATIONAL STANDARDS INSTITUTE (ANSI)
1430 Broadway
New York, N. Y. 10018

- ☐ A12.1 Floor and Wall Openings
- ☐ A14.1 Portable Wood Ladders
- ☐ A58.1 Minimum Design Load
- ☐ A64.1 Fixed Stairs
- ☐ B15.1 Mechanical Power Transmission
- ☐ C1 National Electric Code
- ☐ Z4.1 Sanitation in Places of Employment

NATIONAL FIRE PROTECTION ASSOCIATION (NFPA)
470 Atlantic Ave.
Boston, Mass. 02210

- ☐ NFPA-10-1970 Installation of Portable Fire Extinguishers
- ☐ NFPA-101-1970 Life Safety Code
- ☐ NFPA-13A-1971 Sprinkler Systems, Maintenance
- ☐ NFPA-17-1969 Dry Chemical Extinguishing Systems
- ☐ NFPA-70-1971 National Electric Code

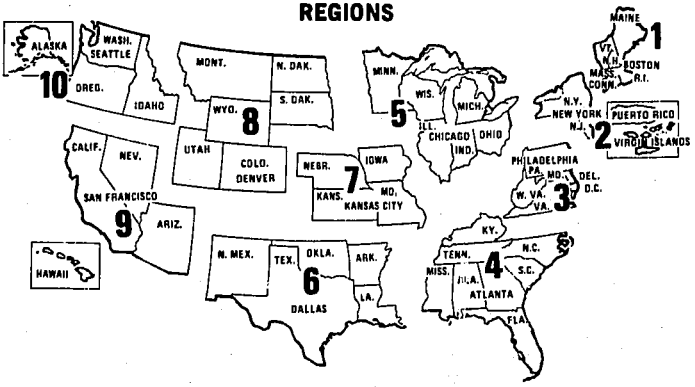
NATIONAL SAFETY COUNCIL
425 North Michigan Avenue
Chicago, Illinois 60611

NIOSH AND OSHA REGIONAL DIRECTORS

Trade associations, state and local governmental agencies, and insurance companies can also provide useful information. The Small Business Administration will provide information concerning procedures for securing economic assistance on compliance with the OSHA Standards (if needed).

NIOSH AND OSHA REGIONAL OFFICES

The following pages list NIOSH and OSHA regional offices. Any of these offices will provide information on the OCCUPATIONAL SAFETY AND HEALTH ACT including questions on standards interpretations, voluntary compliance information, copies of the *OSHA Standards, OSHA Act, Employee Rights Posting Notice* and other OSHA publications.



NIOSH REGIONAL OFFICES

DHEW, Region I
Government Center (JFK Fed. Bldg.)
Boston, Massachusetts 02203
Tel.: 617/223-6668/9

DHEW, Region II — Federal Building
26 Federal Plaza
New York, New York 10007
Tel.: 212/264-2485/8

DHEW, Region III
3525 Market Street, P.O. Box 13716
Philadelphia, Pennsylvania 19101
Tel.: 215/596-6716

DHEW, Region IV
50 Seventh Street, N.E.
Atlanta, Georgia 30323
Tel.: 404/526-5474

DHEW, Region V
300 South Wacker Drive
Chicago, Illinois 60607
Tel.: 312/886-3651

DHEW, Region VI
1200 Main Tower Building, Room 1700-A
Dallas, Texas 75245
Tel.: 214/655-3081

DHEW, Region VII
601 East 12th Street
Kansas City, Missouri 64106
Tel.: 816-374-5332

DHEW, Region VIII
19th & Stout Streets
9017 Federal Building
Denver, Colorado 80202
Tel.: 303/837-3979

DHEW, Region IX
50 Fulton Street (223 FOB)
San Francisco, California 94102
Tel.: 415/556-3781

DHEW, Region X
1321 Second Avenue (Arcade Bldg.)
Seattle, Washington 98101
Tel.: 206/442-0530

OSHA REGIONAL OFFICES

Region I
U.S. Department of Labor
Occupational Safety and Health Administration
JFK Building, Room 1804
Boston, Massachusetts 02203 .....Telephone: 617/223-6712/3

Region II
U.S. Department of Labor
Occupational Safety and Health Administration
1515 Broadway (1 Astor Plaza), Room 3445
New York, New York 10036 .....Telephone: 212/971-5941/2

Region III
U.S. Department of Labor
Occupational Safety and Health Administration
15220 Gateway Center, 3535 Market Street
Philadelphia, Pennsylvania 19104 .....Telephone: 215/596-1201

Region IV
U.S. Department of Labor
Occupational Safety and Health Administration
1375 Peachtree Street, N.E., Suite 587
Atlanta, Georgia 30309 .....Telephone: 404/S26-3573/4 or 2281/2

Region V
U.S. Department of Labor
Occupational Safety and Health Administration
230 S. Dearborn, 32nd Floor
Chicago, Illinois 60604 .....Telephone: 312/353-4716/7

Region VI
U.S. Department of Labor
Occupational Safety and Health Administration
555 Griffin Square Building, Room 602
Dallas, Texas 75202 .....Telephone: 214/749-2477/8/9 or 2567

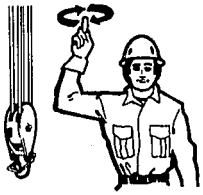
Region VII
U.S. Department of Labor
Occupational Safety and Health Administration
Federal Building, Room 3000, 911 Walnut Street
Kansas City, Missouri 64106 .....Telephone: 816/374-5861

Region VIII
U.S. Department of Labor
Occupational Safety and Health Administration
Federal Building, Room 15010, 1961 Stout Street
Denver, Colorado 80202 .....Telephone: 303/837-3883

Region IX
U.S. Department of Labor
Occupational Safety and Health Administration
9470 Federal Building, 450 Golden Gate Avenue
Post Office Box 36017
San Francisco, California 94102 .....Telephone: 415/556-0584

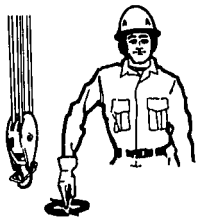
Region X
U.S. Department of Labor
Occupational Safety and Health Administration
6048 Federal Office Building, 909 First Avenue
Seattle, Washington 98174 .....Telephone: 206/442-5930

STANDARD HAND SIGNALS FOR OVERHEAD AND GANTRY CRANES



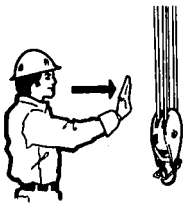
HOIST

With forearm vertical, forefinger pointing up, move hand in small horizontal circle.



LOWER

With arm extended downward, forefinger pointing down, move hand in small horizontal circle.

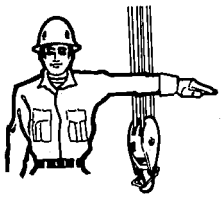


BRIDGE TRAVEL

Arm extended forward, hand open and slightly raised, make pushing motion in direction of travel.

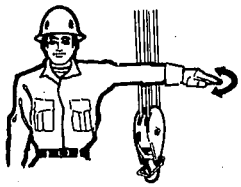
TROLLEY TRAVEL

Palm up, fingers closed, thumb pointing in direction of motion, jerk hand horizontally.



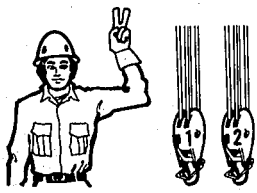
STOP

Arm extended, palm down, hold position rigidly.



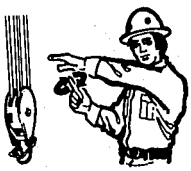
EMERGENCY STOP

Arm extended, palm down, move hand rapidly right and left.



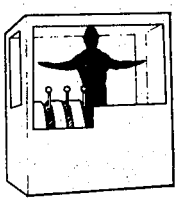
MULTIPLE TROLLEYS

Hold up one finger for block marked "1" and two fingers for block marked "2". Regular signals follow.



MOVE SLOWLY

Use one hand to give any motion signal and place other hand motionless in front of hand giving the motion signal. (Hoise Slowly shown as example)



MAGNET IS DISCONNECTED

Crane operator spreads both hands apart— palms up.

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KIND OF FIRE

DECIDE THE CLASS OF FIRE YOU ARE FIGHTING...

...THEN CHECK THE COLUMNS TO THE RIGHT OF THAT CLASS

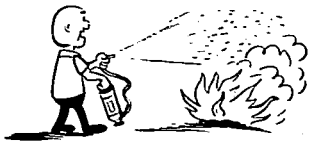
APPROVED TYPE OF EXTINGUISHER

MATCH UP PROPER EXTINGUISHER WITH CLASS OF FIRE SHOWN AT LEFT

	FOAM Solution of Aluminum Sulphate and Bicarbonate of Soda	CARBON DIOXIDE Carbon Dioxide Gas Under Pressure	SODA ACID Bicarbonate of Soda Solution and Sulphuric Acid	PUMP TANK Plain Water	GAS CARTRIDGE Water Expelled by Carbon Dioxide Gas	MULTI-PURPOSE DRY CHEMICAL	ORDINARY DRY CHEMICAL
CLASS A FIRES USE THESE EXTINGUISHERS ORDINARY COMBUSTIBLES • WOOD • PAPER • CLOTH ETC.	A B	✗	A	A	A	A B C	✗
CLASS B FIRES USE THESE EXTINGUISHERS FLAMMABLE LIQUIDS, GREASE • GASOLINE • PAINTS • OILS, ETC.	A B	B C	✗	✗	✗	A B C	B C
CLASS C FIRES USE THESE EXTINGUISHERS ELECTRICAL EQUIPMENT • MOTORS • SWITCHES ETC.	✗	B C	✗	✗	✗	A B C	B C

HOW TO OPERATE

FOAM: Don't Play Stream into the Burning Liquid. Allow Foam to Fall Lightly on Fire.



CARBON DIOXIDE: Direct Discharge as Close to Fire as Possible. First at Edge of Flames and Gradually Forward and Upward

SODA-ACID, GAS CARTRIDGE: Direct Stream at Base of Flame

PUMP TANK: Place Foot on Footrest and Direct Stream at Base of Flames

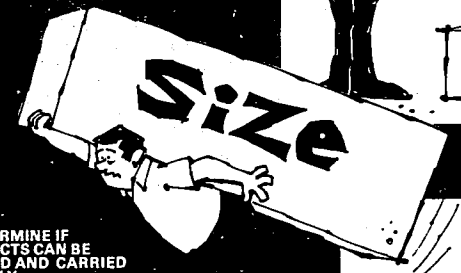
DRY CHEMICAL: Direct at the Base of the Flames. In the Case of Class A Fires, Follow Up by Directing the Dry Chemicals at Remaining Material That is Burning

NATIONAL INSTITUTE FOR OCCUPATIONAL SAFETY AND HEALTH

HOW TO LIFT SAFELY

The following safe practices should be observed in order to avoid injury.

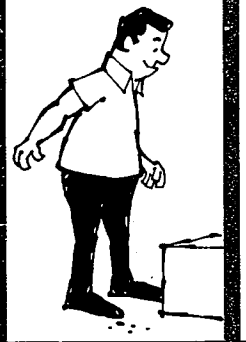
The factors that contribute to safe lifting are...



DETERMINE IF OBJECTS CAN BE LIFTED AND CARRIED SAFELY.

1. Approach the load and size it up (weight, size and shape.)
Consider your physcial ability to handle the load.

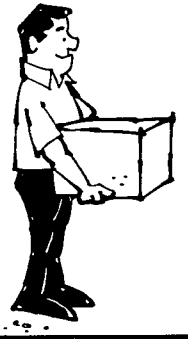
2. Place the feet close to the object to be lifted 8 to 12 inches apart for good balance.



3. Bend the knees to the degree that is comfortable and get a good handhold. Then using both leg and back muscles. . .

4. Lift the load straight up—smoothly and evenly. Pushing with your legs, keep load close to your body.

5. Lift the object into carrying position, making no turning or twisting movements until the lift is completed.



6. Turn your body with changes of foot position after looking over your path of travel making sure it is clear.

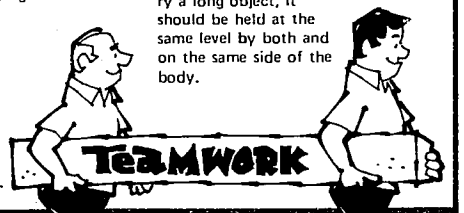
7. Setting the load down, is just as important as picking it up. Using leg and back muscles, comfortably lower load by bending your knees. When load is securely positioned, release your grip.

Stack material in such a manner as to permit full view while carrying.

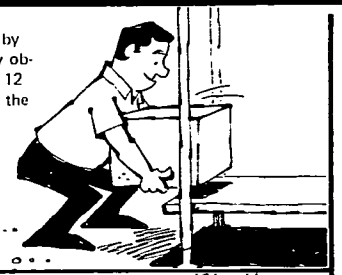
When lifting and carrying with another person—teamwork is important.

The load should be equally distributed. Movements must be coordinated so you both start and finish the lift action at the same time and perform turning movements together.

When two persons carry a long object, it should be held at the same level by both and on the same side of the body.



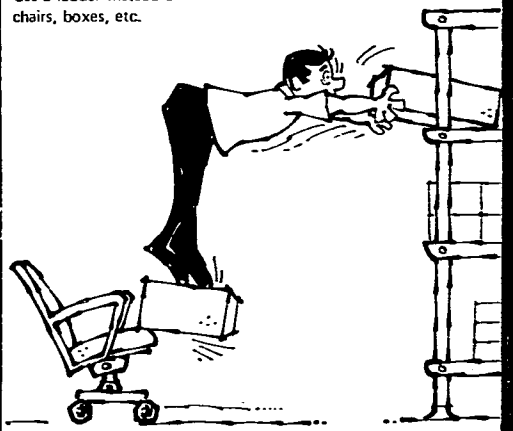
Avoid strain by storing heavy objects at least 12 inches above the floor.



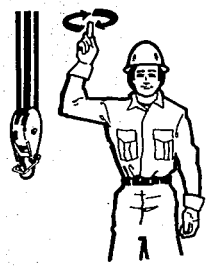
Avoid awkward positions or twisting movements while lifting.

Over-reaching and stretching to reach overhead objects may result in strains or falls.

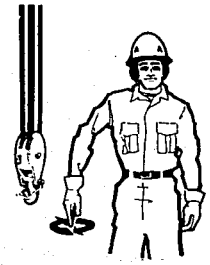
Use a ladder instead of chairs, boxes, etc.



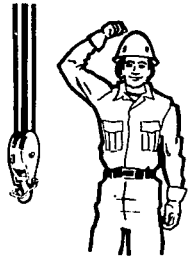
STANDARD HAND SIGNALS FOR CONTROLLING CRAWLER, LOCOMOTIVE, AND TRUCK CRANE OPERATIONS



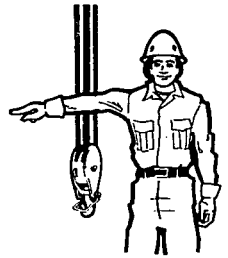
HOIST. With forearm vertical, forefinger pointing up, move hand in small horizontal circle.



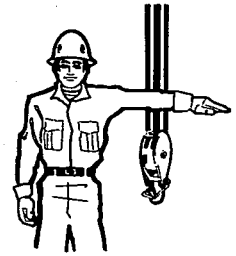
LOWER. With arm extended downward, forefinger pointing down, move hand in small horizontal circle.



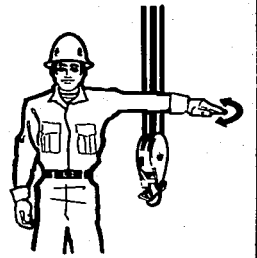
USE MAIN HOIST. Tap fist on head, then use regular signals.



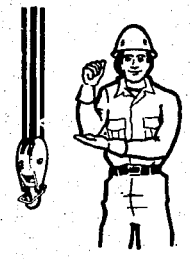
SWING. Arm extended point with finger in direction of swing of boom.



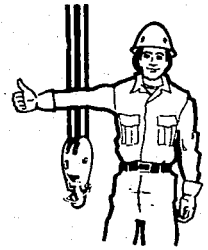
STOP. Arm extended, palm down, hold position rigidly.



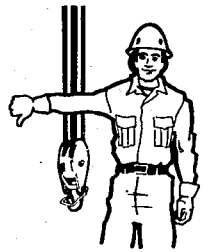
EMERGENCY STOP. Arm extended, palm down, move hand rapidly right and left.



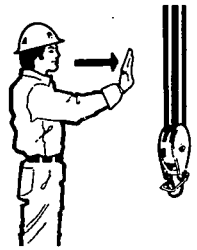
USE WHIPLINE (Auxiliary Hoist). Tap elbow with one hand, then use regular signals.



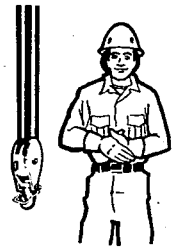
RAISE BOOM. Arm extended, fingers closed, thumb pointing upward.



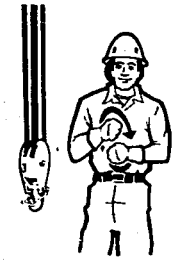
LOWER BOOM. Arm extended, fingers closed, thumb pointing downward.



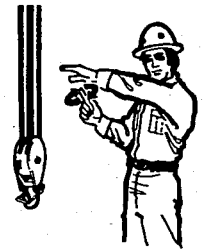
TRAVEL. Arm extended forward, hand open and slightly raised, make pushing motion in direction of travel.



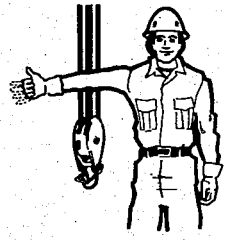
DOG EVERYTHING. Clasp hands in front of body.



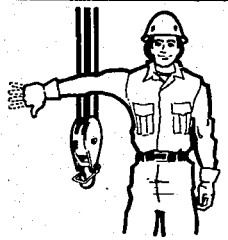
TRAVEL (Both Tracks). Use both fists in front of body, making a circular motion about each other, indicating direction of travel, forward or backward (For crawler cranes only).



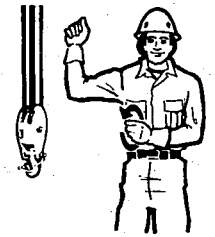
MOVE SLOWLY. Use one hand to give any motion signal and place other hand motionless in front of hand giving the motion signal. (Hoist slowly shown as example).



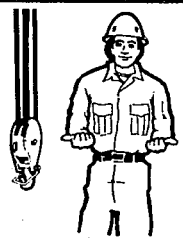
RAISE THE BOOM AND LOWER THE LOAD. With arm extended, thumb pointing up, flex fingers in and out as long as load movement is desired.



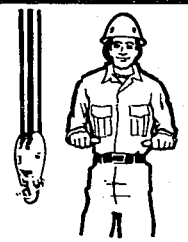
LOWER THE BOOM AND RAISE THE LOAD. With arm extended, thumb pointing down, flex fingers in and out as long as load movement is desired.



TRAVEL. (One Track) Lock the track on side indicated by raised fist. Travel opposite track in direction indicated by circular motion of other fist, rotated vertically in front of body. (For crawler cranes only).

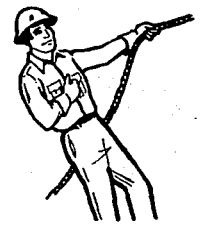


EXTEND BOOM. (Telescoping Booms). Both fists in front of body with thumbs pointing outward.



RETRACT BOOM. (Telescoping Booms). Both fists in front of body with thumbs pointing toward each other.

RETRACT BOOM. (Telescoping Boom). One Hand Signal. One fist in front of chest, thumb pointing outward and heel of fist tapping chest.



EXTEND BOOM. (Telescoping Boom). One hand Signal. One fist in front of chest with thumb tapping chest.

END

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