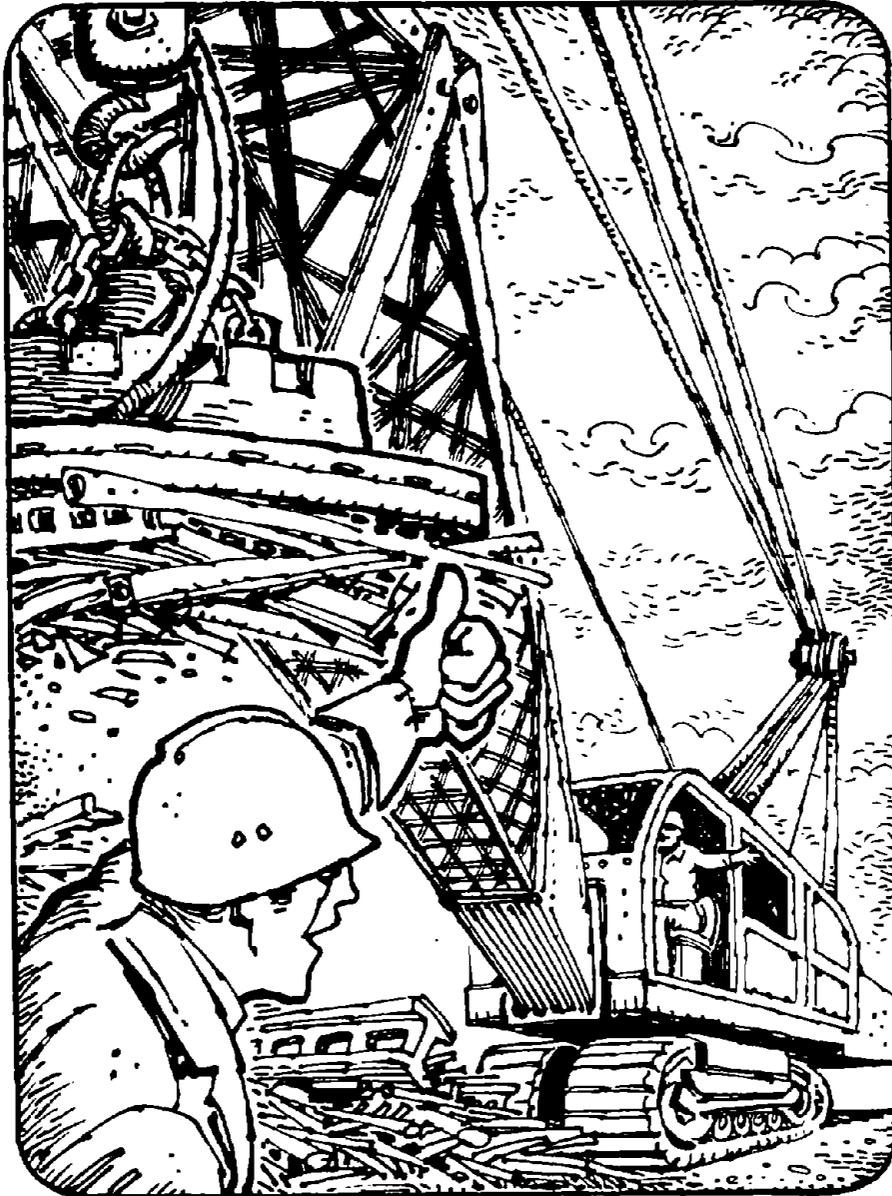


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NIOSH

HEALTH AND SAFETY GUIDE FOR SCRAP PROCESSORS



U.S. DEPARTMENT OF HEALTH, EDUCATION, AND WELFARE

**Public Health Service
Center for Disease Control**

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CONTENTS

Introduction	1
Health and Safety Guidelines	
Health and Safety Program	3
Reducing Unsafe Acts and Practices	5
The Industry and its Hazards	6
Storage Yards	7
Machine Guarding	8
Good HOusekeeping Helps Prevent Fires	8
Safety Rules for Operating Power Tools	9
Frequently Violated Regulations	
Walking and Working Surfaces	10
General Requirements	10
Fixed Ladders	11
Portable Ladders	12
Fixed Industrial Stairs	13
Standard Railing and Toeboard	14
Where a Standard Railing is Required	15
Exits and Exit Markings	17
Occupational Health and Environmental Control	19
Hazardous Materials	25
Personal Protective Equipment	28
General Environmental Controls	31
Medical and First Aid	32
Fire Protection	34
Compressed Air Equipment	36
Materials Handling and Storage	37
Machinery and Machine Guarding	43
Hand and Portable Powered Tools	48
Welding, Cutting and Brazing	50
The National Electrical Code (NEC)	56
Recordkeeping Requirements	59
Checklists	61
Information Sources	83
NIOSH and OSHA Regional Offices	85-86
Standard Hand Signals for Controlling Overhead and Gantry Cranes	87

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.

Words such as "must", "shall", "required", "necessary", etc., 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 enforcement 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.

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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 the program.



Identifying hazards by reviewing injury and illness records.

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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 health and safety responsibilities in the areas of both program development and implementation. Regular meetings or informal discussions can be held to discuss safety promotions, hazards, and injury and illness records. 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.
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, and preferably more persons, trained in first aid.
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

THE INDUSTRY AND ITS HAZARDS

This Health and Safety Guide was written for those establishments primarily engaged in the assembling, sorting, processing, and distribution of scrap and waste materials (ferrous and non-ferrous metals, paper, etc.) for recycling. The potential exists for accidents caused by faulty materials handling, tripping hazards, and unguarded machinery as well as injuries (especially to the eyes and face) caused by flying fragments. The severity and frequency of these accidents can be greatly reduced by following proper work procedures, effectively guarding machinery, and wearing appropriate personal protective equipment. Prompt first aid treatment of cuts, scrapes, and burns is important to prevent infections.

There is also the potential for serious or traumatic injury whenever powered machinery such as alligator or guillotine shears, shredders, compactors, etc. are used. Injuries of this type may be eliminated through the use of effective machine guarding and operator training. A major health concern in scrap metal processing centers on torch cutting or burning operations. Cutting, burning, or welding operations must always be carefully controlled so that workers are not overexposed to fumes that are given off. Mechanical exhaust ventilation or respiratory protective devices may be required, depending on the type of metal being worked on and the location of the operation (see Welding, Cutting, and Brazing).

HEALTH AND SAFETY GUIDELINES

STORAGE YARDS

Most scrap and waste material processors have yards which are used for the storage of bulk materials or for employee parking. Private roadways and railroad sidings may run through the yard for shipping and receiving materials. It should be obvious that good housekeeping in the yard will reduce the chance for injuries.

Good maintenance will encourage employees to use walkways and will discourage the practice of walking on railroad tracks or taking short cuts. Roadways and walkways must be kept in good repair and free of debris and other obstacles.

Whenever railroad cars are to be moved, an authorized person should first make sure that the cars are properly loaded and that no one is in a position to be injured by the movement of cars or engines.

The speed of vehicular traffic traveling on plant yard roadways should be limited to a speed of 12 miles per hour or slower. Also, wherever there are narrow roadways on which vehicles cannot pass and on which it would not be practical to have one-way traffic, special rules governing traffic should be established.

Where a road makes a sharp turn around a blind corner, warning signs should be posted. A helpful device is a mirror placed on the outside of a curve so that drivers approaching from either direction can see the roadway.

Graded and well maintained surfacing on roadways will prevent the formation of holes and slippery conditions which can cause accidents.

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.

Some common causes of fires in all businesses are:

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

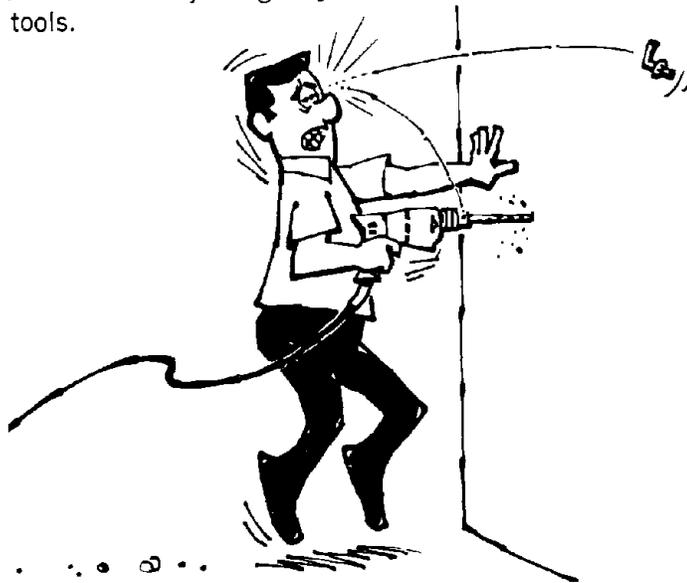
Proper maintenance and awareness of these conditions through a safety program can reduce these hazards.

HEALTH AND SAFETY GUIDELINES

SAFETY RULES FOR OPERATING POWER TOOLS

Employees should be instructed to:

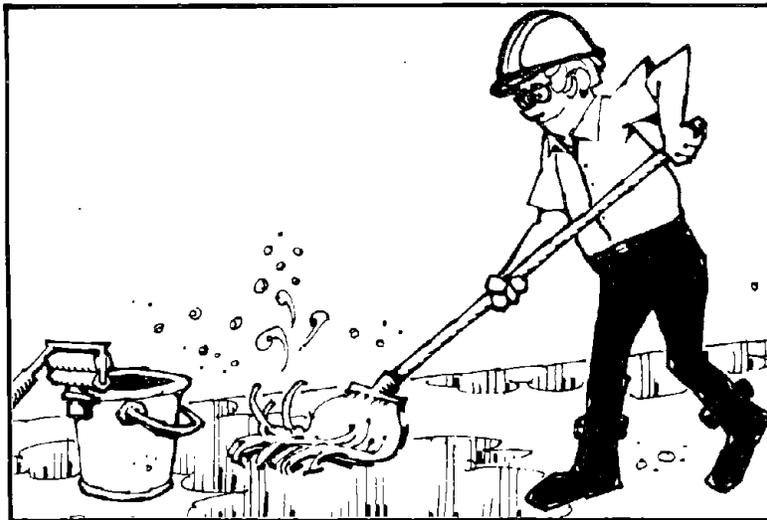
1. Know the application, limitations, and potential hazards of the tool used.
2. Select the proper tool for the job.
3. Remove adjusting keys and wrenches before turning on tools.



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 or use double-insulated tools.
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.

FREQUENTLY VIOLATED REGULATIONS

WALKING AND WORKING SURFACES



GENERAL REQUIREMENTS

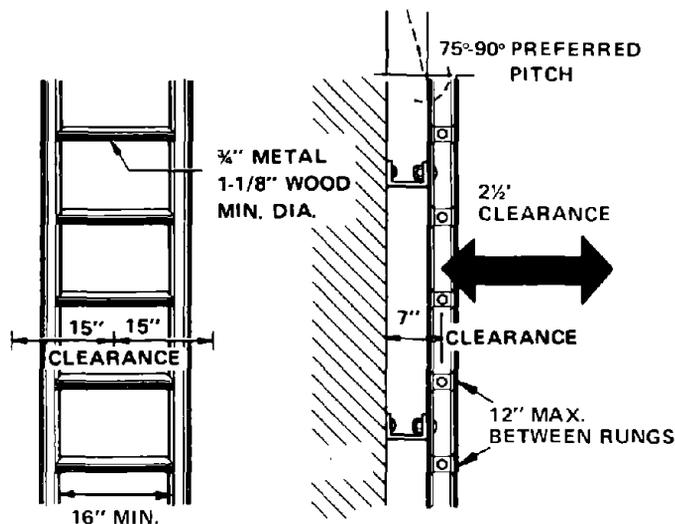
1. All places of employment must be kept clean and orderly, and in a sanitary condition. The floors of all workrooms must be maintained as dry as possible, and outside scrap yards must be maintained so as to minimize tripping and falling hazards. The scrap should be located and stored in such a way that workers are not continually walking on or through it to get from one place to another.
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 passage must be made. Aisles must not be obstructed.
5. All permanent aisles must be easily recognizable.

FREQUENTLY VIOLATED REGULATIONS
WALKING AND WORKING SURFACES (cont.)

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, a competent engineer should be consulted. These floor load capacities must be posted in a readily visible location (except for slab floors with no basements).

FIXED LADDERS MUST:

1. Be designed to withstand a single concentrated load of at least 200 pounds.
2. Have a step-across distance from the nearest edge of the ladder to the nearest edge of the equipment or structure of between 2½ to 12 inches (to provide a sufficient hand hold).



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.

FREQUENTLY VIOLATED REGULATIONS
WALKING AND WORKING SURFACES (cont.)

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-inch clearance in back of the ladder to provide for adequate toe space.
8. Be equipped with cages if they are longer than 20 feet. Cages must extend to within 7 to 8 feet of the base of the ladder. Cages must extend at least 42 inches above the top of the landing unless otherwise suitably protected by a standard guard rail.
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).

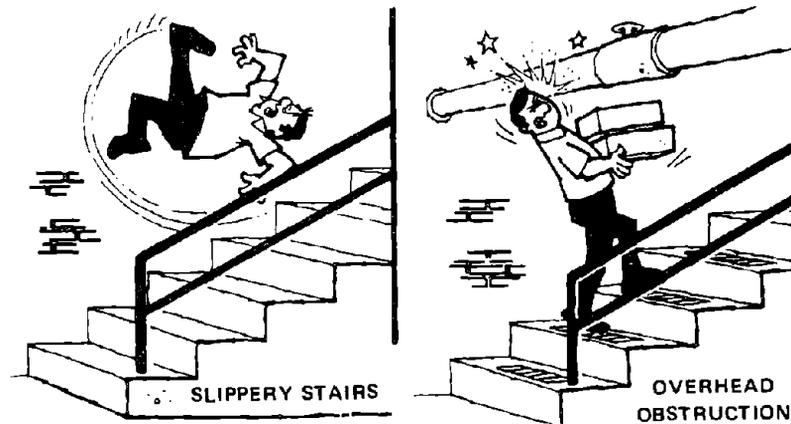
PORTABLE LADDERS

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.

FREQUENTLY VIOLATED REGULATIONS WALKING AND WORKING SURFACES (cont.)

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.

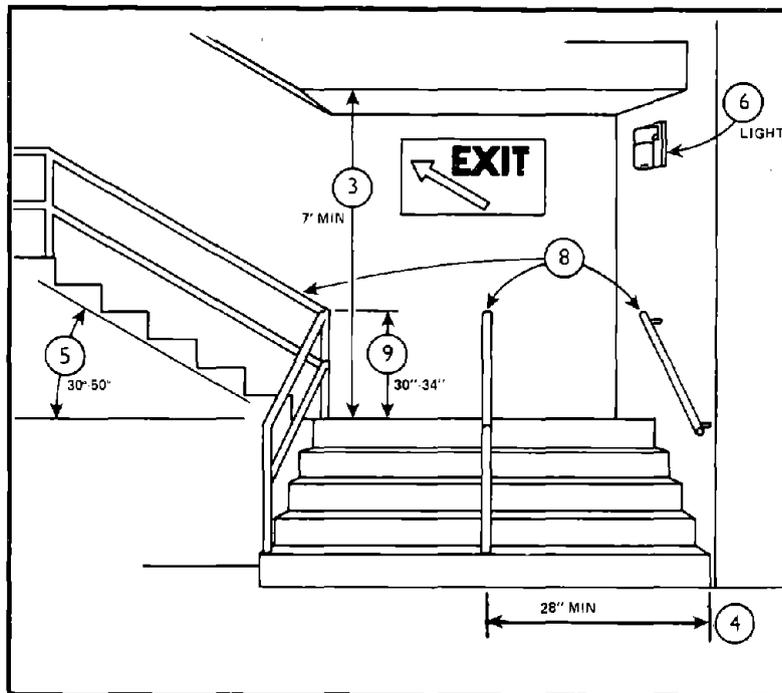


4. The minimum permissible width is 22 inches (if a means of exit access, at least 28 inches).
5. The angle to the horizontal made by the stairs must be between 30° and 50°.
6. All stairs should be adequately lighted.
7. If the tread is less than nine inches wide, the risers should be open.
8. If the flight of stairs has four or more risers:
 - a. a stair railing on each open side is required.
 - b. a hand rail 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.

FREQUENTLY VIOLATED REGULATIONS
WALKING AND WORKING SURFACES (cont.)

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.



THE STANDARD RAILING AND TOEBOARD

A standard railing consists of a top rail, intermediate rail, and supporting 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.

FREQUENTLY VIOLATED REGULATIONS
WALKING AND WORKING SURFACES (cont.)

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.

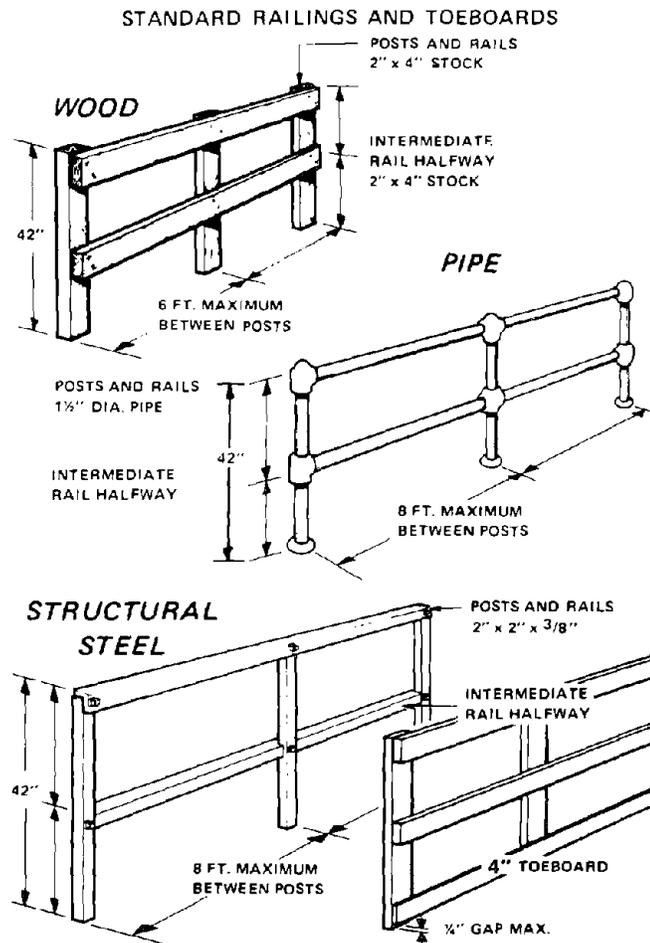
2. Every stairway floor opening must be guarded on all exposed sides except the entrance to the stairway.

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.

FREQUENTLY VIOLATED REGULATIONS 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).



FREQUENTLY VIOLATED REGULATIONS

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 $\frac{3}{4}$ 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 marked by a sign indicating their actual use, e.g. "STORAGE ROOM", "TO BASEMENT", etc.



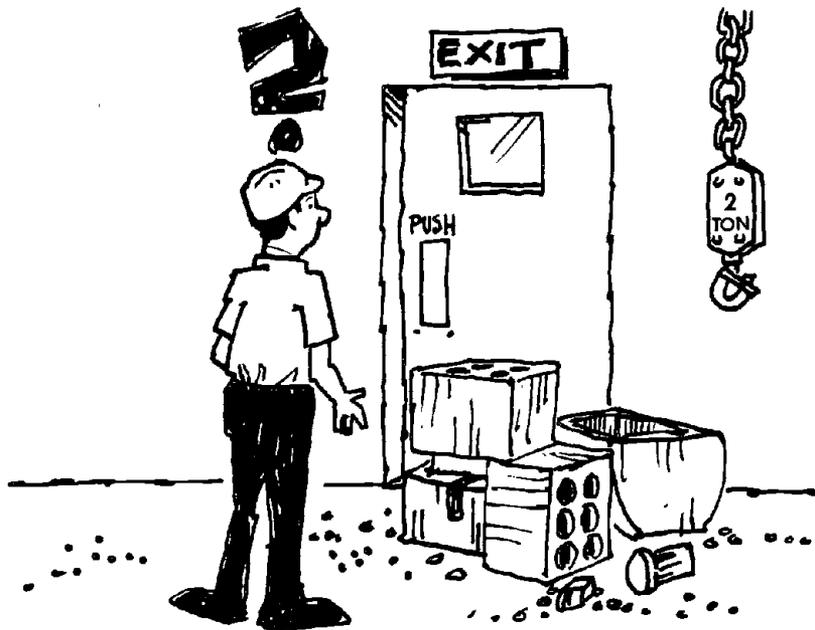
3. When the direction to the nearest exit may not be apparent to an occupant, an exit sign with an arrow indicating direction must be used.

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.

FREQUENTLY VIOLATED REGULATIONS
EXITS AND EXIT MARKINGS (cont.)

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:
- 50 or more persons occupy a room or
 - the exit is for an area of high hazard potential.



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.

FREQUENTLY VIOLATED REGULATIONS

OCCUPATIONAL HEALTH AND ENVIRONMENTAL CONTROL

AIR CONTAMINANTS

Employees may be exposed to fumes, dusts, gases, vapors, etc., resulting from various scrap processing operations such as torch-cutting of metal scrap, burning the covering off of cables, and the breaking and salvage of batteries. When workers are exposed to excessive amounts of air contaminants, administrative or engineering controls must be considered first and implemented wherever feasible. When such controls are not feasible to achieve full compliance, protective equipment must be used.

Administrative controls limit the amount of time an individual is exposed to a health hazard during a particular operation by rotating two or more workers. The primary method of engineering control is ventilation. After careful planning, design, and installation, the ventilation system should be checked and maintained on a regular basis to ensure its proper operation (e.g. fan belts properly adjusted and duct work kept open). Local exhaust ventilation systems are designed to capture and remove excessive fumes and dusts before they escape into the workplace air. General exhaust ventilation (when properly designed) will also remove contaminants from the air, but not as efficiently as local exhaust.

METAL FUMES AND DUSTS

Fumes are very small particles formed by the vaporization of metal during torch-cutting, burning, or welding operations, whereas metal dust is generated by grinding. Special precautions need to be taken when cutting, burning, or grinding scrap containing alloys of the more toxic metals, such as lead, zinc, cadmium, or beryllium.

Lead

Lead poisoning may occur through the inhalation and/or accidental ingestion of lead fumes or dust. The symptoms of

FREQUENTLY VIOLATED REGULATIONS

OCCUPATIONAL HEALTH AND ENVIRONMENTAL CONTROL (cont.)

lead poisoning include loss of appetite, metallic taste in the mouth, anemia, headache, nervous irritability, muscle and joint pains, and abdominal cramps. Chronic lead poisoning is slow and vague in its beginning and the signs and symptoms are not well defined. No one symptom indicates the occurrence of lead poisoning. At first one may experience a general ill-feeling, fatigue, exhaustion, irritability, loss of appetite and weight, vague abdominal discomfort, and a yellow discoloration of the skin. Later there may be colic, constipation and a disturbance of sleep. Sometimes a blue line on the gums is indicative of lead poisoning and may also result in the premature loss of teeth. In the advanced stages of chronic lead poisoning, several body functions and organs such as the liver and kidneys may be affected.

There is a potential for being exposed to excessive quantities of airborne lead particulate whenever cutting or burning materials containing lead or coated with leaded paints. Galvanized steel contains lead and zinc and should be torched with care to avoid unsafe fume exposures. Terneplate is steel plate coated with an alloy of lead and tin (Note: usually a dull gray color). As a precaution **assume** that any paint on steel applied as a protection against the weather or salt water contains lead. Cutting or burning of lead-painted steel has caused many cases of lead poisoning in the past.

Good personal hygiene practices on the part of all lead workers should be stressed. Lead cutters or burners should wash their hands thoroughly before eating. Lead contaminated gloves should be removed and hands washed before smoking to prevent additional lead exposure. Eating must not be allowed in areas where lead cutting or burning is performed.

The same hazards are present in the breakage and salvage of lead acid batteries. Care should be taken to limit worker exposure to lead fumes by exhaust ventilation methods or the use of respirators. Good personal hygiene practices should again be stressed.

FREQUENTLY VIOLATED REGULATIONS
OCCUPATIONAL HEALTH
AND ENVIRONMENTAL CONTROL (cont.)

Zinc

Excessive exposure to zinc oxide (ZnO), resulting from the inhalation of fumes due to the torch-cutting of zinc-containing alloys, such as galvanized steel, is the most frequent cause of an illness known as metal fume fever. This malady may also be known as zinc chills, shakes, or "Monday morning" fever. Metal fume fever may also follow excessive exposure to a number of metal fumes including iron, cadmium, copper, lead, or nickel. The symptoms are similar to those of influenza and usually occur a few hours after exposure. The symptoms include metallic taste in the mouth, dryness of nose and throat, weakness, fatigue, muscular and joint pain, fever, chills, and nausea. These symptoms usually last less than 24 hours and a temporary immunity follows. Therefore, workers are more susceptible on Mondays or on workdays following a holiday, than on other workdays.

Cadmium

The brownish-yellow fume, cadmium oxide (CdO), produced when cutting cadmium-containing metals, can be an extremely hazardous health problem. This fume may, however, be masked by other metal fumes simultaneously given off. Cadmium-plated or alloy steel may look like zinc-coated steel.

Excessive cadmium oxide exposure has no marked initial discomfort, however, acute symptoms occur a few hours later. These symptoms include: dry cough, irritation of throat and tightness of chest leading to extreme difficulty in breathing, chest pains, and possible death from pulmonary edema (fluid in the air spaces of the lungs). Lesser exposure may cause lung and kidney disease.

Beryllium

Beryllium, which has many desirable alloying properties, is also extremely toxic. A single excessive exposure may result in respiratory effects ranging from a mild inflammation of the nose and throat to a severe chemical pneumonitis, possibly

FREQUENTLY VIOLATED REGULATIONS

OCCUPATIONAL HEALTH AND ENVIRONMENTAL CONTROL (cont.)

resulting in death. Chronic exposure to lower concentrations may result in tightness of the chest, shortness of breath, chronic cough, loss of weight, and general weakness.

Other Metals

The fumes and dusts of cobalt, manganese and copper are also potentially toxic and employees' exposure must be limited to safe exposure levels by using adequate ventilation or respiratory protection.

NOISE

Excessive noise is one of the most common violations of the standards and can cause permanent hearing damage. Sources of noise in the scrap processing industry include shredders, certain cutting and shearing operations, conveyors, and heavy equipment motors or exhausts.

It is management's responsibility to make sure employees are not exposed to noise levels in excess of the standards, which are based upon both sound level and duration of exposure. For an eight-hour exposure the standard is 90 decibels, A-weighted (dBA). The noise standard is a sliding scale, so exposures up to four hours to a sound level of 95 dBA, or two hours to a sound level of 100 dBA, etc. (see following table), are allowed if exposures during the remainder of the shift are less than 90 dBA, to give the ear a chance to recover. Even at these noise exposure levels, 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 noise levels of 85 to 90 dBA for eight hours daily.

When employees are subject to sound levels exceeding the standard (e.g. greater than 90 dBA for eight hours or 100 dBA for more than two hours), feasible administrative controls, such as limiting time of exposure, or engineering controls must be utilized to reduce noise level or exposure time to comply with the standard. Engineering control methods include the separation and isolation of noisy operations, impact reduction

FREQUENTLY VIOLATED REGULATIONS
OCCUPATIONAL HEALTH
AND ENVIRONMENTAL CONTROL (cont.)

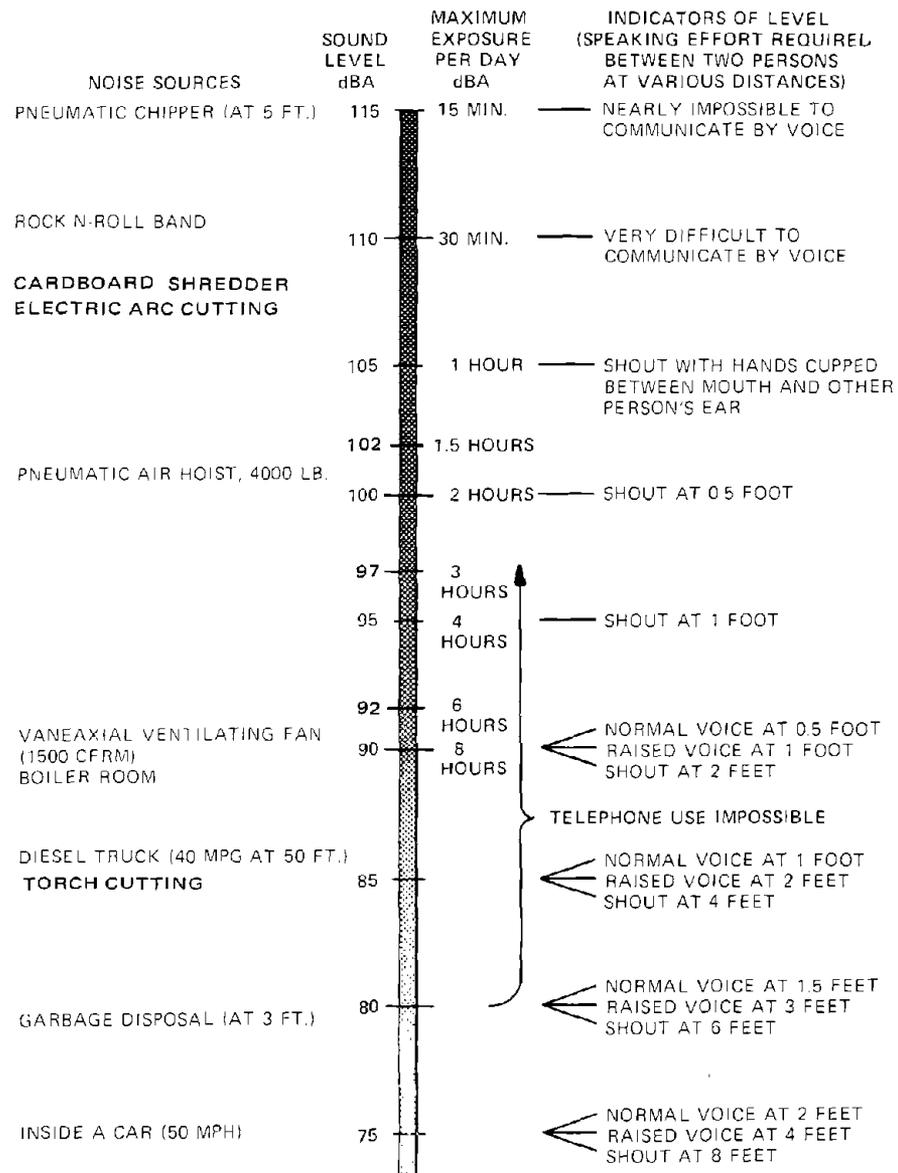
and vibration dampening by lamination or lining with acoustic materials, and process change where applicable. Mufflers on compressed air equipment exhausts and proper lubrication of machinery will also reduce noise levels. Major consideration should be given when purchasing new equipment as to its noise producing characteristics.

If administrative or engineering controls to reduce exposures to acceptable levels are not feasible, personal protective equipment must be provided and a continuing effective on-going hearing conservation program set up. 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.

FREQUENTLY VIOLATED REGULATIONS OCCUPATIONAL HEALTH AND ENVIRONMENTAL CONTROL (cont.)

PERMISSIBLE NOISE EXPOSURES



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

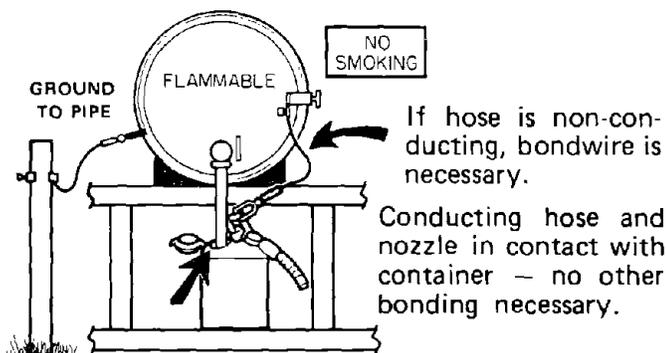
FREQUENTLY VIOLATED REGULATIONS

HAZARDOUS MATERIALS

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 appropriate protective equipment. These liquids must not be allowed to enter a confined space, such as a sewer, because of the possibility of an explosion.

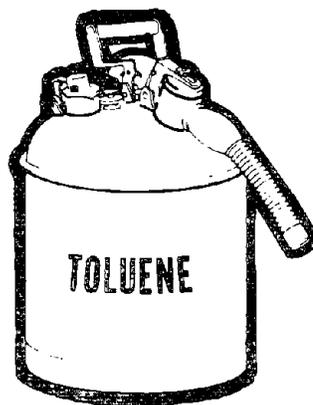
4. Supplies of flammable and combustible liquids must be stored in approved fire-resistant safety containers equipped with flash screens and self-closing lids. These containers can be purchased from an industrial supply house.

FREQUENTLY VIOLATED REGULATIONS
HAZARDOUS MATERIALS (cont.)

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

6. Combustible waste materials, such as oily or solvent saturated rags, must be stored in covered metal containers and be disposed of daily.

7. Open flames or smoking must not be permitted in fueling areas. The motors of all equipment being fueled must be shut off and each fueling area must have at least one fire extinguisher having a minimum approved classification of 6B C located within 75 feet of the dispenser or pump.



STORAGE

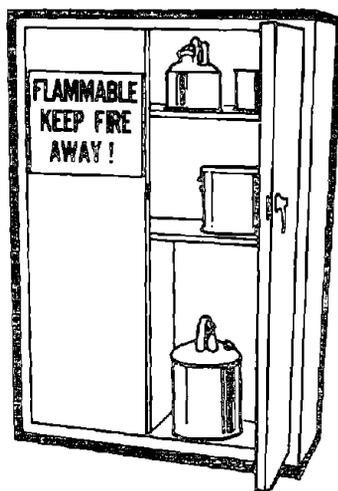
There should never be over one day's supply of flammable liquids outside of an approved storage area. Open flames or smoking must not be permitted in flammable or combustible liquid storage areas. Inside storage rooms for flammables are required to have explosion-proof lights and ventilation with at least six air changes per hour.

STORAGE CABINETS

Cabinets must be distinctly labeled "FLAMMABLE — KEEP FIRE AWAY". Storage cabinets must meet National Fire Protection Association 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 floor.

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



FREQUENTLY VIOLATED REGULATIONS

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.

Head Protection

A strict hard hat policy must be enforced wherever hazards from falling or flying objects may occur. The wearing of hard hats in potentially hazardous areas must become a habit, and management should set a good example and also insist that they be worn. The headband should be adjusted for proper head protection, comfort, and to prevent falling off (a chin strap should be used when working in high winds or while climbing).

Eye and Face Protection

Eye and face protection is required where there is a possibility of eye injury from flying particles, chips, caustic materials, etc. There is an obvious need for protection from sparks during operations such as torch-cutting, but eye injuries also occur during routine work such as maintenance involving hand tools, power tools, grinders, or with work involving shears and shredders. The appropriate type of eye protection (spectacle type safety glasses with side shields, goggles, and face shields) will depend on the situation encountered.

Gloves

When transferring materials by hand, gloves will help prevent painful cuts, which are a more serious problem if they become infected.

FREQUENTLY VIOLATED REGULATIONS
PERSONAL PROTECTIVE EQUIPMENT (cont.)

Foot Protection

Foot protection is required to prevent injuries resulting from punctures, and pinching or crushing caused by falling objects.

Protective Clothing

Protective clothing such as flameproof aprons, leggings, and gauntlet gloves may be needed as protection from the hazards created by cutting or welding operations.

HEARING PROTECTION

Ear plugs or ear muffs are required where the employees' daily noise exposure cannot be reduced to acceptable levels by feasible administrative and/or engineering controls (see Noise in Occupational Health and Environmental Control).

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.

FREQUENTLY VIOLATED REGULATIONS
PERSONAL PROTECTIVE EQUIPMENT (cont.)

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.

RESPIRATOR CLEANING

The following procedure is suggested for cleaning and disinfecting respirators:

1. Remove any filters, cartridges, or canisters.
2. Wash facepiece and breathing tube in cleaner-disinfectant solution. Use a hand brush to facilitate removal of dirt.
3. Rinse completely in clean, warm water.
4. Air dry in a clean area.
5. Clean other respirator parts as recommended by manufacturer.
6. Inspect valves, headstraps, and other parts; replace with new parts if defective.
7. Insert new filters, cartridges, or canisters; make sure seal is tight.
8. Place in a plastic bag or other container for storage.

FREQUENTLY VIOLATED REGULATIONS

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.



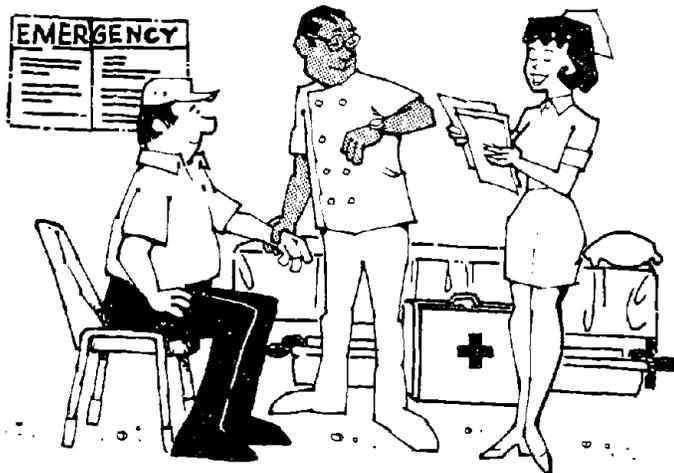
8. Employees working with toxic substances should wash and remove contaminated clothing before eating, drinking, or smoking.

FREQUENTLY VIOLATED REGULATIONS

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.

FREQUENTLY VIOLATED REGULATIONS

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.

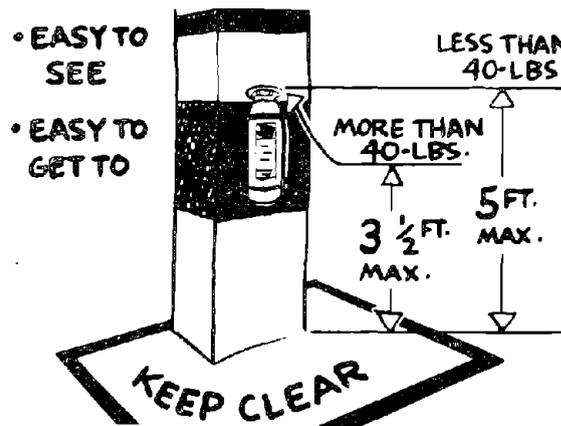
NOTE: First aid is immediate, temporary treatment given in the event of accident or illness — before the doctor arrives. Immediate first aid (within four minutes) may be the difference between complete recovery, permanent impairment, or DEATH.

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



FREQUENTLY VIOLATED REGULATIONS

FIRE PROTECTION



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 actuated
 - 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;

FREQUENTLY VIOLATED REGULATIONS

FIRE PROTECTION (cont.)

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.

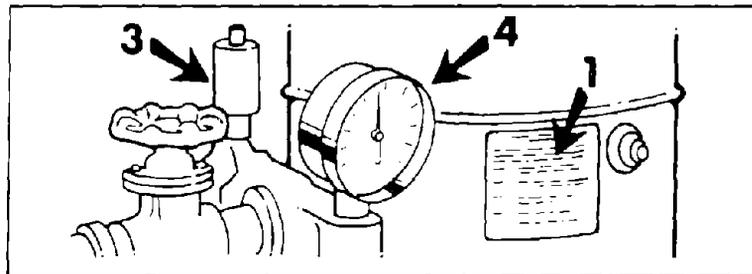
A chart showing fire extinguishers by class and how to use them, is located in the back of this booklet.

FREQUENTLY VIOLATED REGULATIONS

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.

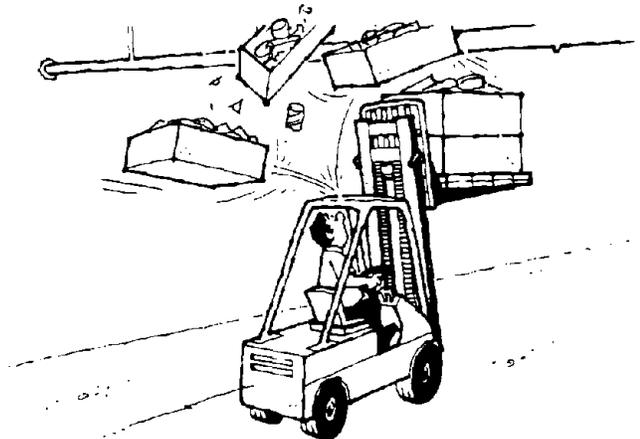
FREQUENTLY VIOLATED REGULATIONS

MATERIALS HANDLING AND STORAGE

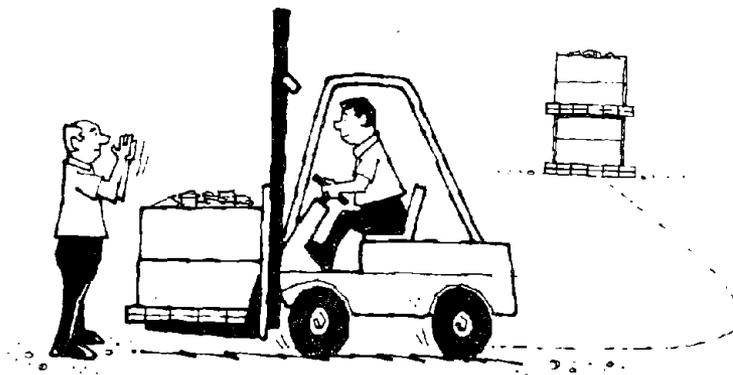
POWERED INDUSTRIAL TRUCKS

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.

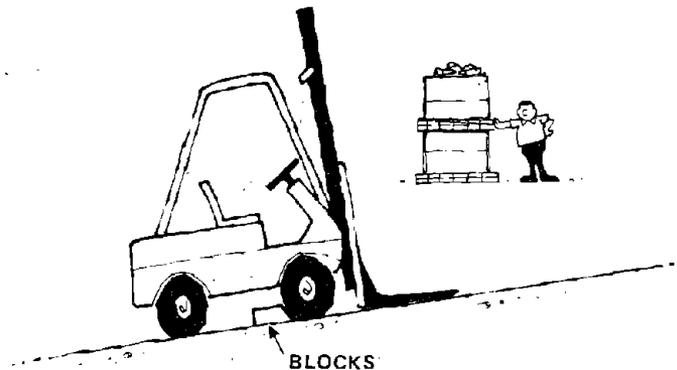
1. High-lift rider trucks must be fitted with an overhead guard to protect the operator from falling objects.



FREQUENTLY VIOLATED REGULATIONS
MATERIALS HANDLING AND STORAGE (cont.)



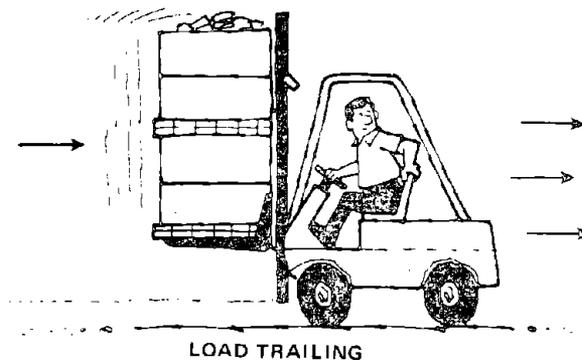
2. Methods must be developed and used to effectively train operators in the safe operation of powered industrial trucks, and only trained and authorized operators may operate the truck.



3. When a powered industrial truck is left unattended (operator 25 feet or more away or truck 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.

FREQUENTLY VIOLATED REGULATIONS
MATERIALS HANDLING AND STORAGE (cont.)

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.

CRANES

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

All new cranes constructed and installed or utilized on or after August 31, 1971, must meet the design specifications

FREQUENTLY VIOLATED REGULATIONS

MATERIALS HANDLING AND STORAGE (cont.)

of the American National Standard Safety Code for Cranes (references in "INFORMATION SOURCES"). Cranes constructed prior to that date should be modified to conform to these design specifications, unless it can be shown that the crane cannot feasibly or economically be altered and that the crane substantially complies with the requirements. Other OSHA requirements include:

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 must 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 twist 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. The crane operator must sound a warning bell or alarm device each time he moves a load.

FREQUENTLY VIOLATED REGULATIONS
MATERIALS HANDLING AND STORAGE (cont.)

14. 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.

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

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

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.

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.

FREQUENTLY VIOLATED REGULATIONS
MATERIALS HANDLING AND STORAGE (cont.)

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.

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 the 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.

FREQUENTLY VIOLATED REGULATIONS

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 most common methods of guarding a hazard or hazardous machine operation are:

1. Enclosing the operation (preferred)
2. Interlocking devices
3. Moving barriers
4. Removal devices
5. Remote control
6. Two-hand tripping devices
7. Electronic safety devices

Certain guarding methods are preferable to others. The type of operation, the size or shape of stock, the method of handling, the physical layout, the type of material, and the production requirements or limitations are important considerations. Certain flexibility in operations may also determine the practicability of the method to be used. As a general rule, however, power transmission apparatus can be protected by fixed enclosure guards.

FREQUENTLY VIOLATED REGULATIONS

MACHINERY AND MACHINE GUARDING (cont.)

The following pages contain examples of specific equipment that must be guarded. This listing is not intended to include all equipment that may require guarding.

SCRAP PROCESSING EQUIPMENT

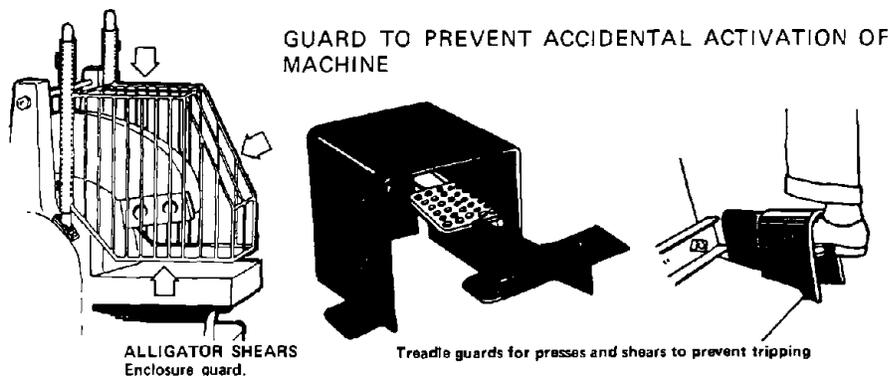
ALLIGATOR SHEARS AND NOTCHERS (METAL SCRAP)

1. A guard must be provided at the point of operation to prevent the employee from inserting hands into the area of operation. A typical point of operation guard is shown in the figure below. This type of guard is adaptable to most alligator shears and modes of use. It can be designed to fit with a clearance of from 1 to 2 inches between the moving arm and the guard. Workers should be trained by supervisors or other experienced personnel in the techniques of handling small parts in holding-tools and in the manipulation of the shear's controls.

2. The operator and others in the vicinity must wear protective goggles or face shields as a protection against flying fragments.

3. On foot operated hydraulic alligator shears, the pedal should have a protective guard to prevent unplanned operation caused by falling objects or someone's accidentally stepping on it.

4. A holddown device at the infeed side should be provided, capable of restraining the material from being forced upward during the shearing stroke.



FREQUENTLY VIOLATED REGULATIONS
MACHINERY AND MACHINE GUARDING (cont.)

GUILLOTINE SHEARS (METAL SCRAP)

1. The operator should have all auxiliary personnel clearly within his view at all times.
2. All affected workers in the shearing area must be protected by curtains or deflectors capable of intercepting ejected parts, or the area should be roped or fenced off or otherwise restricted to worker entry.
3. Hand-fed or conveyor-fed guillotine shears should have an electrical interlock-type gate that will exclude personnel from the point of operation by preventing the shear's operation until the gate is closed.

SHREDDERS (METAL AND PAPER SCRAP)

1. When shredders that may throw random pieces of material back toward the inlet opening are used, flexible shields should be installed as a protection for loaders or passersby. Alternatively the hazardous area could be roped or fenced off, to restrict entry into the danger zone.
2. Warning signs should be posted.
3. Where conveyors are used to load the shredder, there should be "STOP" controls within easy and quick access to employees working on the line.

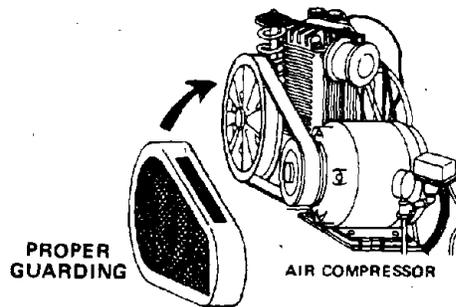
COMPACTORS AND BALERS (METAL AND PAPER SCRAP)

1. All balers or scrap-compressing equipment must be guarded such that the ram or compacting device cannot be activated until workers are out of the danger area. On paper balers, where the scrap is put into a pit prior to compression, an interlocking device which will allow operation of the ram **only** after the loading gates are **closed** and in place should be used. On automobile or large metal compactors the operator must have a clear unobstructed view of the loading, compacting, and unloading areas to be sure that all personnel are safely clear of the operating area.

FREQUENTLY VIOLATED REGULATIONS
MACHINERY AND MACHINE GUARDING (cont.)

OTHER SCRAP PROCESSING EQUIPMENT

Generally there are three considerations to be taken in the safeguarding of any type of powered machinery. The first is that the point of operation is effectively guarded such that employees are not exposed to the actual operation (i.e. cutting, shearing, baling). This can be accomplished by attached guards, interlocking devices, remote control operations, etc. The second consideration is protection to operating personnel and other workers in the adjacent area from flying fragments which may be generated. Machinery should be enclosed, protective screens erected, personal protective equipment (i.e. goggles, face shields, hard hats) worn, or hazardous areas should be fenced off during machine operation. Third, all power transmission components (i.e. belts, pulleys, chains, sprockets, gears) must be effectively guarded, usually by enclosures.



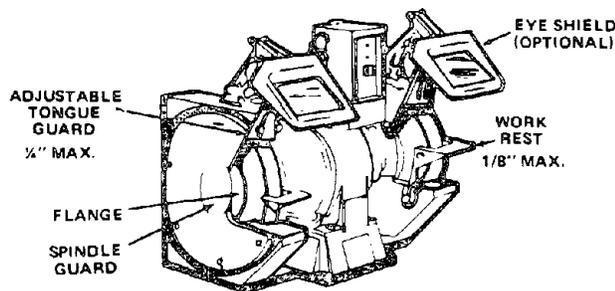
FANS:

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.

FREQUENTLY VIOLATED REGULATIONS MACHINERY AND MACHINE GUARDING (cont.)



GRINDERS

1. Safety wheel 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 visor 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 $\frac{1}{8}$ 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 $\frac{1}{4}$ inch.

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

FREQUENTLY VIOLATED REGULATIONS

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.

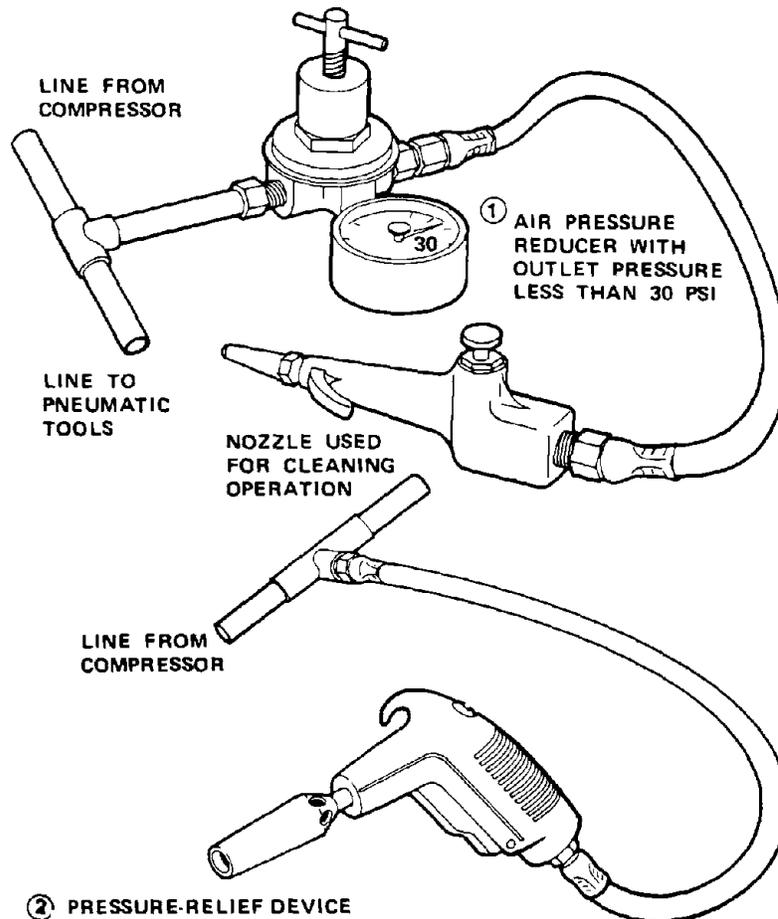
4. Portable circular saws must be equipped with guards above and below the base plate or shoe. The lower guard must retract when the blade is in use, and automatically return when the tool is withdrawn from the work.

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



FREQUENTLY VIOLATED REGULATIONS
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.



FREQUENTLY VIOLATED REGULATIONS

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.



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.

FREQUENTLY VIOLATED REGULATIONS
WELDING, CUTTING, AND BRAZING (cont.)

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.

FREQUENTLY VIOLATED REGULATIONS
WELDING, CUTTING, AND BRAZING (cont.)

**REQUIREMENTS FOR VENTILATION AND RESPIRATORS
WHEN WELDING OR CUTTING**

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.



FREQUENTLY VIOLATED REGULATIONS
WELDING, CUTTING, AND BRAZING (cont.)

GAS WELDING

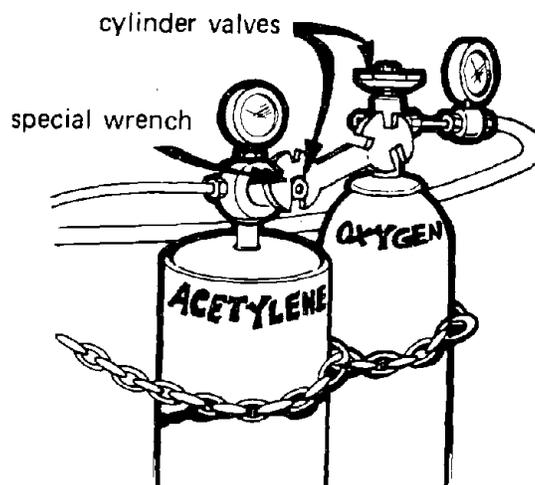
It is required that:

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 noncombustible barrier at least five feet high and having a one-half hour fire resistance rating.

FREQUENTLY VIOLATED REGULATIONS
WELDING, CUTTING, AND BRAZING (cont.)



5. All cylinder valves must be closed when work is finished. Where a special wrench is required it shall 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.

FREQUENTLY VIOLATED REGULATIONS
WELDING, CUTTING, AND BRAZING (cont.)



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

FREQUENTLY VIOLATED REGULATIONS

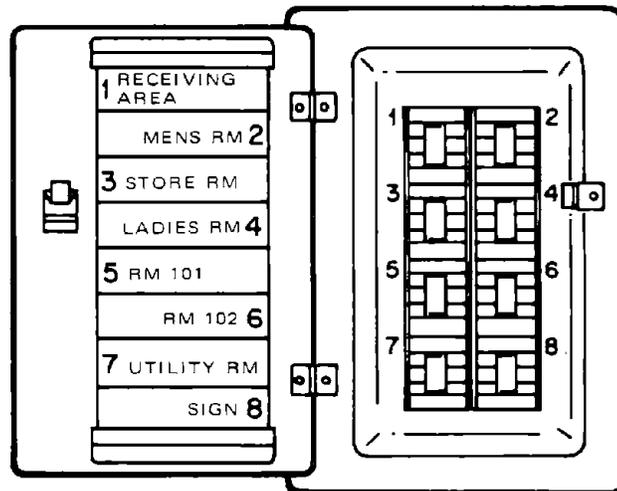
THE NATIONAL ELECTRICAL CODE (NEC)

ELECTRICAL REQUIREMENTS

MORE FIRES ARE CAUSED BY ELECTRICAL MALFUNCTION THAN ANY OTHER CAUSE, and standards pertaining to electrical equipment and 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.

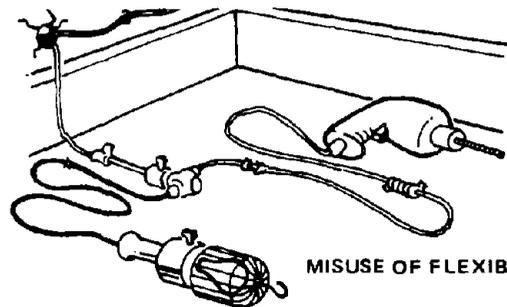
1. Each disconnecting means (e.g. circuit breaker or fuse boxes) must be legibly marked to indicate its purpose unless its purpose is evident.



Proper labeling of circuit breakers.

FREQUENTLY VIOLATED REGULATIONS
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 (e.g. flammable liquid storage).
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

FREQUENTLY VIOLATED REGULATIONS
THE NATIONAL ELECTRICAL CODE (NEC) (cont.)

6. Flexible cords may not be:
 - a. used as a substitute for fixed wiring.
 - b. run 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 when 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 six 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, for the previous year must be posted for the entire month of February whether or not a recordable injury occurred.

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.

RECORDKEEPING REQUIREMENTS (cont.)

job safety and health protection

Citation: If upon inspection OSHA believes an employer has violated the Act, it creates alleged such violations will be issued to the employer. Each violation 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 non-serious 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.

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 onsite 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.



Washington, D. C.
1974
OSHA 2203

John J. Brennan
John J. Brennan
Secretary of Labor

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

Employers must post one of the full size versions (10x16) of this type of OSHA poster or a state-approved poster where required.

60

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.



CHECKLISTS

	Yes	No
WALKING AND WORKING SURFACES — BUILDINGS AND YARDS (29 CFR 1910.22)		
Are all places of employment kept clean and orderly? _____	<input type="checkbox"/>	<input type="checkbox"/>
Are floors, aisles, and inside passageways kept clean and dry and all spills cleaned up immediately? _____	<input type="checkbox"/>	<input type="checkbox"/>
Are floor holes, such as drains, covered? _____	<input type="checkbox"/>	<input type="checkbox"/>
As much as possible, are scrap yards maintained so as to minimize tripping and falling hazards? _____	<input type="checkbox"/>	<input type="checkbox"/>
STORAGE LOFTS, SECOND FLOORS, ETC. (29 CFR 1910.22, .23)		
Are signs showing floor-load capacity present? _____	<input type="checkbox"/>	<input type="checkbox"/>
Are platforms, storage lofts, balconies, etc. that are more than four feet above the floor protected with standard guardrails? _____	<input type="checkbox"/>	<input type="checkbox"/>
Are all platforms, lofts, and balconies (above where people or machinery could be exposed to falling objects) guarded with standard four-inch toeboards? _____	<input type="checkbox"/>	<input type="checkbox"/>
STAIRS (29 CFR 1910.24)		
Are there standard stair rails or handrails on all stairways having four or more risers? _____	<input type="checkbox"/>	<input type="checkbox"/>
Are all stairways at least 22 inches wide? _____	<input type="checkbox"/>	<input type="checkbox"/>

CHECKLISTS

	Yes	No
Do stairs have at least a seven-foot overhead clearance? _____	<input type="checkbox"/>	<input type="checkbox"/>
Do stairs angle no more than 50° and no less than 30°? _____	<input type="checkbox"/>	<input type="checkbox"/>
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? _____	<input type="checkbox"/>	<input type="checkbox"/>
Is it prohibited to use the top of an ordinary step ladder as a step? _____	<input type="checkbox"/>	<input type="checkbox"/>
Do fixed ladders have at least 3½ feet of extension at the top of the landing? _____	<input type="checkbox"/>	<input type="checkbox"/>
Is the distance between the centerline of rungs on a fixed ladder and the nearest permanent object in back of the ladder at least seven inches or more? _____	<input type="checkbox"/>	<input type="checkbox"/>
Do all fixed ladders have a preferred pitch of 75°-90°? _____	<input type="checkbox"/>	<input type="checkbox"/>
EGRESS (29 CFR 1910.36, .37)		
Are all exits marked with an exit sign and illuminated by a reliable light source? _____	<input type="checkbox"/>	<input type="checkbox"/>
Is the lettering at least six inches high with the principal letter strokes at least ¾ of an inch wide? _____	<input type="checkbox"/>	<input type="checkbox"/>
Is the direction to exits, when not immediately apparent, marked with visible signs? _____	<input type="checkbox"/>	<input type="checkbox"/>

CHECKLISTS

	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.? _____	<input type="checkbox"/>	<input type="checkbox"/>
Are exit doors side-hinged? _____	<input type="checkbox"/>	<input type="checkbox"/>
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 being locked inside? _____	<input type="checkbox"/>	<input type="checkbox"/>
Are all exit routes always kept free of obstructions? _____	<input type="checkbox"/>	<input type="checkbox"/>
OCCUPATIONAL HEALTH AND ENVIRONMENTAL CONTROL (29 CFR 1910.1000, .94)		
Is management aware of the potential health hazards caused by the various operations in the facility? _____	<input type="checkbox"/>	<input type="checkbox"/>
Is employee exposure kept within the acceptable levels? _____	<input type="checkbox"/>	<input type="checkbox"/>
Are all containers, such as vats, storage tanks, etc. labeled as to their contents? _____	<input type="checkbox"/>	<input type="checkbox"/>
If internal combustion engines are used, is carbon monoxide kept within acceptable levels? _____	<input type="checkbox"/>	<input type="checkbox"/>
Is employee exposure to welding fumes controlled by ventilation, use of respirators, exposure time, or other means? _____	<input type="checkbox"/>	<input type="checkbox"/>

CHECKLISTS

	Yes	No
Are employees required to wear personal protective equipment when handling solvents, etc. to avoid eye or skin contact? _____	<input type="checkbox"/>	<input type="checkbox"/>
OCCUPATIONAL NOISE EXPOSURE (29 CFR 1910.95)		
If a noise problem is suspected, have noise levels been accurately measured? _____	<input type="checkbox"/>	<input type="checkbox"/>
If a noise problem exists, have plans to reduce noise levels by engineering methods been formulated (e.g. enclosure, maintenance, different methods of processing)? _____	<input type="checkbox"/>	<input type="checkbox"/>
If engineering controls cannot reduce the noise to safe levels:		
1. Have administrative controls, such as limiting worker-exposure in a given area, been started? _____	<input type="checkbox"/>	<input type="checkbox"/>
2. Are affected employees given annual audiometric tests, if necessary? _____	<input type="checkbox"/>	<input type="checkbox"/>
3. Do all employees in high-noise areas wear hearing protection? _____	<input type="checkbox"/>	<input type="checkbox"/>
4. Are annual noise surveys made to reevaluate the problem? _____	<input type="checkbox"/>	<input type="checkbox"/>

CHECKLISTS

	Yes	No
HAZARDOUS MATERIALS		
FLAMMABLE AND COMBUSTIBLE LIQUIDS		
(29 CFR 1910.106)		
Are all connections on drums and piped systems of combustible and flammable liquids vapor and liquid tight? _____	<input type="checkbox"/>	<input type="checkbox"/>
Are flammable liquids kept in closed containers when not in use (e.g. parts cleaning tanks, pans, etc.)? _____	<input type="checkbox"/>	<input type="checkbox"/>
Are all spills of flammable or combustible liquids cleaned up promptly? _____	<input type="checkbox"/>	<input type="checkbox"/>
Is combustible waste material (oily rags, etc.) stored in covered metal receptacles and disposed of daily? _____	<input type="checkbox"/>	<input type="checkbox"/>
Are bulk drums of flammable liquids grounded and bonded to containers during dispensing? _____	<input type="checkbox"/>	<input type="checkbox"/>
Are gasoline and other flammable liquids stored in approved containers? _____	<input type="checkbox"/>	<input type="checkbox"/>
Do storage rooms for flammable and combustible liquids have explosion-proof lights? _____	<input type="checkbox"/>	<input type="checkbox"/>
Do storage rooms for flammable and combustible liquids have mechanical or gravity ventilation (at least six air changes per hour)? _____	<input type="checkbox"/>	<input type="checkbox"/>
Are storage cabinets for flammable liquids labeled "FLAMMABLE — KEEP FIRE AWAY"? _____	<input type="checkbox"/>	<input type="checkbox"/>

CHECKLISTS

	Yes	No
Are storage areas for flammables prominently posted as "NO SMOKING" areas? _____	<input type="checkbox"/>	<input type="checkbox"/>
Is there never more than one day's supply of flammable liquids outside of approved storage cabinets or rooms? _____	<input type="checkbox"/>	<input type="checkbox"/>
In fueling areas for internal combustion engines:		
Are smoking or open flames not allowed? _____	<input type="checkbox"/>	<input type="checkbox"/>
Are engines of vehicles being fueled turned off? _____	<input type="checkbox"/>	<input type="checkbox"/>
Is a fire extinguisher located within 75 feet? _____	<input type="checkbox"/>	<input type="checkbox"/>
PERSONAL PROTECTIVE EQUIPMENT (29 CFR 1910.132—,137)		
Is personal protective equipment provided, used, and maintained wherever it is necessary? _____	<input type="checkbox"/>	<input type="checkbox"/>
Is employee-owned personal protective equipment, such as gloves, protective shoes, etc., also adequate and properly maintained? _____	<input type="checkbox"/>	<input type="checkbox"/>
Is eye and face protection required to prevent injury from molten metal, flying debris, sparks, or chips during pouring, grinding, welding, cutting, etc.? _____	<input type="checkbox"/>	<input type="checkbox"/>

CHECKLISTS

	Yes	No
Are leggings, aprons, gloves, etc. worn as protection from flames, sparks, and metal splashes? _____	<input type="checkbox"/>	<input type="checkbox"/>
Are hard hats and safety shoes available where falling objects could be a problem? _____	<input type="checkbox"/>	<input type="checkbox"/>
Are ear plugs or muffs provided and worn during noisy conditions? _____	<input type="checkbox"/>	<input type="checkbox"/>
Are respirators provided when necessary? _____	<input type="checkbox"/>	<input type="checkbox"/>
Are there written standard operating procedures for the selection and use of respirators? _____	<input type="checkbox"/>	<input type="checkbox"/>
Is the user instructed and trained in the proper use of respirators? _____	<input type="checkbox"/>	<input type="checkbox"/>
Where practicable, are respirators individually assigned for use by employees? _____	<input type="checkbox"/>	<input type="checkbox"/>
Are respirators cleaned and disinfected after use? _____	<input type="checkbox"/>	<input type="checkbox"/>
Are respirators stored in a convenient, clean, and sanitary location? _____	<input type="checkbox"/>	<input type="checkbox"/>
Are routinely-used respirators inspected during cleaning? _____	<input type="checkbox"/>	<input type="checkbox"/>

CHECKLISTS

	Yes	No
Is eye and face protection available where debris or flying objects could be a hazard? _____	<input type="checkbox"/>	<input type="checkbox"/>
Is foot protection provided and worn to prevent injuries from punctures and falling objects? _____	<input type="checkbox"/>	<input type="checkbox"/>
Are gloves provided and worn where necessary to help avoid cuts? _____	<input type="checkbox"/>	<input type="checkbox"/>
Are hard hats required where falling objects could be a hazard? _____	<input type="checkbox"/>	<input type="checkbox"/>
GENERAL ENVIRONMENTAL CONTROLS		
SANITATION (29 CFR 1910.141)		
Are restrooms and washrooms kept in clean and sanitary condition? _____	<input type="checkbox"/>	<input type="checkbox"/>
Are covered receptacles for waste food kept in clean and sanitary condition? _____	<input type="checkbox"/>	<input type="checkbox"/>
Are covered receptacles for sanitary napkins provided in the women's restroom? _____	<input type="checkbox"/>	<input type="checkbox"/>
Are all outlets for water that is not suitable for drinking, clearly posted as "UNSAFE FOR DRINKING, WASHING, OR COOKING"? _____	<input type="checkbox"/>	<input type="checkbox"/>

CHECKLISTS

	Yes	No
Are employees prohibited from eating in areas where toxic materials are present? _____	<input type="checkbox"/>	<input type="checkbox"/>
Has pest control been exercised? _____	<input type="checkbox"/>	<input type="checkbox"/>
If employees are permitted to eat on the premises, are they provided with a suitable space for that purpose? _____	<input type="checkbox"/>	<input type="checkbox"/>
MEDICAL AND FIRST AID (29 CFR 1910.151)		
Are first aid supplies readily available, inspected, and replenished? _____	<input type="checkbox"/>	<input type="checkbox"/>
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). _____	<input type="checkbox"/>	<input type="checkbox"/>
Are first aid supplies approved by a consulting physician, indicating that they are adequate? _____	<input type="checkbox"/>	<input type="checkbox"/>
Are medical personnel readily available for advice and consultation on matters of employee health? _____	<input type="checkbox"/>	<input type="checkbox"/>

CHECKLISTS

	Yes	No
Is there a first aid kit easily accessible to the work area? _____	<input type="checkbox"/>	<input type="checkbox"/>
Are emergency phone numbers posted? _____	<input type="checkbox"/>	<input type="checkbox"/>
Where employees may be exposed to injurious corrosive materials, are they provided with quick-drenching and flushing facilities for immediate emergency use? _____	<input type="checkbox"/>	<input type="checkbox"/>
FIRE PROTECTION (29 CFR 1910.157)		
Are the 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. _____	<input type="checkbox"/>	<input type="checkbox"/>
Are extinguishers fully charged and in designated places? _____	<input type="checkbox"/>	<input type="checkbox"/>
Are extinguishers located along normal paths of travel? _____	<input type="checkbox"/>	<input type="checkbox"/>
Are extinguisher locations free from obstruction or blockage? _____	<input type="checkbox"/>	<input type="checkbox"/>
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. _____	<input type="checkbox"/>	<input type="checkbox"/>

CHECKLISTS

	Yes	No
Have all extinguishers been serviced, maintained, and tagged at intervals not to exceed one year? _____	<input type="checkbox"/>	<input type="checkbox"/>
Are all extinguishers checked (by management or designated employee) monthly to see if they are in place or if they have been discharged, etc.? _____	<input type="checkbox"/>	<input type="checkbox"/>
COMPRESSED AIR (29 CFR 1910.169)		
Are pulleys and belts on compressors and motors completely guarded? _____	<input type="checkbox"/>	<input type="checkbox"/>
Are flexible cords or plugs on electric motors periodically checked and replaced if in a deteriorated condition? _____	<input type="checkbox"/>	<input type="checkbox"/>
Do the relief valves operate properly? _____	<input type="checkbox"/>	<input type="checkbox"/>
Are air tanks drained regularly? _____	<input type="checkbox"/>	<input type="checkbox"/>
Is the pressure-relief device and gauge in good operating condition? _____	<input type="checkbox"/>	<input type="checkbox"/>
MATERIALS HANDLING AND STORAGE (29 CFR 1910.176—,180)		
Is there safe clearance for equipment through aisles and doors? _____	<input type="checkbox"/>	<input type="checkbox"/>
Is stored material stable and secure? _____	<input type="checkbox"/>	<input type="checkbox"/>
Are storage areas free from tripping hazards? _____	<input type="checkbox"/>	<input type="checkbox"/>

CHECKLISTS

	Yes	No
Are only trained operators allowed to operate powered industrial trucks? _____	<input type="checkbox"/>	<input type="checkbox"/>
Are appropriate overhead guards installed on powered lift trucks? _____	<input type="checkbox"/>	<input type="checkbox"/>
Is battery charging on electric units performed only in designated areas? _____	<input type="checkbox"/>	<input type="checkbox"/>
Are "NO SMOKING" signs posted near electric battery charging units? _____	<input type="checkbox"/>	<input type="checkbox"/>
Are all vehicles shut off prior to loading? _____	<input type="checkbox"/>	<input type="checkbox"/>
Are dock boards (bridge plates) used when loading or unloading from dock to truck or dock to rail car? _____	<input type="checkbox"/>	<input type="checkbox"/>
Is all storage secured against sliding or collapsing? _____	<input type="checkbox"/>	<input type="checkbox"/>
Have aisles been designated and kept clear to allow unhindered passage? _____	<input type="checkbox"/>	<input type="checkbox"/>
Are containers of combustibles or flammables, when stacked one upon the other, always separated by dunnage sufficient to provide stability? _____	<input type="checkbox"/>	<input type="checkbox"/>
Are racks and platforms loaded only within the limits of their capacity? _____	<input type="checkbox"/>	<input type="checkbox"/>
If motorized equipment, such as lift trucks, is used, are aisles permanently marked, providing sufficient clearance for passage of the equipment? _____	<input type="checkbox"/>	<input type="checkbox"/>

CHECKLISTS

	Yes	No
Are motorized vehicles and mechanized equipment inspected daily or prior to use? _____	<input type="checkbox"/>	<input type="checkbox"/>
Are chain hoists,ropes, and slings adequate for the load? _____	<input type="checkbox"/>	<input type="checkbox"/>
Are the brakes set and the rear wheels chocked to prevent highway trucks from moving while being boarded by powered industrial trucks? _____	<input type="checkbox"/>	<input type="checkbox"/>
Are wheel stops or other positive protection provided to prevent railroad cars from moving during loading or unloading operations? _____	<input type="checkbox"/>	<input type="checkbox"/>
CRANES (29 CFR 1910.179, .180)		
Are only designated qualified employees permitted to operate cranes? _____	<input type="checkbox"/>	<input type="checkbox"/>
Is the rated load of each crane plainly marked? _____	<input type="checkbox"/>	<input type="checkbox"/>
Are loads never carried over the heads of people? _____	<input type="checkbox"/>	<input type="checkbox"/>
Does the operator test the brakes each time a near capacity load is handled? _____	<input type="checkbox"/>	<input type="checkbox"/>
Is a fire extinguisher kept in the cab or vicinity of the crane? _____	<input type="checkbox"/>	<input type="checkbox"/>
Are hooks, ropes, brakes, and all functional operating mechanisms inspected daily for indication of damage and wear, and written monthly records signed and dated? _____	<input type="checkbox"/>	<input type="checkbox"/>
Is the hoist rope never wrapped around the load? _____	<input type="checkbox"/>	<input type="checkbox"/>

CHECKLISTS

	Yes	No
Is hoisting, lowering, or traveling never done while someone is on the load or hook? _____	<input type="checkbox"/>	<input type="checkbox"/>
Is access to overhead and gantry cranes by a conveniently placed fixed ladder (caged if longer than 20 feet), stairway or platform requiring no stepping over any gap exceeding 12 inches? _____	<input type="checkbox"/>	<input type="checkbox"/>
On gantry and overhead cranes are holding brakes automatically applied if power is removed? _____	<input type="checkbox"/>	<input type="checkbox"/>
Are crawler and locomotive cranes a minimum of 10 feet away from electrical power lines? _____	<input type="checkbox"/>	<input type="checkbox"/>
MACHINERY AND MACHINE GUARDING (29 CFR 1910.212)		
Are belts, pulleys, and rotating shafts (air compressor, drill presses, etc.) properly guarded? _____	<input type="checkbox"/>	<input type="checkbox"/>
Are chains, sprockets, and gears properly guarded? _____	<input type="checkbox"/>	<input type="checkbox"/>
Are all in-going nip points properly guarded? _____	<input type="checkbox"/>	<input type="checkbox"/>
Are rotating shafts that are not smooth properly guarded? _____	<input type="checkbox"/>	<input type="checkbox"/>
Are all rotating parts (lubrication, fittings, etc.) recessed or covered with collars? _____	<input type="checkbox"/>	<input type="checkbox"/>
Are all pieces of equipment with an electric motor or any electrical connection effectively grounded? _____	<input type="checkbox"/>	<input type="checkbox"/>

CHECKLISTS

	Yes	No
<p>Are alligator shears and notchers provided with guards at the point of operation to prevent the employee's hands from being inserted into the shearing zone?</p> <p>_____</p>	<input type="checkbox"/>	<input type="checkbox"/>
<p>Are the pedals of foot operated shears guarded to prevent accidental operation (caused by, for instance, falling objects)?</p> <p>_____</p>	<input type="checkbox"/>	<input type="checkbox"/>
<p>Are guillotine shears guarded or arranged such that workers are protected from the shearing action? _____</p>	<input type="checkbox"/>	<input type="checkbox"/>
<p>Are the inlet and outlet openings of shredders shielded to prevent injuries from ejected fragments?</p> <p>_____</p>	<input type="checkbox"/>	<input type="checkbox"/>
<p>Are all balers or scrap compressing equipment guarded so that the ram device cannot be activated until the "gates" are closed or workers are out of the way?</p> <p>_____</p>	<input type="checkbox"/>	<input type="checkbox"/>
<p>Are sprockets and belt drives within reach of platforms and passageways or less than seven feet from the floor completely enclosed?</p> <p>_____</p>	<input type="checkbox"/>	<input type="checkbox"/>
<p>Are fans less than seven feet above floor guarded, having openings 1/2 inch or less?</p> <p>_____</p>	<input type="checkbox"/>	<input type="checkbox"/>
<p>ABRASIVE WHEEL MACHINERY GRINDERS (29 CFR 1910.215)</p>		
<p>Is the work rest used and kept adjusted to within 1/8 inch of wheel?</p> <p>_____</p>	<input type="checkbox"/>	<input type="checkbox"/>

CHECKLISTS

	Yes	No
Is the adjustable tongue on top side of grinder used and kept adjusted to within ¼ inch of wheel? _____	<input type="checkbox"/>	<input type="checkbox"/>
Do side guards cover the spindle, nut, and flange and 75% of the wheel diameter? _____	<input type="checkbox"/>	<input type="checkbox"/>
Are bench and pedestal grinders permanently mounted? _____	<input type="checkbox"/>	<input type="checkbox"/>
Are goggles or face shields always worn when grinding? _____	<input type="checkbox"/>	<input type="checkbox"/>
HAND AND PORTABLE POWER TOOLS (29 CFR 1910.242—,244)		
Are tools and equipment (both company and employee-owned) in good condition? _____	<input type="checkbox"/>	<input type="checkbox"/>
Have mushroomed heads on chisels, punches, etc. been reconditioned or replaced if necessary? _____	<input type="checkbox"/>	<input type="checkbox"/>
Have broken hammer handles been replaced? _____	<input type="checkbox"/>	<input type="checkbox"/>
Have worn or bent wrenches been replaced? _____	<input type="checkbox"/>	<input type="checkbox"/>
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? _____	<input type="checkbox"/>	<input type="checkbox"/>
Have deteriorated air hoses been replaced? _____	<input type="checkbox"/>	<input type="checkbox"/>
Have employees been made aware of the hazards caused by faulty or improperly used hand tools? _____	<input type="checkbox"/>	<input type="checkbox"/>

CHECKLISTS

	Yes	No
WELDING, CUTTING, AND BRAZING (29 CFR 1910.252)		
Are fuel gas cylinders and oxygen cylinders in storage separated by 20 feet or a barrier five feet high having a ½-hour fire resistance rating? _____	<input type="checkbox"/>	<input type="checkbox"/>
Are cylinders secured and stored where they cannot be knocked over? _____	<input type="checkbox"/>	<input type="checkbox"/>
Are cylinder protective caps in place except when the cylinder is connected for use? _____	<input type="checkbox"/>	<input type="checkbox"/>
Are compressed gas cylinders kept away from sources of heat, elevators, stairs, or gangways? _____	<input type="checkbox"/>	<input type="checkbox"/>
Are only trained employees, who are judged competent by the employer, allowed to use oxygen or fuel gas equipment? _____	<input type="checkbox"/>	<input type="checkbox"/>
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? _____	<input type="checkbox"/>	<input type="checkbox"/>
Are welding and cutting always conducted at a safe distance from flammable liquids? _____	<input type="checkbox"/>	<input type="checkbox"/>
Are all compressed gas cylinders legibly marked for identifying the contents? _____	<input type="checkbox"/>	<input type="checkbox"/>
Are the valves shut off when the cylinder is not in use? _____	<input type="checkbox"/>	<input type="checkbox"/>

CHECKLISTS

	Yes	No
Are precautions taken to be sure that barrels, tanks, or other containers have been cleaned thoroughly to remove all flammable vapors or residues before cutting, welding or other hot work is permitted on them? _____	<input type="checkbox"/>	<input type="checkbox"/>
Is eye protection (goggles, helmets, hand shields) provided and worn as a protection against sparks and other debris? _____	<input type="checkbox"/>	<input type="checkbox"/>
Is appropriate protective clothing (gloves, aprons, leggings, etc.) worn as a protection against sparks and other debris? _____	<input type="checkbox"/>	<input type="checkbox"/>
Are nearby workers protected from welding flash? _____	<input type="checkbox"/>	<input type="checkbox"/>
Are employee exposures to cutting and welding fumes kept within acceptable limits? _____	<input type="checkbox"/>	<input type="checkbox"/>
Outdoors — Is NIOSH-approved respiratory protective equipment supplied and used when cutting or welding on metals containing or coated with:		
a. Lead _____	<input type="checkbox"/>	<input type="checkbox"/>
b. Cadmium _____	<input type="checkbox"/>	<input type="checkbox"/>
c. Mercuric compounds (certain paints) _____	<input type="checkbox"/>	<input type="checkbox"/>
In confined spaces — Is local exhaust ventilation or NIOSH-approved supplied air respirators provided and used when cutting or welding on metals containing or coated with:		
a. Lead _____	<input type="checkbox"/>	<input type="checkbox"/>
b. Cadmium (also for indoor work) _____	<input type="checkbox"/>	<input type="checkbox"/>
c. Zinc _____	<input type="checkbox"/>	<input type="checkbox"/>

CHECKLISTS

	Yes	No
d. Mercuric compounds _____	<input type="checkbox"/>	<input type="checkbox"/>
e. Fluorine (certain fluxes) _____	<input type="checkbox"/>	<input type="checkbox"/>
Indoors — Is local exhaust ventilation (hoods or booths) used when performing torchwork on		
a. Lead _____	<input type="checkbox"/>	<input type="checkbox"/>
b. Zinc _____	<input type="checkbox"/>	<input type="checkbox"/>
Whenever toxic exposures to workers cutting or welding on beryllium may occur are local exhaust ventilation and NIOSH-approved supplied air respirators provided? _____	<input type="checkbox"/>	<input type="checkbox"/>
With respect to other metals (copper, iron, nickel, etc.) is mechanical ventilation or supplied-air respirators provided when cutting:		
a. in a space of less than 10,000 cubic feet per worker? _____	<input type="checkbox"/>	<input type="checkbox"/>
b. in a room having a ceiling height less than 16 feet? _____	<input type="checkbox"/>	<input type="checkbox"/>
c. in confined spaces? _____	<input type="checkbox"/>	<input type="checkbox"/>
d. in any location where employees are exposed to toxic levels of contamination? _____	<input type="checkbox"/>	<input type="checkbox"/>
NATIONAL ELECTRICAL CODE		
ELECTRICAL WIRING		
(29 CFR 1910.308—.309)		
Have exposed wires, frayed cords, and deteriorated insulation been repaired or replaced? _____	<input type="checkbox"/>	<input type="checkbox"/>
Are junction boxes, outlets, switches, and fittings covered? _____	<input type="checkbox"/>	<input type="checkbox"/>

CHECKLISTS

	Yes	No
Is all metal fixed electrical equipment grounded? _____	<input type="checkbox"/>	<input type="checkbox"/>
Are flexible cords and cables fastened so that there is no direct pull on joints or terminal screws? _____	<input type="checkbox"/>	<input type="checkbox"/>
Are flexible cords and cables never substituted for fixed wiring? _____	<input type="checkbox"/>	<input type="checkbox"/>
Do flexible cords and cables not run through holes in wall or ceiling or through doorways or windows? _____	<input type="checkbox"/>	<input type="checkbox"/>
Are flexible cords and cables free from splices or taps? _____	<input type="checkbox"/>	<input type="checkbox"/>
Does all equipment connected by cord and plug have grounded connections? _____	<input type="checkbox"/>	<input type="checkbox"/>
Are electrical appliances such as vacuums, polishers, vending machines, etc. grounded? _____	<input type="checkbox"/>	<input type="checkbox"/>
Are all portable electrical hand tools grounded? (Double-insulated tools are acceptable without grounding). _____	<input type="checkbox"/>	<input type="checkbox"/>
Are breaker switches identified as to their use? _____	<input type="checkbox"/>	<input type="checkbox"/>
RECORDKEEPING (29 CFR 1904.2—,8)		
Is employee poster (OSHA or equivalent state poster) prominently displayed? _____	<input type="checkbox"/>	<input type="checkbox"/>

CHECKLISTS

	Yes	No
Has a summary of all occupational injuries and illnesses been compiled at the conclusion of each calendar year and been recorded on OSHA Form No. 102? Was it posted during the month of February? _____	<input type="checkbox"/>	<input type="checkbox"/>
Have all OSHA records been retained for a period of five years, excluding the current year? _____	<input type="checkbox"/>	<input type="checkbox"/>
Have occupational injuries or illnesses, except minor injuries requiring only first aid, been recorded on OSHA Form Nos. 100 and 101, or equivalent? _____	<input type="checkbox"/>	<input type="checkbox"/>

**NIOSH
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
- B30.2.0 Safety Code For Overhead and Gantry Cranes
- B30.5 Safety Code For Crawler, Locomotive and Truck Cranes
- C1 National Electric Code
- Z4.1 Sanitation In Places of Employment
- Z268.1 Safety Requirements For Design, Use and Maintenance of Metal Scrap Processing Equipment

**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-70-1971 National Electric Code

“NIOSH Certified Personal Protective Equipment”
NIOSH Pub. No. 75-119
4676 Columbia Parkway
Cincinnati, Ohio 45226

**NATIONAL SAFETY COUNCIL
425 North Michigan Avenue
Chicago, Illinois 60611**

HEALTH AND SAFETY CONSULTANTS

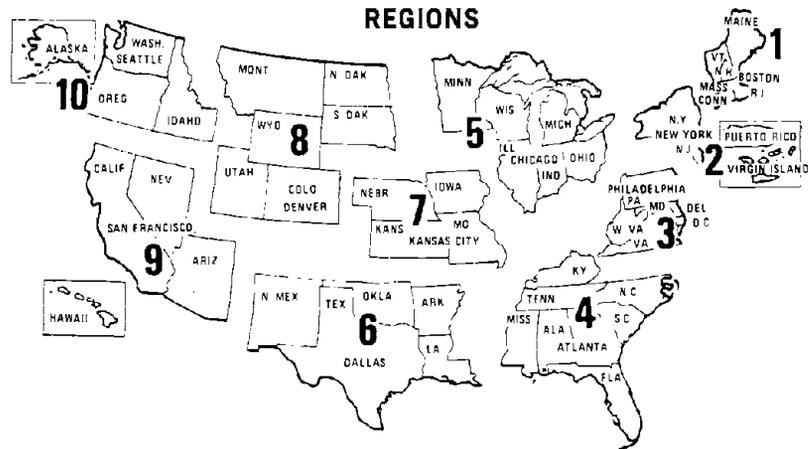
For a list of health and safety consultants write to:
American Industrial Hygiene Assoc.
c/o William E. McCormick, Managing Director
66 S. Miller Road
Akron, Ohio 44313

NIOSH AND OSHA REGIONAL DIRECTORS

Trade associations 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.: 312/686-3651

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

The nearest OSHA regional office is listed below. For more information on the OSHA Regional Offices, contact the OSHA Regional Office nearest you.

Region I

U.S. Department of Labor
Occupational Safety and Health Administration
JFK Building, Room 1804
Boston, Massachusetts 02203Telephone: 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 10036Telephone: 212/971-5941/2

Region III

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

Region IV

U.S. Department of Labor
Occupational Safety and Health Administration
1375 Peachtree Street, N.E., Suite 587
Atlanta, Georgia 30309Telephone: 404/526-3573/4 or 2281/2

Region V

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

Region VI

U.S. Department of Labor
Occupational Safety and Health Administration
555 Griffin Square Building, Room 602
Dallas, Texas 75202Telephone: 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 64106Telephone: 816/374-5861

Region VIII

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

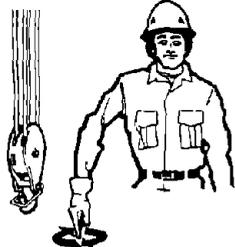
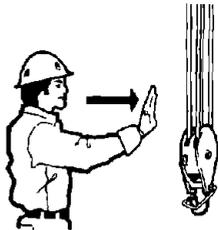
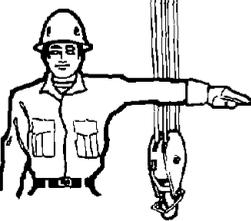
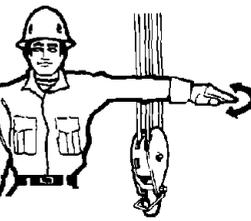
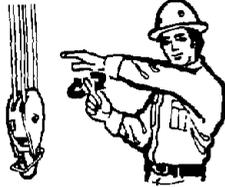
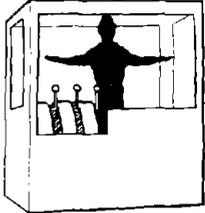
Region IX

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

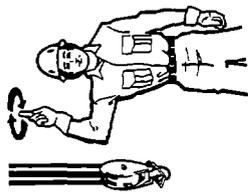
Region X

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

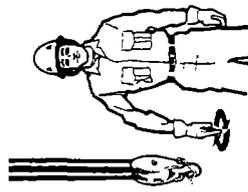
STANDARD HAND SIGNALS FOR OVERHEAD AND GANTRY CRANES

 <p>HOIST</p> <p>With forearm vertical, forefinger pointing up, move hand in small horizontal circle.</p>	 <p>LOWER</p> <p>With arm extended downward, forefinger pointing down, move hand in small horizontal circle.</p>	 <p>BRIDGE TRAVEL</p> <p>Arm extended forward, hand open and slightly raised, make pushing motion in direction of travel.</p>
 <p>TROLLEY TRAVEL</p> <p>Palm up, fingers closed, thumb pointing in direction of motion, jerk hand horizontally.</p>	 <p>STOP</p> <p>Arm extended, palm down, hold position rigidly.</p>	 <p>EMERGENCY STOP</p> <p>Arm extended, palm down, move hand rapidly right and left.</p>
 <p>MULTIPLE TROLLEYS</p> <p>Hold up one finger for block marked "1" and two fingers for block marked "2". Regular signals follow.</p>	 <p>MOVE SLOWLY</p> <p>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)</p>	 <p>MAGNET IS DISCONNECTED</p> <p>Crane operator spreads both hands apart—palms up.</p>

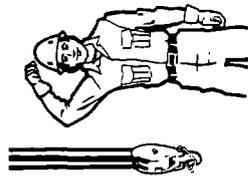
**STANDARD
HAND
SIGNALS FOR
CONTROLLING
CRAWLER,
LOCOMOTIVE,
AND TRUCK
CRANE
OPERATIONS**



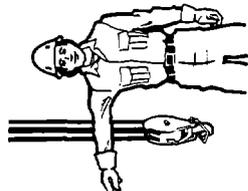
HOIST. With forearm vertical, forefinger pointing up, move hand in small horizontal circle.



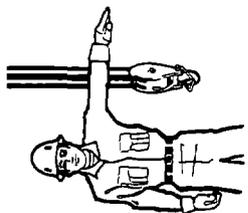
LOWER. With arm extended downward, forefinger pointing down, move hand in small horizontal circle.



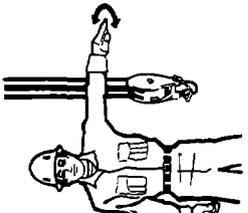
USE MAIN HOIST. Tap fist on head, then use regular signals.



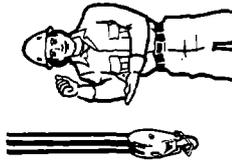
SWING. Arm extended point with finger in direction of swing of boom.



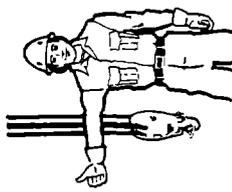
STOP. Arm extended, palm down, hold position rigidly.



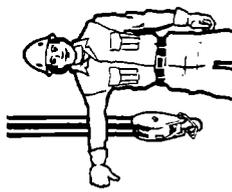
EMERGENCY STOP. Arm extended, palm down, move hand rapidly right and left.



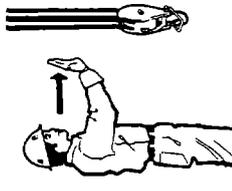
USE WHIPLINE (Auxiliary Hoist). Tap elbow with one hand, then use regular signals.



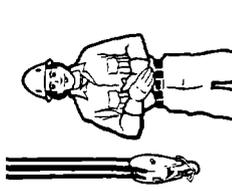
RAISE BOOM. Arm extended, fingers closed, thumb pointing upward.



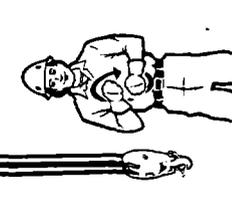
LOWER BOOM. Arm extended, fingers closed, thumb pointing downward.



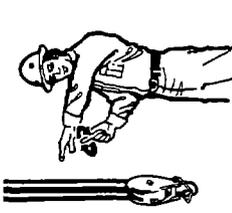
TRAVEL. Arm extended forward, hand open and slightly raised, make pushing motion in direction of travel.



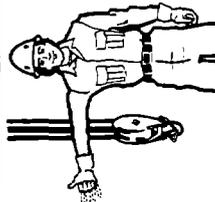
DOG EVERYTHING. Clasp hands in front of body.



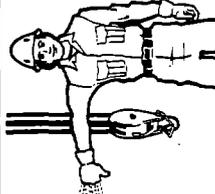
TRAVEL (Both Tracks). Use both fists in front of body, making a circular motion about each other, indicating direction of travel, forward or backward. (For crawler cranes only).



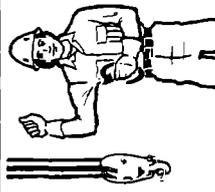
MOVE SLOWLY. Use one hand to give any motion signal and place other hand motionless in front of head giving the motion signal. (Hoist slowly shown as example).



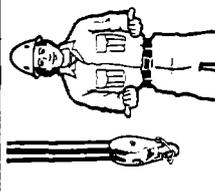
RAISE THE BOOM AND LOWER THE LOAD. With arm extended, thumb pointing up, flex fingers in and out as long as load movement is desired.



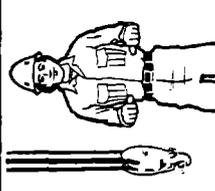
LOWER THE BOOM AND RAISE THE LOAD. With arm extended, thumb pointing down, flex fingers in and out as long as load movement is desired.



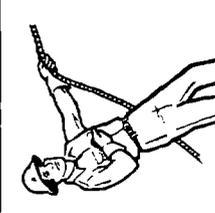
TRAVEL. (One Track) Lock the track on side indicated by raised fist. Travel opposite track in direction indicated by circular motion of other fist, rotated vertically in front of body. (For crawler cranes only).



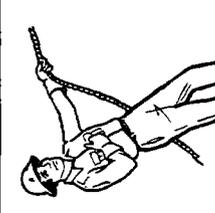
EXTEND BOOM. (Tele-scoping Booms). Both fists in front of body with thumbs pointing outward.



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



RETRACT BOOM. (Tele-scoping Booms). One Hand Signal. One fist in front of chest, thumb pointing outward and heel of fist tapping chest.



EXTEND BOOM. (Tele-scoping Booms). One Hand Signal. One fist in front of chest with thumb tapping chest.

HOW TO LIFT SAFELY

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

The factors that contribute to safe lifting are...

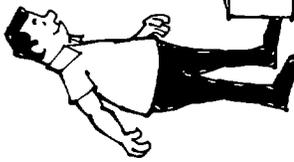


DETERMINE IF OBJECTS CAN BE LIFTED AND CARRIED SAFELY.

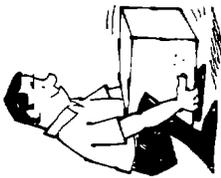
1. Approach the load and size it up (weight, size and shape.) Consider your physical ability to handle the load.



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



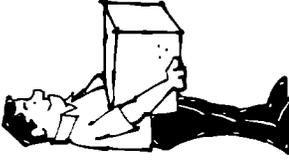
3. Bend the knees to the degree that is comfortable and get a good handhold. Then using both leg and back muscles...



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



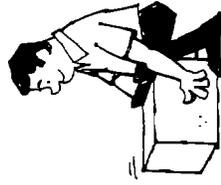
5. Lift the object into carrying position, making no turning or twisting movements until the lift is completed.



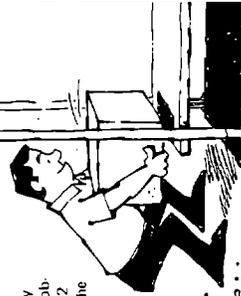
6. Turn your body with changes of foot position after looking over your path of travel making sure it is clear.



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.



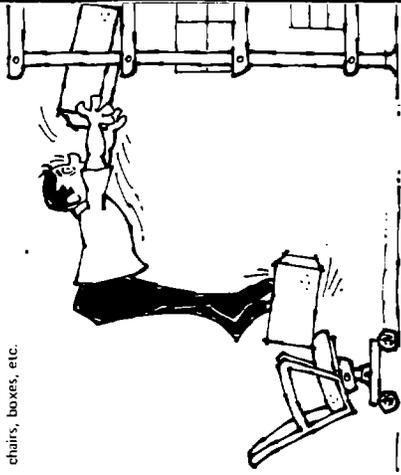
Avoid strain by storing heavy objects at least 12 inches above the floor.



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.



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.



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





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



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

KIND OF FIRE

DECIDE THE CLASS OF FIRE YOU ARE FIGHTING. . .

↓

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

→

CLASS A FIRES

USE THESE EXTINGUISHERS

ORDINARY COMBUSTIBLES

- WOOD
- PAPER
- CLOTH
- ETC.

CLASS B FIRES

USE THESE EXTINGUISHERS

FLAMMABLE LIQUIDS, GREASE

- GASOLINE
- PAINTS
- OILS, ETC.

CLASS C FIRES

USE THESE EXTINGUISHERS

ELECTRICAL EQUIPMENT

- MOTORS
- SWITCHES
- ETC.

EMERGENCY INFORMATION

FIRE

Telephone Fire Department _____

Nearest Alarm Box at _____

CRIME

Telephone Police _____

INJURY/ILLNESSES

Avoid infection of minor injuries; always get medical attention or skilled first aid.

Doctor _____

Office _____ Tel. _____

Residence _____ Tel. _____

Hospital _____

Address _____ Tel. _____

Ambulance _____

Address _____ Tel. _____

(In emergencies, get medical attention and transportation elsewhere if necessary.)

In all cases of Fire, Crime, Accident, or Sickness, promptly notify:

1. Name _____ Office Tel. _____

Address _____ Res. Tel. _____

or

2. Name _____ Office Tel. _____

Address _____ Res. Tel. _____

