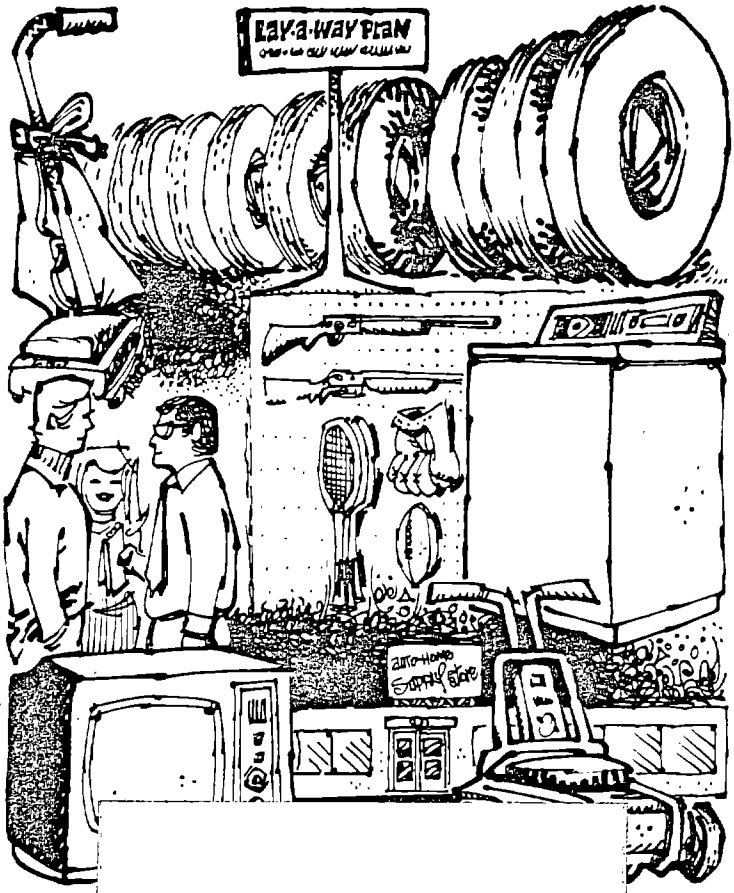
NIOSH

HEALTH AND SAFETY GUIDE FOR AUTO AND HOME SUPPLY STORES



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

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HEALTH AND SAFETY GUIDE FOR AUTO AND HOME SUPPLY STORES

U.S. DEPARTMENT OF HEALTH, EDUCATION, AND WELFARE
Public Health Service
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National Institute for Occupational Safety and Health
Division of Technical Services
Cincinnati, Ohio
November 1975

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ACKNOWLEDGMENT

This booklet was prepared by a Task Force in the Division of Technical Services and NIOSH personnel in the Regional Offices, who gathered information from state and federal agencies, trade associations, insurance companies, and through in-plant visits. Those contributing to the development of the *"Health and Safety Guide for Auto and Home Supply Stores"* were: Gerald J. Karches, Director of the Task Force; Harry L. Markel, Henry M. Stafford, and Raymond L. Hervin.

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INTRODUCTION

The Williams-Steiger *"Occupational Safety and Health Act of 1970"* was passed into law "to assure safe and healthful working conditions for working men and women. . ." This Act established the NATIONAL INSTITUTE FOR OCCUPATIONAL SAFETY AND HEALTH (NIOSH) under the Department of Health, Education, and Welfare (DHEW) and the OCCUPATIONAL SAFETY AND HEALTH ADMINISTRATION (OSHA) under the Department of Labor (DOL). The Act provides for research, information, education, and training in the field of occupational safety and health and authorizes enforcement of the standards. As part of these activities, surveys have been made by NIOSH to determine the most common health and safety problems in auto and home supply stores. The first edition of this Guide was 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", and "NECESSARY" 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

GENERAL PHILOSOPHY FOR HEALTH AND SAFETY COMPLIANCE

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

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

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

Even when a citation is issued, it is desirable that the employer have demonstrated his willingness to comply with the intent of the law by operating an effective, on-going safety and health program, correcting existing hazards in the workplace, and maintaining records of purchases, installations, and other compliance-promoting activities. By documenting intent to provide a safe and healthful workplace, an establishment may be given the benefit of having shown "good faith" when penalties are being determined after an OSHA compliance visit.

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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."

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

An employee safety committee can provide direct employee involvement in company safety programs.

Hazards may be identified by investigating accidents, reviewing injury and illness records, soliciting employee input (interviews, suggestions, and complaints), performing self-inspections, and using material in this Guide and other information sources. Typical examples 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 can be customized to fit program needs.

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 hazards.

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HEALTH AND SAFETY GUIDELINES (cont.)

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

Safety teams can provide leadership in an emergency.

Management may want to assign 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 foreman, must be delegated the authority and have management support to carry out the part of the program assigned to him. Likewise, everyone in the establishment should be aware of the program activities 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 personnel will likely show interest and a desire to participate.

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HEALTH AND SAFETY GUIDELINES (cont.)

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 the standard and emergency procedures during each shift.
4. Post appropriate warning signs and operating procedures.
5. Instruct employees in the use of portable fire extinguishers. (Refer to fold-out chart in this booklet and post in a conspicuous place.)
6. Have at least one person trained in first aid on each shift.
7. Be sure employees 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. Be sure machines are appropriately guarded and employees are aware of guarding requirements.

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10. Be sure employees using, or working in conjuction with, fork lifts, cranes, trucks, and other powered equipment are appropriately trained as to use, safety precautions, signals, etc.
11. Be sure all employees have available a printed list of standard procedures and emergency procedures.
12. Organize a health and safety committee or routinely talk to the employees about health and safety, noting their suggestions and complaints.
13. Instruct employees in safe-lifting practices. Such instructions 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.

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HEALTH AND SAFETY GUIDELINES (cont.)

SAFETY RULES FOR OPERATING POWER TOOLS

1. Know the application, limitations, and potential hazards of the tool you are using.
2. Select the proper tool for the job.
3. Remove adjusting keys and wrenches before turning on tools.
4. Do not use tools with frayed cord.
5. Keep guards in place and in working order. Do not remove ground lugs.
6. Working areas MUST be free of clutter that can be tripping hazards.
7. Keep alert to potential hazards in the working environment such as damp locations or the presence of highly combustible materials.
8. Dress properly to avoid loose clothing catching in moving parts.
9. Use safety glasses, dust or face masks, or other protective clothing and equipment when necessary.
10. Do not surprise or distract anyone using a power tool. It may result in a serious injury.

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HEALTH AND SAFETY GUIDELINES (cont.)

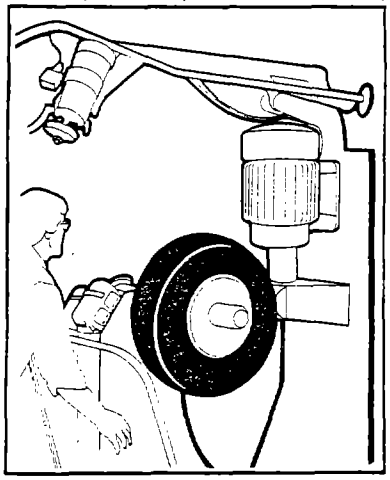
GENERAL—ABOUT THE INDUSTRY

Health and safety considerations for employees working in auto and home supply stores vary with the kinds of activities included in any location and, therefore, there may be material in this Guide that does not apply to your individual business.

Some of the most common potential health and safety hazards observed in the automotive services include: the use of hand and powered tools; lifting and suspending automobiles on hoists; working near running engines with the inherent hazards of hot surfaces, moving parts, and carbon monoxide; using flammable and combustible liquids; using pressurized substances such as air and hydraulic fluids; battery servicing and charging; and changing and repairing automobile and truck tires.

Service station activities require serving customers at or near gasoline pumps. Moving vehicles and handling flammable and combustible liquids are common potential hazards.

Tire recapping also has hazards which should be investigated. Among these are high noise levels associated with buffing and grinding; spraying flammable liquids such as special cements and solvents; powered grinders, buffers, tire inspection fixtures, and air compressors; hot surfaces from heated molds; and high air pressure. Warehousing (stacking of palletized tires) deserves mention because of the height they are usually stacked.



Home supplies generally involve displays and demonstrations and this requires material handling and connecting appliances to electrical sources. Care should be exercised so that displays do not obstruct aisles and passageways.

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Hazards common to all industry activities are wet or slippery floors and working surfaces; tripping hazards; fire hazards; elevated areas without standard railings and toeboards; and electrical hazards due to running extension cords and exposed electrical contacts (frayed wires, open electrical junction boxes and overloaded electrical outlets). Environmental contaminants, such as from cements and solvent fumes, grinding and buffing dusts, and welding fumes, have potential health hazards. Spray painting, like flammable cement spraying, can create fire and explosion hazards as well as health hazards.

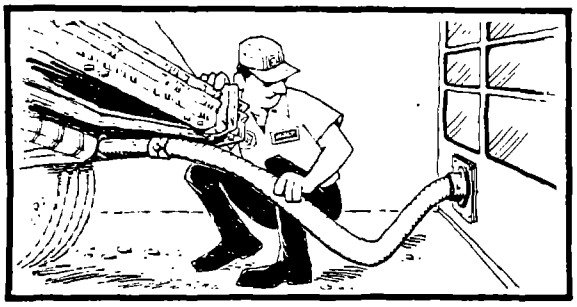
CARBON MONOXIDE

Persons working in this industry are often exposed to dangerous levels of carbon monoxide. Auto exhaust and space heaters are two sources of carbon monoxide which have been observed in auto and home supply stores. Provisions MUST be made to remove carbon monoxide from the work area.

General ventilation may be adequate to reduce the carbon monoxide level. However, a tail pipe exhaust system is recommended and may be needed; particularly in a closed garage or service bay.

Employees MUST be instructed about job hazards, including the safeguards provided and their use.

To illustrate the exhaust gas volume given off by a running internal combustion engine, consider a 300 cubic inch automobile engine idling at 600 RPM's. That engine will give off about 100 cubic feet of exhaust gases per minute—or enough to totally fill a closed service bay 12' x 12' x 20' in less than 30 minutes.



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TIRE CHANGING AND REPAIR

Tire changing and repair is often done carelessly and without adequate tools and equipment. Truck tires, particularly those with lockrings, offer the greatest injury potential.

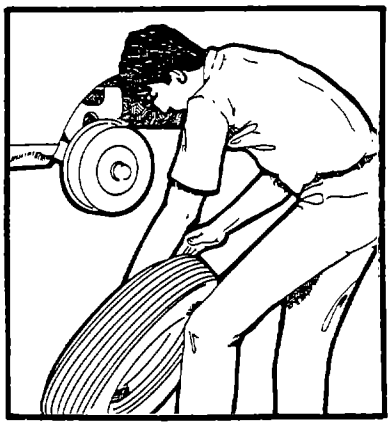
A safety rack (cage) or equivalent protection should be provided and used when inflating, mounting, or dismounting tires with split rims or lockrings.

An extension hose equipped with a clip-on chuck and an in-line valve and gauge should be used for inflation so the employee does not have to place his hand inside the safety cage (some states make this a requirement).

Employees should know that some truck tires have been initially balanced by vulcanizing a sheet of rubber, containing a high density of lead, into the inside of the tire. If removal is necessary, use low heat. Never grind or buff these lead impregnated sheets—respirable lead oxide will result.

EASY TECHNIQUE OF WHEEL MOUNTING

1. Position the hoist so that the axle hub is about belt buckle height to the operator.
2. Position the tire and wheel on the floor so that the inside of the tire faces the operator and the outside of the tire faces the auto.
3. The operator places one hand in the wheel hub hole and has the tire resting against his thigh, just above his knee—(right hand in wheel hub hole, tire rests against right thigh; left hand in wheel hub hole, tire rests against left thigh).



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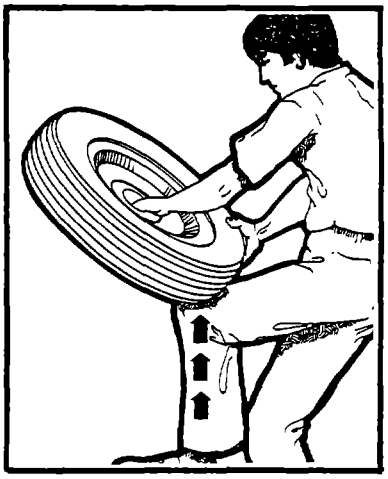
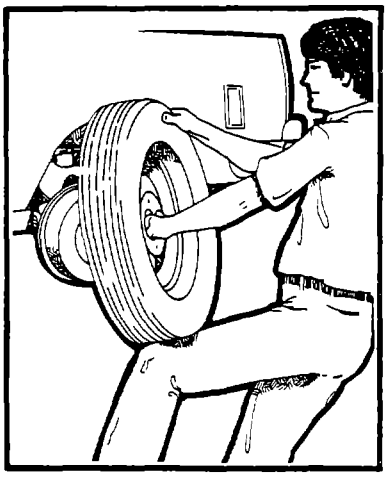
4. With a continuous motion, the operator straightens up, using his thigh as a pivot point, rotates the tire until most of its weight is resting on his thigh. The inside of the tire is now facing the car.



5. Continuing the momentum, the tire and wheel goes toward the hub with a little guidance with the free hand. At this point the hand which has been positioned in the hub hole is smoothly withdrawn and placed in a guiding position opposite the free hand.



6. The tire and wheel assembly is guided so that the hub is positioned in the wheel hub hole, the wheel is rotated (if necessary) to align the lugs with their holes.

This is a simple, strain reducing technique that an operator can learn in a few practice attempts. The secret lies in the smooth, continuous lifting motion, with both hands and the leg assisting.

For dismounting a wheel the same general procedure can be

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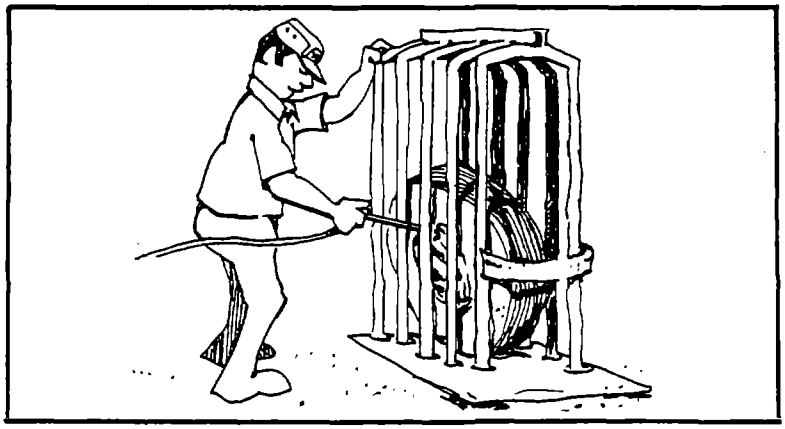
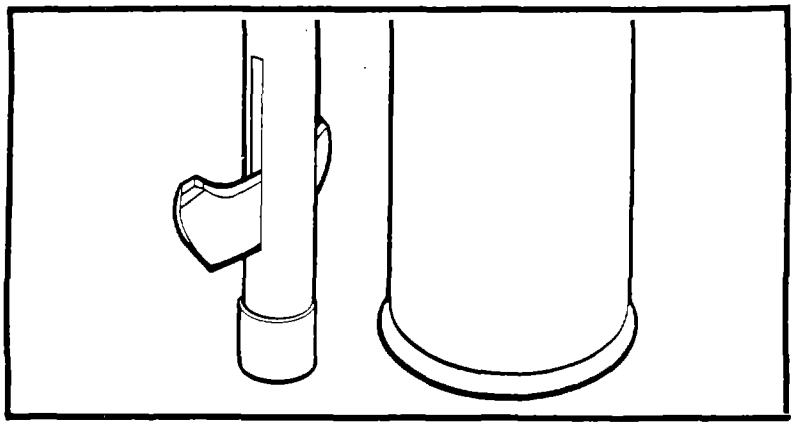
HEALTH AND SAFETY GUIDELINES (cont.)

used except that neither hand is placed in the wheel hub hole. In dismounting the wheel, the tire is allowed to roll down the operator's leg to the floor. This procedure helps to avoid strains by coordinating the leg, arm, and back muscles.



HYDRAULIC VEHICLE LIFT

There is a safety catch on many hydraulic vehicle lifts which should always be in place when the lift is up. Consistent use of safety devices like this will help prevent accidents.



The area near vehicle lifts is a perpetual housekeeping problem due to slippery work surfaces. Floor drains should be

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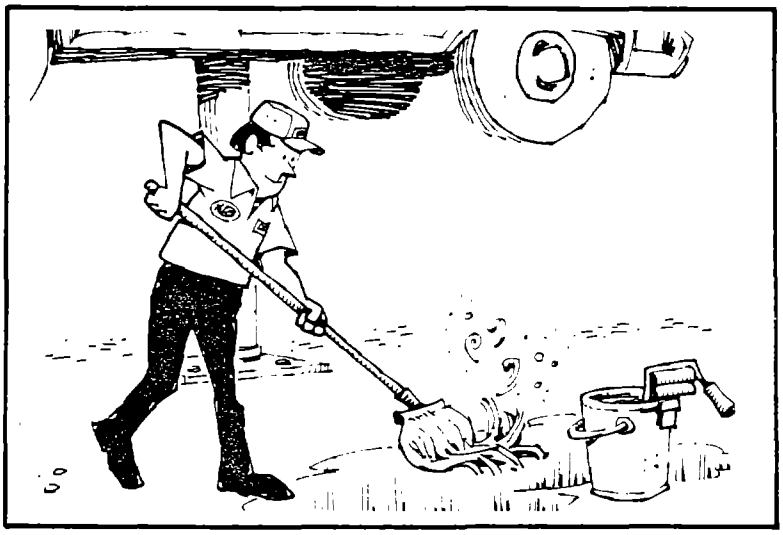
free of collected debris to provide good drainage.

This will aid in maintaining a clean, safe work area. Drain covers MUST fit properly to avoid a tripping hazard.



BATTERY CHARGING

Battery charging MUST be done in specifically designated areas. Where batteries are serviced, methods MUST be provided for flushing and neutralizing spilled electrolyte, fire protection, adequate ventilation to prevent hydrogen gas build-up (hydrogen gas given off during battery charging is explosive), and for quick drenching of the worker if acid is splashed or spilled.

Smoking MUST be prohibited in battery charging areas. Appropriate "NO SMOKING" signs MUST be posted. Likewise, open flames, spark producing apparatus, and electric arc MUST be excluded from the area.

Tools and other metallic objects MUST be kept away from the tops of uncovered batteries.

RAMP AREA AND PUMP ISLAND

The ramp area and pump island offer opportunities for serious problems if certain precautions are not observed.

"NO SMOKING" and "SHUT OFF ENGINES" signs MUST

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be prominently posted as a reminder to employees and customers. Smoking, open flames, and sparks MUST NOT be permitted where fuel is dispensed or fuel systems serviced.

Pumps with retractable hoses should be kept in good working order. Hoses lying on the driveway provide a tripping hazard and are sometimes pinched and ruptured by vehicle wheels resulting in gasoline leaks.

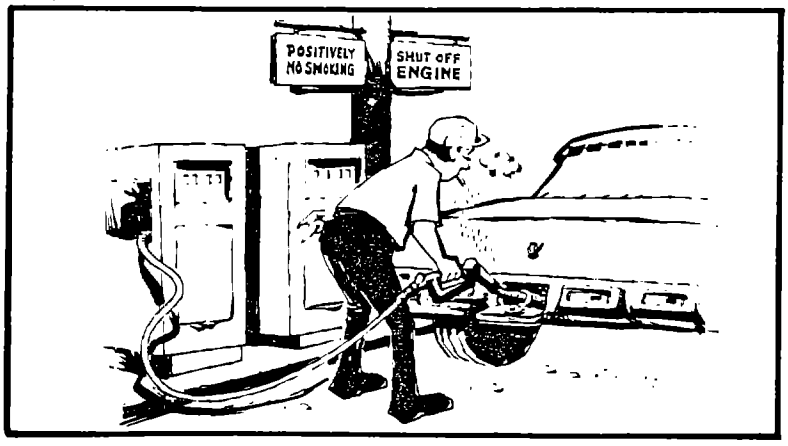
The ramp area should be free from cracks and uneven surfaces that may cause unsafe footing.

If the pump island is operated during hours of darkness, adequate lighting should be provided.

Emergency power cutoffs MUST be provided for gasoline pumps. The cutoffs MUST be clearly identified, easily accessible, and located away from the pumps (but not more than 100 feet). Employees should know where they are and how to use them.

An automatic type nozzle with a hold open latch may be used only if the attendant dispenses the fuel. If the customer is allowed to dispense the fuel, the nozzle MUST be an approved automatic closing type but without a hold open latch.

Rebuilt nozzle valves may be used if the rebuilt valves meet the same requirements as those approved by Underwriters Laboratories, Inc. or Factory Mutual Engineering Corp.



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TOW TRUCKS

Where tow trucks and service vehicles are utilized, there are safe practices which should be instituted. Each vehicle should be equipped with an operable fire extinguisher; one which may be used on class B fires (flammable and combustible liquids and greases).

Vehicles designed for hoisting and towing MUST have their capacities prominently posted on the lifting apparatus. The manufacturer's data plate MUST NOT be removed or painted over.

Hoisting controls should be remotely located from the operating mechanism (winch drum, traveling cables, sheaves, and hook) so as not to pose a hazard to the operator.

The vehicle should be equipped with flood lights if intended to be used at night.

Wheel chocks and emergency warning flares should be available on the vehicle.

Control mechanisms and safety devices should be inspected frequently for safe operating condition and possible adjustment.

Hooks, drums, sheaves, cables, and structural members should be inspected periodically for cracks, excessive wear, deformation, and corrosion. The same holds true for locking pins and other locking devices, bearings, shafts, and gears.

Jack stands should be placed beneath raised vehicles before employees are allowed to work under them.

Hand tools carried on service vehicles should have the same periodic inspection and maintenance as those tools utilized in the shops.

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HEALTH AND SAFETY GUIDELINES (cont.)

OCCUPATIONAL HEALTH AND ENVIRONMENTAL CONTROL

In the occupational environment, persons may be exposed to excessive levels of a variety of harmful materials, including gases, dusts, mists, vapors, fumes, certain liquids and solids, noise, heat, cold, and so forth.

Often health hazards are not recognized because materials used are identified only by trade names; a further complication arises from the fact that materials tend to contain mixtures of substances, making identification still more difficult.

To begin identifying occupational health hazards, a materials analysis (product inventory) is made and all hazardous substances listed and evaluated. If the composition of a material cannot be determined, the information should be requested from the manufacturer or supplier who often will provide **Material Safety Data Sheets** for their products. These Sheets may contain health and safety information about materials, such as signs and symptoms of over-exposure, physical characteristics, and incompatibilities with other substances.

A process analysis is now performed noting all chemicals used and all products and by-products formed. When doing such an analysis, allied activities such as maintenance and service operations should be included. Examples of specifics to watch for are:

1. Welding performed around chlorinated materials may cause the formation of toxic gases in addition to welding fumes.
2. If fork lift trucks with internal combustion engines are used for materials handling, then exhaust gases such as carbon monoxide should be included in the analysis.
3. When certain cleaning agents are mixed, sometimes poisonous gases, as chlorine, are formed.

It should be noted that skin conditions, such as chemical burns, skin rashes, and dermatitis constitute over half of all occupational health problems. The use of protective creams or lotions, proper personal protective clothing and other protective equipment, and the practice of good personal hygiene can often prevent these problems.

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HEALTH AND SAFETY GUIDELINES (cont.)

Various control methods can be used to prevent or reduce employee exposure. They are as follows:

1. Substituion of less toxic materials.
2. Process change—a change from gas-operated fork lift trucks to electric lift trucks.
3. Isolation—placing the hazardous process in a separate room or in a corner of the building to reduce the number of persons exposed.
4. Administrative controls—limiting the total amount of time an individual is exposed to a health hazard by daily rotating the person to work operations where the hazard is not present.
5. Training and education of employees—employees should be told what hazards they are exposed to and the ways to reduce or limit exposures (see **"Employee Training"**).
6. Personal hygiene—cannot be over-emphasized. Persons should wash their hands before eating. If chemicals or solvents get on the skin, they should be washed off immediately. Employees should not be permitted to eat around toxic chemicals or in contaminated areas. Clothing should be changed and washed daily if it becomes contaminated with toxic chemicals, dusts, fumes, or liquids.
7. Personal protective equipment—such items as respirators, hearing protection devices, protective clothing, and protective equipment (see **"Personal Protective Equipment"**).
8. Ventilation—includes either local exhaust ventilation, where contamination is removed at the point of generation, or general mechanical ventilation (see **"Occupational Health and Environmental Control"**).

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FREQUENTLY VIOLATED REGULATIONS

WALKING AND WORKING SURFACES

GENERAL REQUIREMENTS

1. The workplace MUST be maintained clean, orderly, sanitary, and, as far as possible, in a dry condition. Spills should be cleaned up promptly.
2. Areas which are constantly wet should have nonslip surfaces where personnel normally walk or work.
3. Every floor, working place, and passageway MUST be maintained free from protruding nails, splinters, holes, and loose boards.
4. Where mechanical handling equipment such as lift trucks is used, sufficient safe clearances MUST be provided for aisles at loading docks, through doorways, and wherever turns or passage must be made. Aisles MUST NOT be obstructed.
5. All permanent aisles MUST be easily recognizable. Usually aisles are identified by painting or taping lines on the floor.
6. The floor load capacity is the maximum weight which can be safely supported by the floor, expressed in pounds per square foot. When this information is not available, and when floor load capacity is in doubt, it is suggested that a competent engineer be consulted. These floor load capacities MUST be posted in a readily visible location (except for slab floors with no basements).

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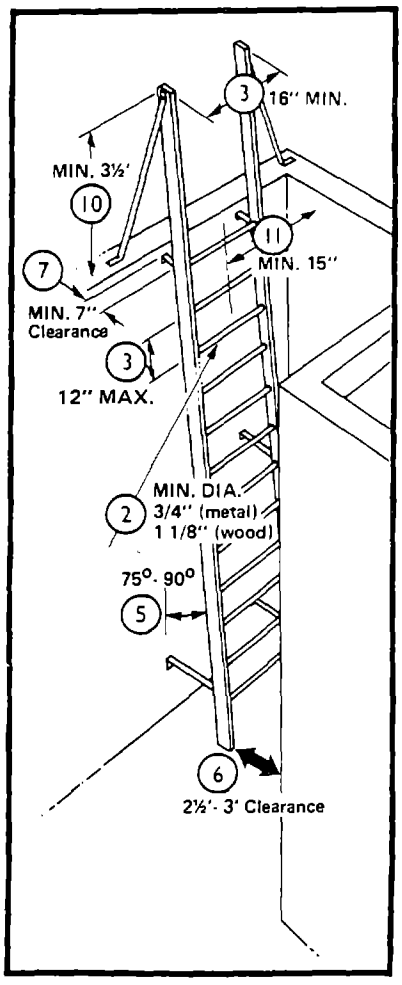
FREQUENTLY VIOLATED REGULATIONS

WALKING AND WORKING SURFACES (cont.)

FIXED LADDERS **MUST:**

1. Be designed to withstand a single concentrated load of at least 200 pounds.
2. Have rungs with a minimum diameter of ¾ inches for metal ladders, or 1⅛ inches for wood ladders.
3. Not have rungs spaced more than 12 inches apart and MUST be at least 16 inches wide.
4. Be painted (if metal), or otherwise treated to resist deterioration when location demands.
5. Have a preferred pitch of 75°-90° for safe descent.
6. Have 2½ foot clearance for ladders with 90° pitch and three feet for 75° pitch on the climbing side of ladder (unless caged).
7. Have at least seven inches clearance in back of the ladder to provide for adequate toe space.
8. Be equipped with cages if they are longer than 20 feet.
9. Have landing platforms if they are longer than 30 feet. 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).



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FREQUENTLY VIOLATED REGULATIONS

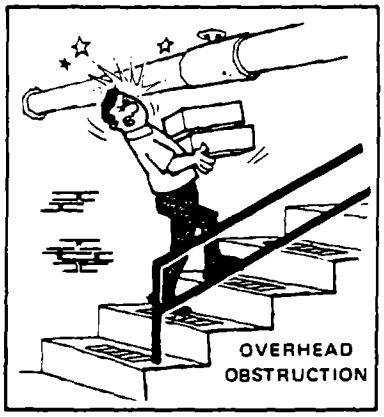
WALKING AND WORKING SURFACES (cont.)

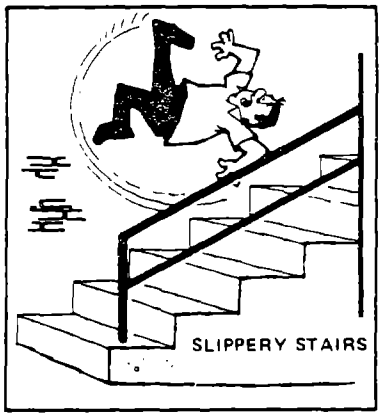
PORTABLE LADDERS:

1. MUST be maintained in good condition at all times.
2. Should be kept coated with a suitable protective material.
3. MUST be inspected frequently. Those which have developed defects MUST be tagged, "DANGEROUS–DO NOT USE" and be removed from service for repair or destruction.
4. If wooden, 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.

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).

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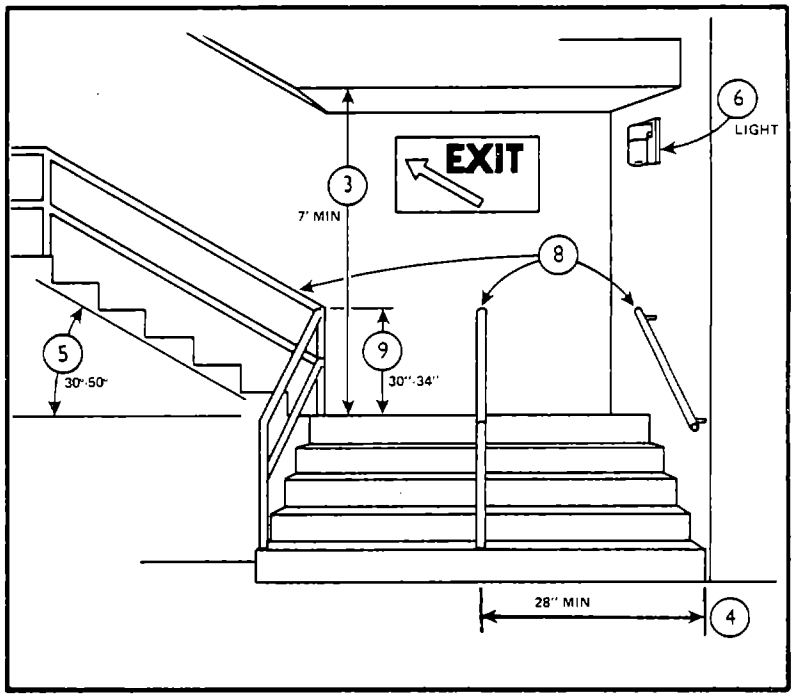
FREQUENTLY VIOLATED REGULATIONS

WALKING AND WORKING SURFACES (cont.)

5. The angle to the horizontal made by the stairs MUST be between 30° and 50°.
6. All stairs should be adequately lighted.
7. If the tread is less than nine inches wide, the risers should be open.
8. If the flight of stairs has four or more risers:
   a. a stair railing on each open side is REQUIRED.
   b. a 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.
   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.



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FREQUENTLY VIOLATED REGULATIONS

WALKING AND WORKING SURFACES (cont.)

THE STANDARD RAILING AND TOEBOARD:

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

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

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

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

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

WHERE A STANDARD RAILING IS REQUIRED:

1. Every open-sided floor or platform four feet or more above the adjacent floor or ground level MUST be railed on all open sides except where there is entrance to a ramp, stairway, or fixed ladder.
2. Every stairway floor opening MUST be guarded on all exposed sides except the entrance to the stairway.
3. Every ladderway floor opening MUST be guarded by a standard railing and toeboard on all sides, with passage through the railing so constructed as to prevent a person from walking directly into the opening.
4. Every runway or catwalk MUST have railings on all open sides four feet or more above ground or floor level.

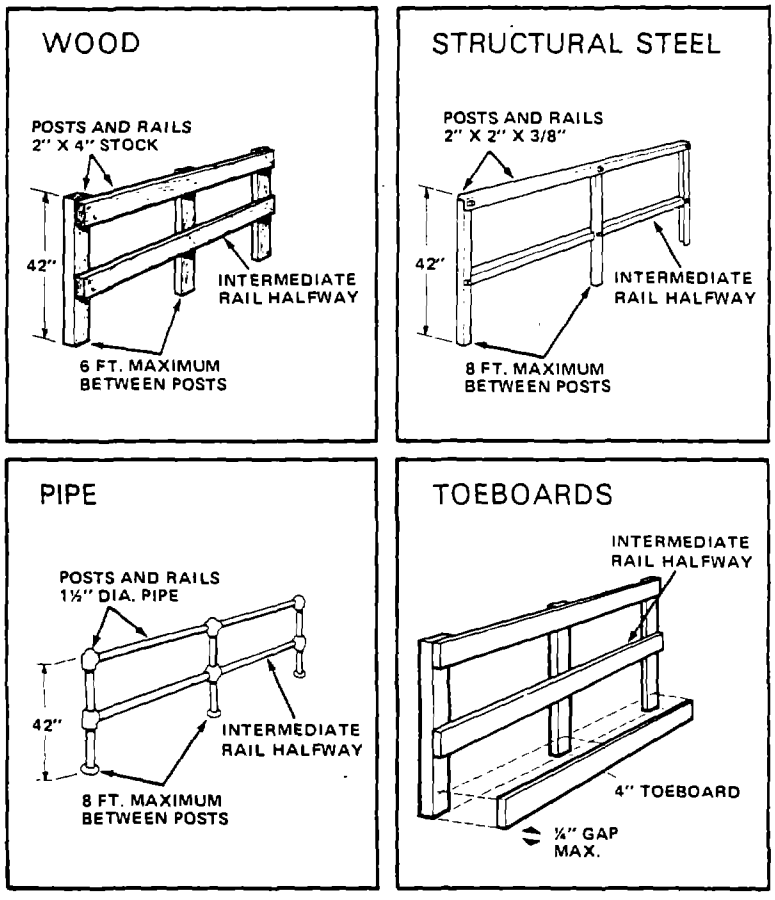
NIOSH

FREQUENTLY VIOLATED REGULATIONS

WALKING AND WORKING SURFACES (cont.)

5. Alignment pits which are four feet (or more) in depth REQUIRE standard guard rails and toeboards. Safety chains or gates should be provided at entrances to the pit.

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).



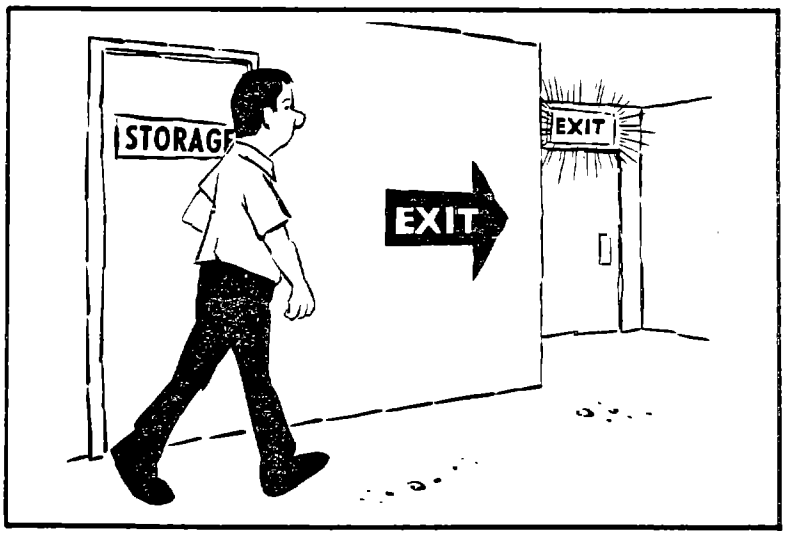
NIOSH

FREQUENTLY VIOLATED REGULATIONS

EXITS AND EXIT MARKINGS

EXITS AND EXIT MARKINGS

1. Every exit MUST have the word "EXIT" in plain legible letters not less than six inches high with the strokes of the letters not less than ¾ inches wide.
2. Doors, passageways, or stairways which are neither exits nor ways to an exit, but may be mistaken for an exit, MUST be clearly marked "NOT AN EXIT" or marked by a sign indicating their actual use e.g., "STORAGE ROOM", "TO BASEMENT", etc.



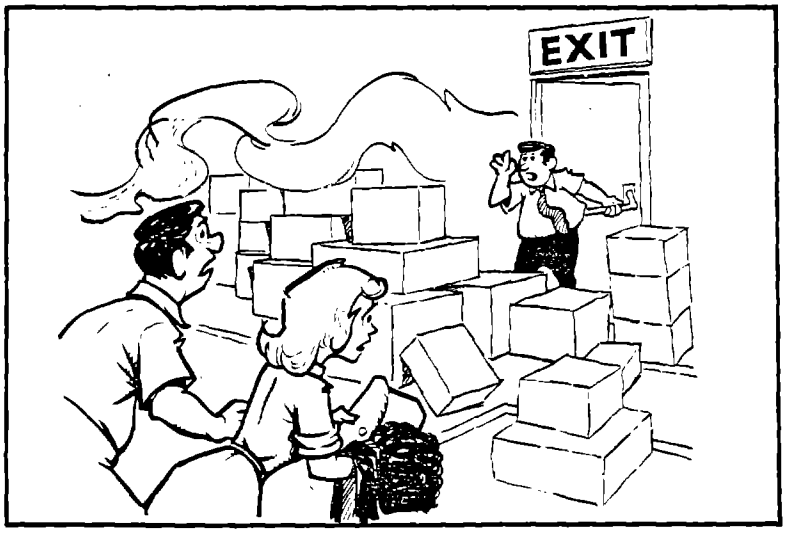
3. When the direction to the nearest exit may not be apparent to an occupant, an exit sign with an arrow indicating direction should be used.
4. Exit access should be arranged so that is is unnecessary to travel toward any area of high hazard potential in order to reach the nearest exit (unless the path 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.

NIOSH

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:
   a. 50 or more persons occupy the room or
   b. 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.

NIOSH

FREQUENTLY VIOLATED REGULATIONS

OCCUPATIONAL HEALTH AND ENVIRONMENTAL CONTROL

Persons working in repair garages are often exposed to dangerous amounts of gases, dusts, and vapors. For example, carbon monoxide is a DEADLY gas. This gas can poison or kill a person in a matter of minutes. Asbestos dust is related to lung cancer when inhaled, and certain solvents and body plastics can cause allergies and skin conditions. Because exposure of personnel to these substances is difficult for management to measure, (e.g., special equipment is needed) excessive exposures often occur without management being aware of it. Some control measures are suggested for the following frequently-observed air contaminants and other hazardous substances.

1. ASBESTOS

   Individuals repairing brakes most of the day or machining linings to fit the drums may be exposed to excess asbestos unless precautions are taken. Adequate ventilation should be provided and dust mask should be worn by all employees in the exposure area. Dust should be vacuumed (not blown) from the drums and the floor vacuumed ininstead of swept.

2. CARBON MONOXIDE

   Auto exhaust and space heaters are two sources of carbon monoxide. If employees complain of headaches and environmental controls have not been provided, the carbon monoxide level may be too high.

   Although large amounts of general ventilation can be used, a tail pipe exhaust system is recommended for removing auto exhaust from garages. For all but the very small garages, where direct piping to the outside is possible, a mechanical ventilation system is needed. The system MUST be adequately designed, inspected regularly to make sure it is performing properly, and be used as a matter of routine.

   Some problems that have been observed are:

   a. The system becomes blocked with paper, rags, or other material.
   b. Fan belts slip or break.
   c. Hoses break or split.

NIOSH

FREQUENTLY VIOLATED REGULATIONS

OCCUPATIONAL HEALTH AND ENVIRONMENTAL CONTROL (cont.)

Space heaters can also be a carbon monoxide source and therefore should be inspected to insure they are adequately vented and do not become blocked.

3. SOLVENTS

If a person spends a considerable amount of time cleaning parts, the tank should contain local exhaust ventilation and be vented to the outside.

4. PAINTS AND THINNERS

Thinners used in most paints will have a narcotic effect on workers and may eventually cause irreparable illness such as liver and lung damage. In addition to ventilation in the spray area or spray booth, respirators should be worn (see respirators under **PERSONAL PROTECTIVE EQUIPMENT**).

Some of the newer paints contain hardeners and other additives that can cause skin rashes and dermatitis.

Do not permit employees to wash their hands in thinners and solvents because this takes the fats out of the skin and increases the chance of skin rashes and may be absorbed through the skin. Rubber gloves worn while handling the paint will prevent absorption.

5. DUSTS

Dust is a problem in this business. Activities such as sanding paints, primers, and body fillers all produce large quantities of dust. Dust is also a problem in brake overhaul. Dust is created in preparing tire casings for recap and local exhaust systems and personal protective equipment may be required.

6. HYDROGEN

Battery charging operations produce hydrogen gas and an explosive atmosphere may result unless adequate ventilation is provided. **"NO SMOKING"** signs MUST also be posted.

7. NOISE

Excessive noise is the greatest cause of hearing loss. The loudest noises produced in this industry are from machinery and powered tools; often exceeding the OSHA exposure limits.

NIOSH

FREQUENTLY VIOLATED REGULATIONS

OCCUPATIONAL HEALTH AND ENVIRONMENTAL CONTROL (cont.)

OCCUPATIONAL NOISE EXPOSURE

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

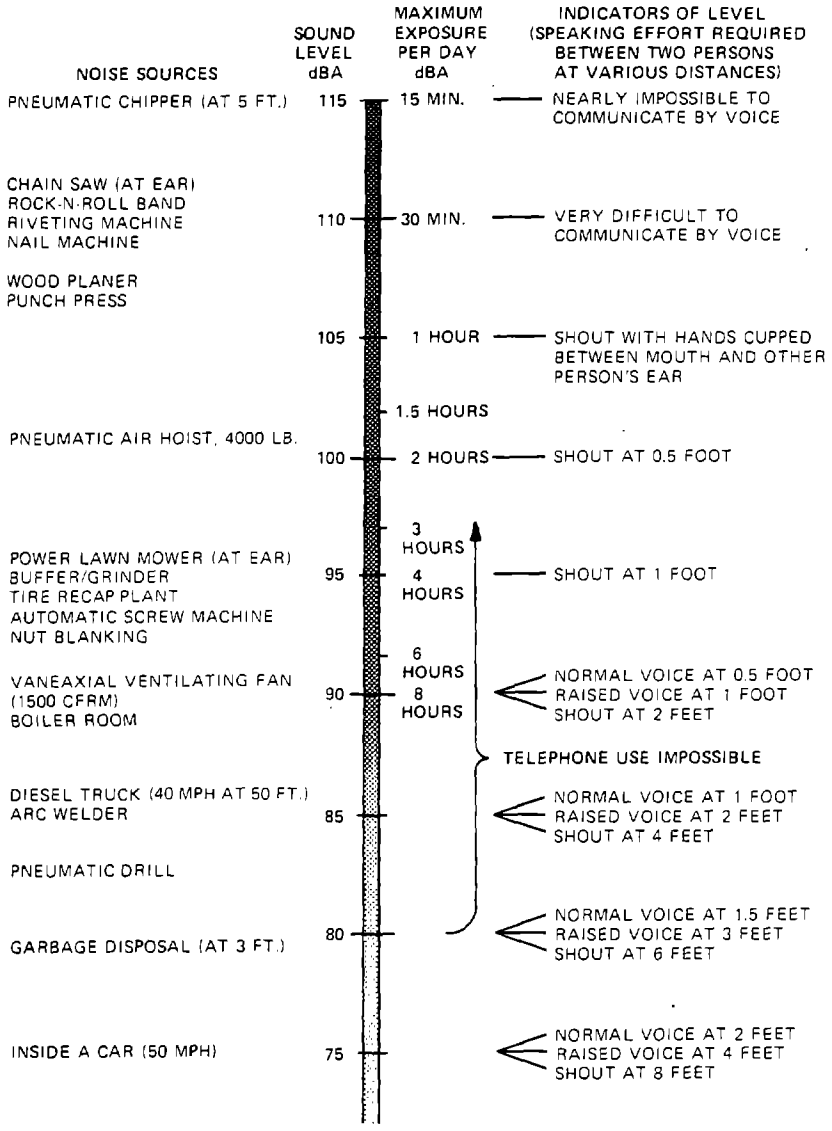
At greater than 90 dBA exposures (eight hours per day) or for higher noise levels in excess of the allowable time (e.g., 100 dBA for more than two hours) a continuing, effective hearing conservation program MUST be administered. Reference to the following table gives estimates of noise levels and the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

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

NIOSH

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

PERMISSIBLE NOISE EXPOSURES



NIOSH

FREQUENTLY VIOLATED REGULATIONS

HAZARDOUS MATERIALS

FLAMMABLE AND COMBUSTIBLE LIQUIDS

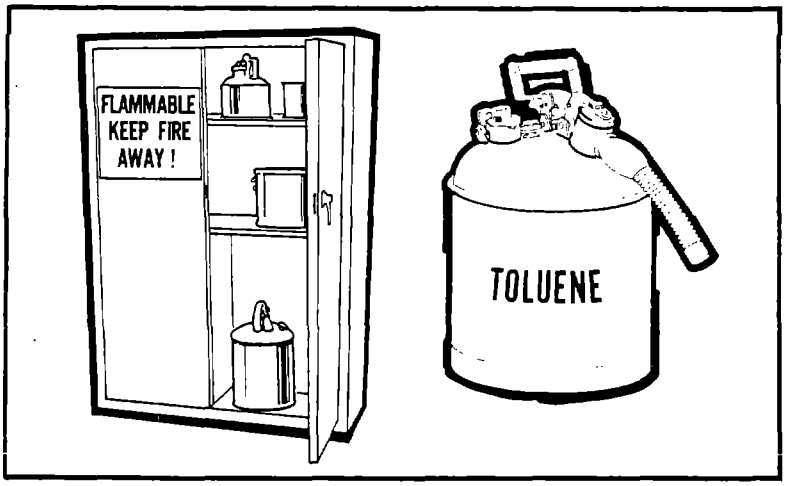
STORAGE

Flammable or combustible liquids MUST be stored in tanks or closed containers within storage cabinets or inside storage rooms designed for that purpose. Storage cabinets may contain no more than 60 gallons of Class I or II liquids, nor more than 120 gallons of Class III liquids.

Storage cabinets may be constructed of metal (at least 18 gauge sheet iron) or plywood (at least one inch thickness).

If metal, the cabinet MUST be double-walled with 1½ inch air space. The joints MUST be welded or riveted. The door MUST be provided with a three-point lock and the door sill raised at least two inches above the floor of the cabinet.

If wood, the joints MUST be rabbetted and fastened in two directions with flathead wood screws. When more than one door is used, there MUST be a rabbetted overlap of at least one inch.



The quantity of flammable and combustible liquids allowed to be stored in inside storage rooms is dependent upon several factors: room size, fire resistance rating, and whether fire protection is provided. The following table may be used to calculate allowable quantities.

NIOSH

FREQUENTLY VIOLATED REGULATIONS

HAZARDOUS MATERIALS (cont.)

STORAGE IN INSIDE ROOMS

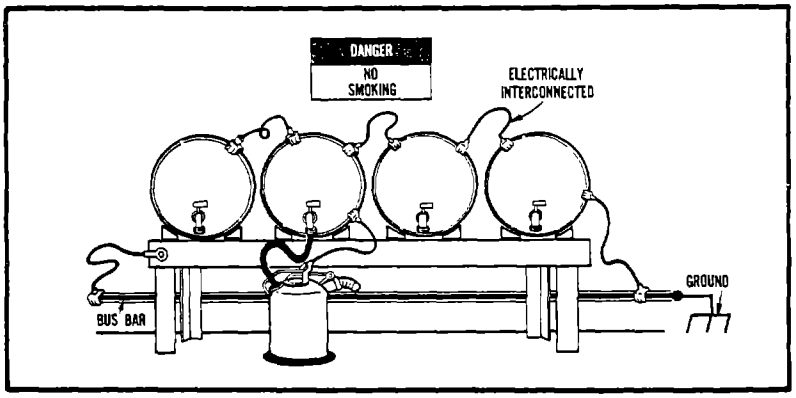
Fire protection* provided	Fire resistance	Maximum size	Total allowable quantities (gals./sq. ft./ floor area)
Yes	2 hours	500 sq. ft.	10
No	2 hours	500 sq. ft.	4
Yes	1 hour	150 sq. ft.	5
No	1 hour	150 sq. ft.	2

*Fire protection system shall be sprinkler, water spray, carbon dioxide, or other system.

Inside storage rooms MUST comply with fire test specifications contained in National Fire Protection Association Standard (NFPA) 251-1969. Openings leading to other rooms or buildings MUST have a noncombustible, liquid-tight raised sill or ramp at least four inches high or an open-grated trench inside the room which drains to a safe location.

HANDLING

1. Connections on all drums and piped flammable and combustible liquids MUST be vapor and liquid tight.
2. When flammable liquids are transferred from one container to another, they MUST be effectively bonded together and also to ground.



NIOSH

FREQUENTLY VIOLATED REGULATIONS

HAZARDOUS MATERIALS (cont.)

3. All spills of flammable or combustible liquids MUST be cleaned up promptly.
4. All flammable liquids MUST be kept in closed containers when not in use.
5. Combustible waste materials, such as oily shop rags, MUST be stored in covered metal containers and disposed of daily.
6. Gasoline should never be used for cleaning.

GENERAL SPRAY OPERATIONS

1. Portable lamps MUST be removed during spraying.
2. Low flash-point thinners (less than 100°F) may only be used for cleaning purposes in a well-ventilated area such as a spray booth.
3. The fire control sprinkler heads MUST be kept clean and free of overspray.
4. "NO SMOKING" signs MUST be posted wherever flammable liquids are sprayed or stored.

SPRAY AREAS

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

SPRAY BOOTHS

1. Spray booths MUST be made of metal, masonry or other

HAZARDOUS MATERIALS (cont.)

suitable non-combustible material and be smooth on the inside to aid in cleaning.

2. The floor surface and baffles MUST be of non-combustible material and easily cleaned.
3. Spray-booth lights MUST be explosion-proof or enclosed in sealed panels with lights located outside the booth.
4. Ventilation
   a. Mechanical ventilation MUST be installed and operating during spraying.
   b. The ventilation rate MUST be at least 100 linear feet per minute.
   c. The electric motors for the exhaust fans MUST be placed outside the booth or ducts and the belts and pulleys fully enclosed.
   d. Air exhausted from the paint booth MUST be discharged outside where it cannot re-enter the work area.
   e. Ducts connected to the booth MUST have access doors to allow for cleaning.
5. Air supply for spray booths
   a. Overspray filters, if installed, MUST have pressure gauges to indicate when the filters are plugged and need replacement.
   b. When temperatures are below 55°, the make-up air MUST be heated to at least 65°.
   c. The heater for the make-up air MUST be located outside the spray booth.

NIOSH

FREQUENTLY VIOLATED REGULATIONS

PERSONAL PROTECTIVE EQUIPMENT

Personal protective equipment is REQUIRED whenever toxic substances can do bodily harm through absorption, inhalation, or physical contact. Various processes, environments, chemicals, or mechanical irritants constitute hazards for which personal protective devices for the eyes, face, head, and extremities, as well as protective clothing and respiratory devices, are required. Furthermore, it MUST be safely designed and sufficiently well-constructed to provide the protection for which it is intended.

It is REQUIRED that all personal protective equipment be maintained in a sanitary and reliable condition.

EYE PROTECTION

Eye protection is REQUIRED where there is a possibility of an eye injury from flying particles, chips, and corrosive materials. Employees MUST wear eye protection when using grinders, power drills, and other similar equipment.

PERSONAL PROTECTIVE CLOTHING

GLOVES

When handling hazardous liquids, employees MUST wear gloves which are impervious to such liquids. The gloves MUST be long enough to protect the forearms.

FOOT PROTECTION

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

HEAD PROTECTION

Hard hats are REQUIRED in a situation where workers may be subjected to impact or penetration from falling or flying objects.

HEARING PROTECTION

Appropriate hearing protection MUST be available to personnel, and used, where noise levels are in excess of the maximum exposure per day. (See **OCCUPATIONAL HEALTH AND ENVIRONMENTAL CONTROL.**) Such sound intensity is likely to occur around powerful motors or high speed tools.

NIOSH

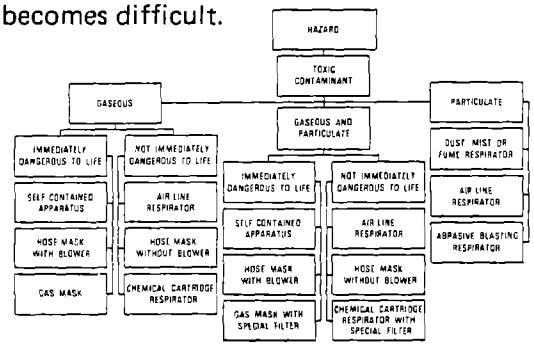
FREQUENTLY VIOLATED REGULATIONS

PERSONAL PROTECTIVE EQUIPMENT (cont.)

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 instituted.* When respirators are used, a respirator program MUST be established and include the following requirements:

1. Respirators designed to protect against the specific hazards to which the worker is exposed MUST be selected.
2. Written instructions covering selection, cleaning, 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 are taken apart, washed, dried, and defective parts replaced.
5. Two people never wear the same respirator unless it has been cleaned and disinfected between uses.
6. All straps are tied and adjusted.
7. A good face seal—beards, sideburns, glasses may interfere.
8. Filters are 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.



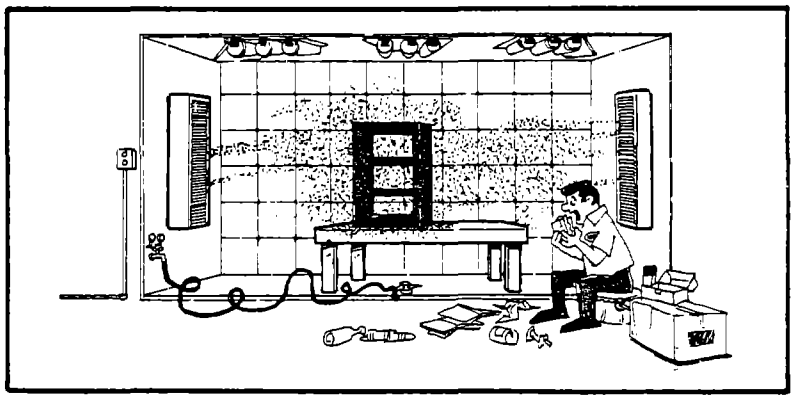
NIOSH

FREQUENTLY VIOLATED REGULATIONS

GENERAL ENVIRONMENTAL CONTROLS

Federal Standards for Occupational Safety and Health which apply to your place of business REQUIRE that:

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.
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 materials which could be hazardous if ingested.
8. Employees working with hazardous substances should wash and remove contaminated clothing before eating, drinking, or smoking.

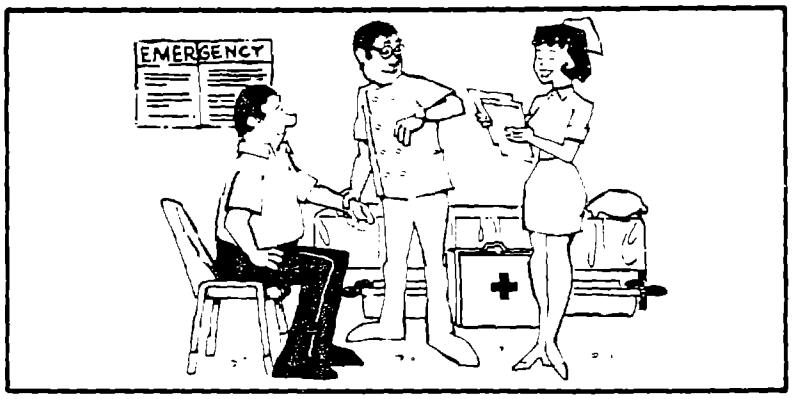
NIOSH

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.

NIOSH

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.

NIOSH

FREQUENTLY VIOLATED REGULATIONS

FIRE PROTECTION

GOOD HOUSEKEEPING HELPS PREVENT FIRES

Maintaining a clean and orderly environment reduces the danger of fires. However, the "sweep it under the rug" type of cleaning creates new built-in fire hazards. An example of such a hazard is the temporary storing of combustible waste in unsafe areas such as closets or basements. Combustible material of any type should be kept only in spaces which are isolated by fire-resistant construction.

Rubbish should not be allowed to accumulate. A routine of safe disposal of rubbish should be followed. If it is necessary to store rubbish or combustible packing materials, a metal receptacle with a tight fitting cover should be used.

Materials used for cleanup operations can create hazards. Combustibles such as oily rags can be a fire hazard. Materials containing low-flash-point solvents can be dangerous, especially when using electric machines. All mops and rags soaked with combustibles MUST be stored in metal containers to reduce fire hazards.

Some common causes of fires in all business are:

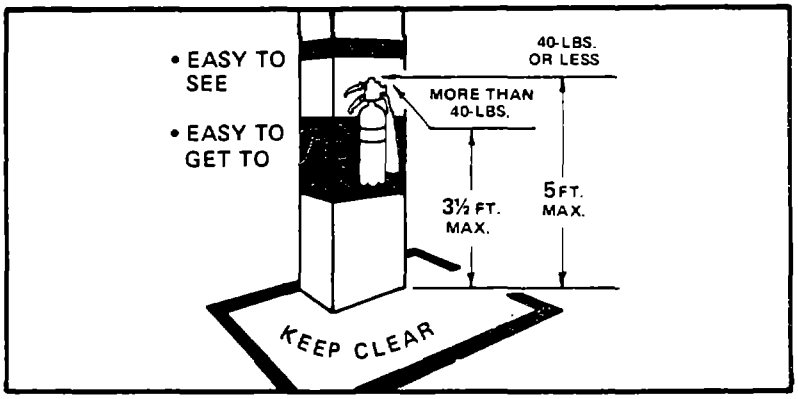
1. Electrical malfunctions.
2. Friction.
3. Smoking.
4. Hot work operations such as open flames, sparks, welding, or hot surfaces.
5. Combustible materials (e.g., rags, scrap lumber) not being removed on regular intervals.
6. Electrical apparatus left on and unattended.
7. Electrodes left in welder area in "ON" position while not in use.
8. Leaking combustible liquid and gas containers.

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

NIOSH

FREQUENTLY VIOLATED REGULATIONS

FIRE PROTECTION (cont.)



PORTABLE FIRE EXTINGUISHERS MUST:

1. Be kept fully charged and in their designated places.
2. Be located along normal paths of travel.
3. Not be obstructed or obscured from view.
4. Not be mounted higher than 5 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 impairment.
6. Be inspected at least yearly and 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. The extinguisher sales representative usually will perform this service at appropriate intervals.
8. Be selected on the basis of type of hazard, degree of hazard, and area to be protected.
9. Be placed so that the maximum travel distances, unless there are extremely hazardous conditions, do not exceed 75 feet for Class A or 50 feet for Class B.

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

NIOSH

FREQUENTLY VIOLATED REGULATIONS

FIRE PROTECTION (cont.)

AUTOMATIC SPRINKLER SYSTEMS

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

1. Every automatic sprinkler system MUST have at least one automatic water supply of adequate pressure, capacity, and reliability.
2. One or more fire department connections through which the fire department can pump water are REQUIRED. *No shut-off valve is allowed in this connection.*
3. The employer is responsible for the condition of the sprinkler system and MUST keep it in good operating order. At least annual functional tests are REQUIRED.
4. The clearance between sprinkler deflectors and the top of combustible storage MUST be at least 36 inches unless the material is in solid piles less than 15 feet high or in piles less than 12 feet high with horizontal channels, in which case a minimum clearance of 18 inches is allowed. Commodities containing only small amounts of combustible material may be stored up to 18 inches from the sprinkler deflector.
5. Alarm systems, audible to all employees, MUST be provided on all automatic sprinkler installations.

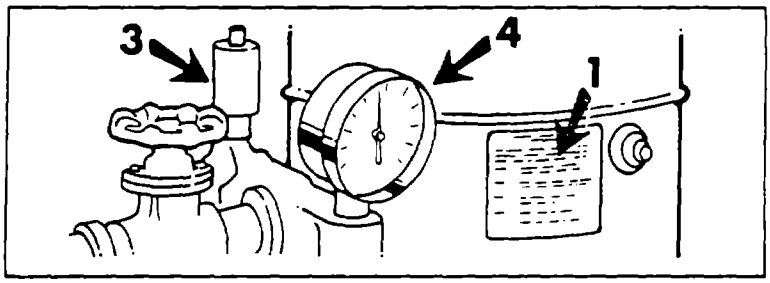
NIOSH

FREQUENTLY VIOLATED REGULATIONS

COMPRESSED AIR EQUIPMENT

Employees should be familiar with the air compressor 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.

NIOSH

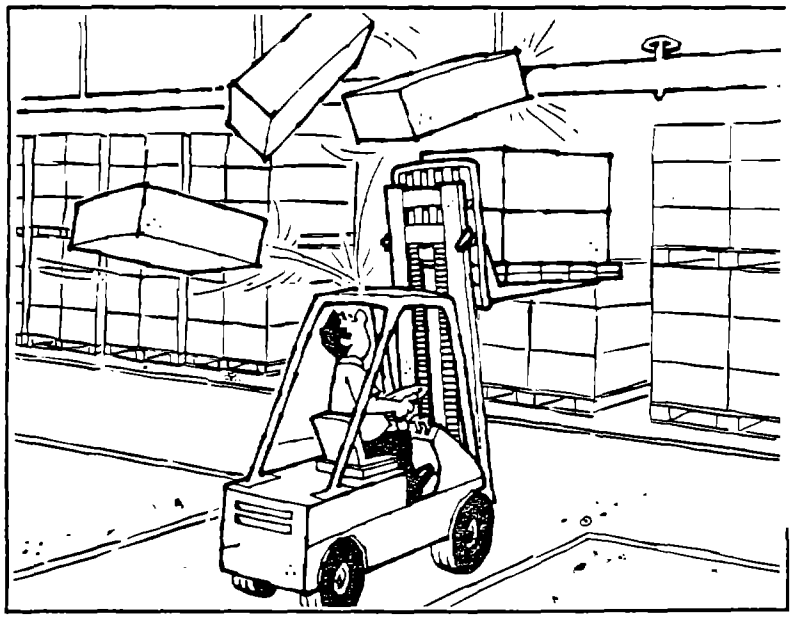
FREQUENTLY VIOLATED REGULATIONS

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.

High-lift-rider trucks MUST be fitted with an overhead guard.



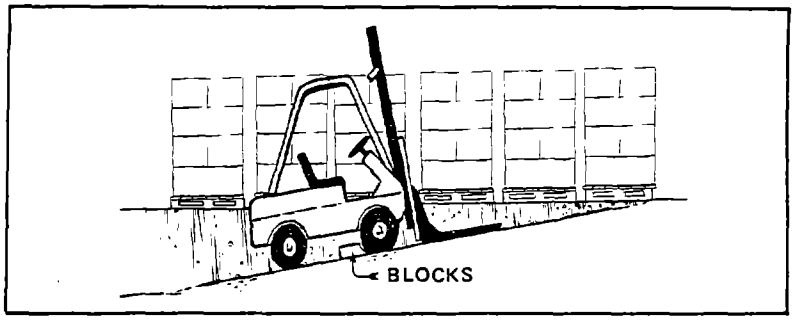
Methods MUST be developed and used to effectively train operators in the safe operation of powered industrial trucks, *and only trained and authorized operators may operate the truck.*

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.

NIOSH

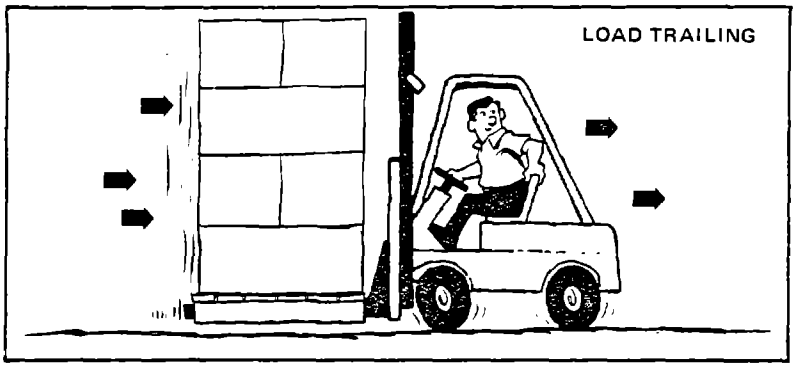
FREQUENTLY VIOLATED REGULATIONS

MATERIALS HANDLING AND STORAGE (cont.)



When a powered industrial truck is left unattended (operator 25 feet or more away or truck not in view), the forks MUST be 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.

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.



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

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.

NIOSH

FREQUENTLY VIOLATED REGULATIONS

MATERIALS HANDLING AND STORAGE (cont.)

SAFE WAREHOUSING

The primary problem confronting the warehouse supervisor (or person responsible for the storage area) is maintaining a neat and orderly area for both temporary and permanent storage. Proper planning of material storage areas demands that the material not obstruct fire extinguishers, fire alarm boxes, sprinkler system controls, electric switches, lights, first aid equipment, or exits. Safe clearances MUST be allowed for aisles, at loading docks, through doorways, and whenever turns or passage must be made. All permanent aisles and passageways MUST be appropriately marked, preferably with lines on the floor. Proper drainage MUST be provided and clearance limits SHALL be marked.

SPACE LAYOUT

When laying out storage space, the following safety factors should be considered. You MUST consider:

1. **Nature of material**

   Hazardous commodities, including flammable and toxic materials should be kept segregated from each other and other kinds of supplies. Pallets loaded with cardboard boxes do not stack evenly and become unstable.

2. **Floorloads**

   The floorload capacity is the maximum weight of stored supplies which can be safely supported by the floor, expressed in pounds per square foot of storage space. When this information is not available and when floor load capacity is in doubt, it is suggested that you consult a competent engineer to determine the maximum floor load capacity. These floor load capacities MUST be posted in a readily visible location.

3. **Doors**

   Doors should be of sufficient height and width to readily

MATERIALS HANDLING AND STORAGE (cont.)

accommodate the safe use of materials handling equipment.

4. **Loading Facilities**

   Adequate space for safe loading and unloading of warehouse materials is a must. This includes maintaining sufficient aisle space leading to the loading dock.

5. **Stack Clearance**

   Standard regulations on stack clearance should be observed—keeping in mind the requirement for clearance below fire protection sprinkler heads (See "FIRE PROTECTION".)

6. **Layout of Aisles**

   Safe operations within the storage areas REQUIRE considerable attention to space layout for aisles. There MUST be enough operating space for handling and stacking materials safely.

   Aisles should be planned to provide easy access to exits and fire control equipment. They should be straight and clear of obstructions.

   A clear space should be maintained around fire protection equipment and the location of such equipment should be well marked.

7. **Floors and Stairways**

   Floors, stairways, and loading areas MUST be kept clear of slipping and tripping hazards such as oil spills or splintered or damaged floors.

   All drums should be kept tightly sealed. If leakage occurs, the damaged container MUST be removed and any resultant fire or slipping hazard be eliminated.

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FREQUENTLY VIOLATED REGULATIONS

MATERIALS HANDLING AND STORAGE (cont.)

HOUSEKEEPING

To insure the safety and health of those who work in or around the warehouse, highest standards of housekeeping are necessary. The following basic requirements should be in effect.

1. Adequate lighting.
2. Machines, equipment, and working surfaces clean and in good condition.
3. Plenty of approved waste containers—strategically located.
4. Orderly tool storage.
5. Systematic disposal of scrap materials.

HOISTS (Other Than Automotive Hydraulic Hoists)

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

1. The rated load MUST be legibly marked on each side of the hoist. Employees should be made aware of the weight of the load.
2. The hoist MUST be equipped with a self-setting brake, applied to the motor shaft or some part of the gear train.
3. For powered hoists, holding brakes MUST be applied automatically when the power is off.
4. Hooks, chains, and all functional operating mechanisms MUST be visually inspected daily for indications of damage and wear, and monthly records maintained.
5. Loads MUST NOT be carried over the heads of people.

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FREQUENTLY VIOLATED REGULATIONS

MATERIALS HANDLING AND STORAGE (cont.)

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

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

HYDRAULIC LIFT SKID TRUCKS

A hydraulic lift truck that leaks should be taken out of service until repaired. The leaking can cause the load to settle after it is raised thereby becoming a hazard.

HAND TRUCKS

Operators of hand trucks should wear gloves and safety shoes. The most frequent injuries of hands and feet may then be avoided. Also, hand trucks should be fitted with knuckle guards to prevent jamming hands into obstructions.

NIOSH

FREQUENTLY VIOLATED REGULATIONS

MACHINERY AND MACHINE GUARDING

Guarding devices MUST prevent the operator from having any part of the body in the danger zone during the operating cycle. 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

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.

1. Guards MUST be attached to the machine if possible. The guard should be such that it does not constitute a hazard.

2. The guarding device MUST conform to appropriate standards, or if no standards exist, be designed and made to prevent the operator from having any part of his body in the danger zone during the operating cycle.

3. All belts, pulleys, chains, sprockets, and gears MUST be effectively guarded.

4. All belts, chain drives, shafting, couplings, keys, collars, or clutches located seven feet or less above the ground, floor, or working platform, MUST be guarded to prevent

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FREQUENTLY VIOLATED REGULATIONS

MACHINERY AND MACHINE GUARDING (cont.)

accidental contact. V belts and chain drives MUST be completely enclosed.

5. Belt conveyors MUST have the nip point of head, tail, and take-up pulleys protected with guards that cover the entire side of the pulleys and extend at least three feet from the point of contact of the belt with the pulleys.

Certain guarding methods are preferable to others, and 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 *may present important considerations.* A certain flexibility in operations may also determine the practicability of the method to be used.

As a general rule, power transmission apparatus can be protected by fixed enclosure guards. It is when guarding the point-of-operation, where work is being done on an object, that the most effective and practical of several means of guarding MUST be selected.

Machines designed for fixed locations MUST be securely anchored to prevent "walking" or tipping. 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.

ROTATING, RECIPROCATING, AND TRANSVERSE MOTION

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

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

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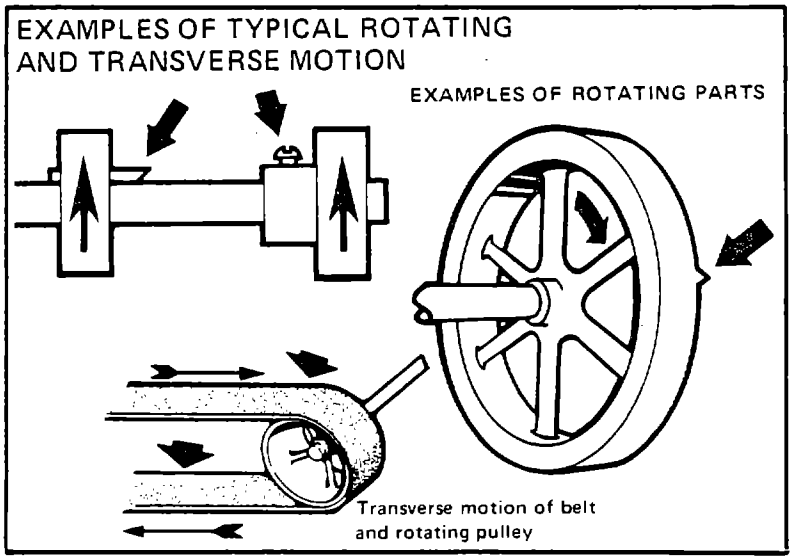
FREQUENTLY VIOLATED REGULATIONS

MACHINERY AND MACHINE GUARDING (cont.)

EXAMPLES OF TYPICAL ROTATING AND TRANSVERSE MOTION

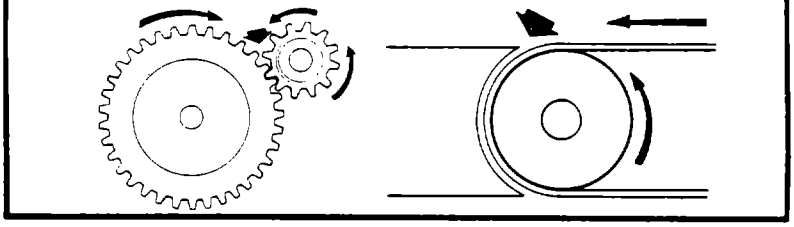


IN-RUNNING NIP POINTS

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

The in-running side of rolling mills and calenders, the in-running side of a chain and sprocket, belt and pulley, a gear rack, a gear and pinion, and a belt conveyor terminal are typical examples of nip point hazards.

EXAMPLES OF IN-RUNNING NIP POINTS



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FREQUENTLY VIOLATED REGULATIONS

MACHINERY AND MACHINE GUARDING (cont.)

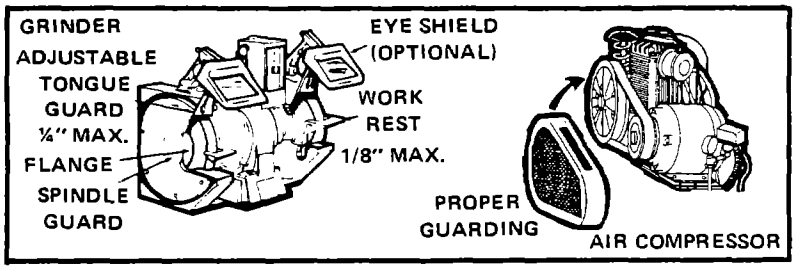
GRINDERS

Requirements:

1. **Wheel Guard**—Safety guards MUST cover the spindle end, nut, and flange projections.

   The exposed area of the grinding wheel and sides for the safety guards should NOT exceed more than one-fourth of the entire wheel.

   When measuring the guard opening, the visors or other accessory equipment are not included as a part of the guard unless this accessory equipment is as strong as the guard.
2. **Work or Tool Rests**—These 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 1/8 inch, to prevent the work from becoming jammed between the wheel and the work rest.



3. **Exposure Adjustment or Tongue Guards**—This safety guard MUST be constructed so that the tongue guard can be adjusted to the constantly decreasing diameter of the wheel. The distance between the tongue guard and the wheel MUST never be more than ¼ inch.
4. **Goggles or a Face Shield**—These MUST be worn by the operator.

FANS

If fans are located within seven feet of the floor, they MUST be guarded with **grille or mesh**, limiting openings to not more than ½ inch.

AIR COMPRESSORS

MUST have their flywheel and drive pulley **fully enclosed.**

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FREQUENTLY VIOLATED REGULATIONS

HAND AND PORTABLE POWERED TOOLS

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.*

1. Hammers with broken or cracked handles, chisles and punches with mushroomed heads, or bent or broken wrenches should NOT be used.

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

NIOSH

FREQUENTLY VIOLATED REGULATIONS

HAND AND PORTABLE POWERED TOOLS (cont.)

4. All hand-held portable electrical equipment MUST have its frame grounded or be doubly insulated and identified as such.
5. Wrenches with sprung jaws SHALL NOT be used.
6. All tools MUST be used with appropriate shields, guards, and attachments and in accordance with recommendations by the manufacturers. Employees MUST be trained concerning the use of power tools and safety requirements.
7. The rated load of all jacks MUST be permanently marked on the jack.
8. Jacks MUST be inspected at least once every six months.
9. Jacks MUST be appropriately blocked or cribbed when necessary to provide a firm foundation.
10. Pneumatic power tools MUST be positively secured to the hose to prevent the tool from becoming disconnected; also a tool retainer MUST be used on tools to prevent attachment from being expelled.
11. Nailers, staplers, and similar equipment with auto-feed should have a muzzle to prevent tool from ejecting material unless muzzle is in contact with work surface.

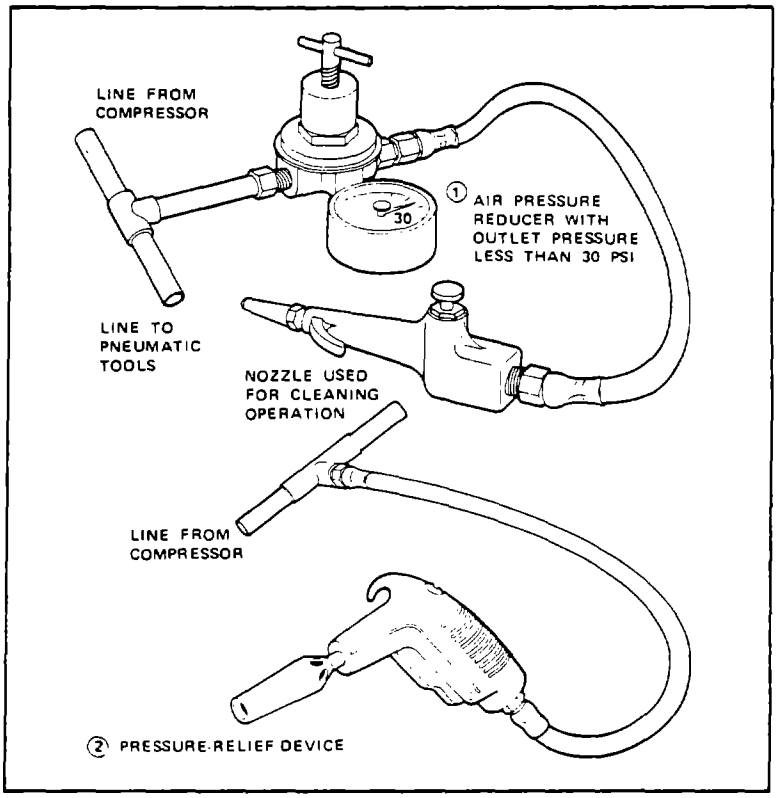
NIOSH

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 "below 30 psi" requirement are illustrated below.

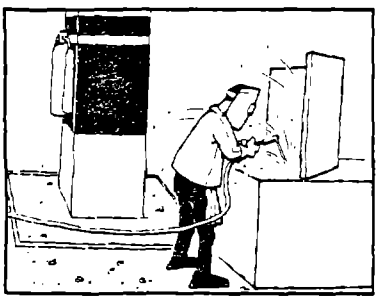


NIOSH

FREQUENTLY VIOLATED REGULATIONS

COMPRESSED GAS AND WELDING

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.
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.

NIOSH

FREQUENTLY VIOLATED REGULATIONS

COMPRESSED GAS AND WELDING (cont.)

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.
   The table below summarizes these requirements.

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. When working in confined spaces.

Such mechanical ventilation MUST be at the minumum 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. Alternately NIOSH approved supplied-air respirators MUST be used.

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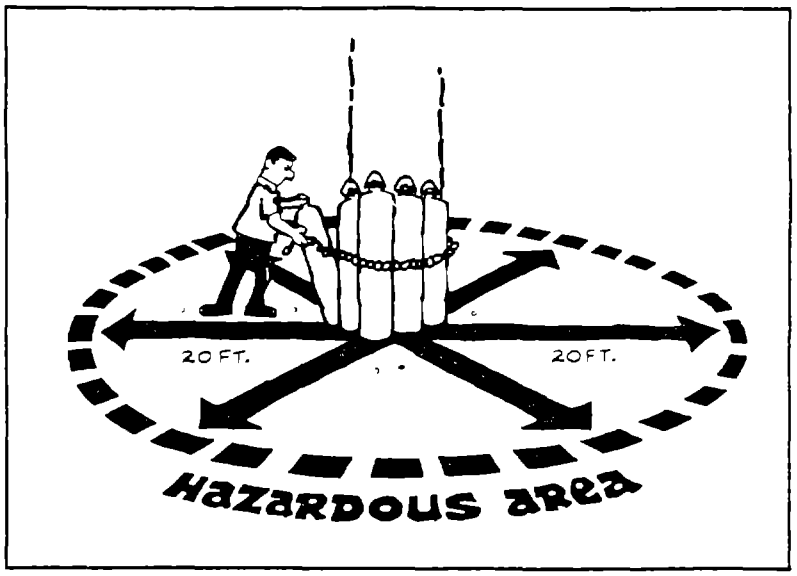
FREQUENTLY VIOLATED REGULATIONS

COMPRESSED GAS AND WELDING (cont.)

GAS WELDING

It is REQUIRED that:

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



2. All cylinders stored inside buildings are 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 are utilized where the cylinder is designed to accept a cap except when cylinders are in use or connected for use.

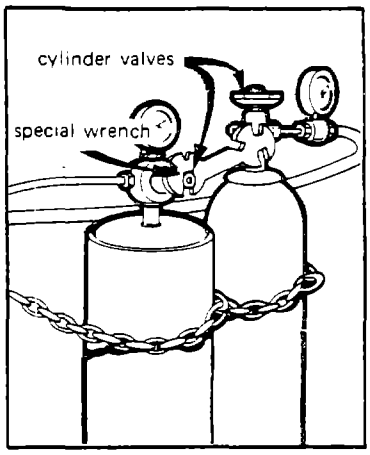
4. Stored oxygen cylinders are separated from stored fuel gas cylinders or combustible materials (especially oil or grease) by a minimum distance of 20 feet or by a non-combustible barrier at least five feet high and having a one-half hour fire resistance rating.

NIOSH

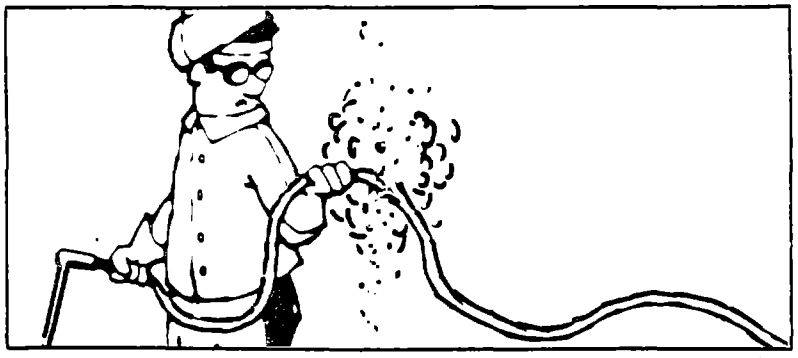
FREQUENTLY VIOLATED REGULATIONS

COMPRESSED GAS AND WELDING (cont.)

5. All cylinder valves MUST be closed when work is finished. Where a special wrench is required, it MUST be left in position on the stem of the valve while the cylinder is in use so that the fuel-gas flow can be quickly turned off in case of emergency. In the case of manifolded or coupled cylinders, at least one such wrench MUST 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 in cylinders is limited to a total capacity of 2,000 cubic feet or 300 pounds of liquefied petroleum gas.



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

NIOSH

FREQUENTLY VIOLATED REGULATIONS

COMPRESSED GAS AND WELDING (cont.)

ELECTRIC ARC WELDING

1. If the welding machine is wet, it MUST be thoroughly dried and tested before it is used again.
2. Coiled welding cable is to be spread out; the ground lead MUST be firmly attached to the work.
3. Cables MUST be inspected for damage and loss of insulation and be repaired immediately.
4. Ground and electrode cables may be joined together only with connectors specifically designed for that purpose.
5. Cables with splices within 10 feet of the operator may not be used; neither may the operator coil cables around his body.
6. Welding helmets or hand shields MUST be worn by the operator. Persons close by MUST wear eye protection.
7. Shields MUST protect others in the vicinity from arc welding rays.
8. Arc welders should wear clean, fire-resistant gloves and clothing with collars and sleeves buttoned.
9. Electrode holders which are not in use MUST be placed in a safe place, for example, away from conducting objects.

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FREQUENTLY VIOLATED REGULATIONS

THE NATIONAL ELECTRICAL CODE (NEC)

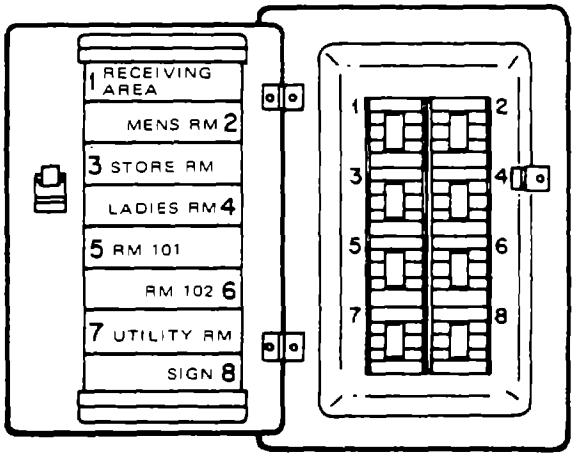
ELECTRICAL REQUIREMENTS

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 any persons and of 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.

IT IS REQUIRED THAT:

1. Each disconnecting means for motors and appliances MUST be legibly marked to indicate its purpose unless its purpose is evident.



Proper labeling of circuit breakers.

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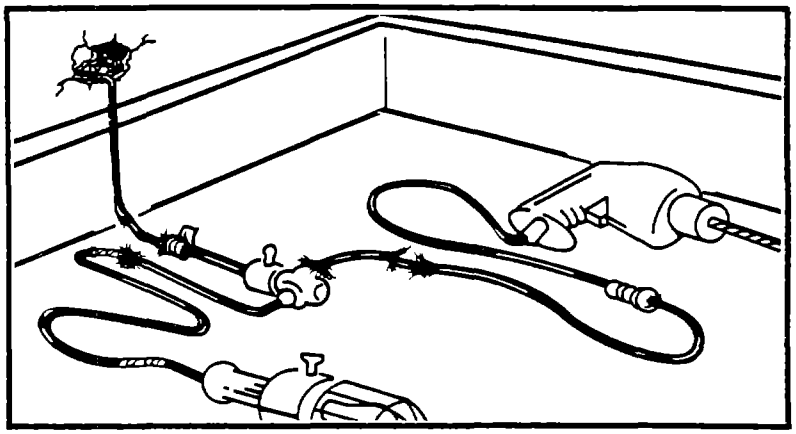
FREQUENTLY VIOLATED REGULATIONS

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.
4. Exposed noncurrent-carrying metal parts of the following plug-connected equipment which are liable to become energized, MUST be grounded.
   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.



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.

NIOSH

FREQUENTLY VIOLATED REGULATIONS

THE NATIONAL ELECTRICAL CODE (NEC) (cont.)

7. Flexible cords MUST be:
   a. Continuous lengths without splices or taps.
   b. Fastened so that there is no pull on joints or terminal screws.
   c. Replaced when frayed or insulation is deteriorated.
8. Polarity be maintained throughout electrical circuits:
   a. The green wire is used only as the grounding conductor.
   b. The ground conductor is continuous throughout the circuit.
   c. The polarity at receptacle terminals is maintained when replacements are made or extensions are added.

ARCING PARTS

Parts of electrical equipment which in ordinary operation produce arcs, sparks, etc. MUST be enclosed unless they are separated and isolated from all combustible materials.

WET LOCATIONS

A switch or circuit breaker in a wet location or outside of a building MUST be enclosed in a weatherproof enclosure.

In damp or wet locations, cabinets, and cutout boxes of the surface type MUST be weatherproof and so placed or equipped as to prevent moisture or water from entering and accumulating within the cabinet or cutout box, and be mounted so there is at least ¼-inch of air space between the enclosure and the wall or other supporting surface. It is recommended that boxes of nonconductive material be used with nonmetallic-sheathed cable.

In locations where walls are frequently washed or where there are surfaces of absorbent materials, such as damp paper or wood, the entire wiring system, including all boxes, fittings, conduits, and cable used, MUST be mounted so that there is at least a ¼-inch air space between it and the wall or supporting surface.

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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 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, MUST be posted for the entire month of February.

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

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

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RECORDKEEPING REQUIREMENTS (cont.)

job safety and health protection

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

DEPARTMENT OF LABOR · UNITED STATES OF AMERICA

Washington, D.C.
1974
OSHA 2203

Peter J. Brennan
Secretary of Labor

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

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

NIOSH

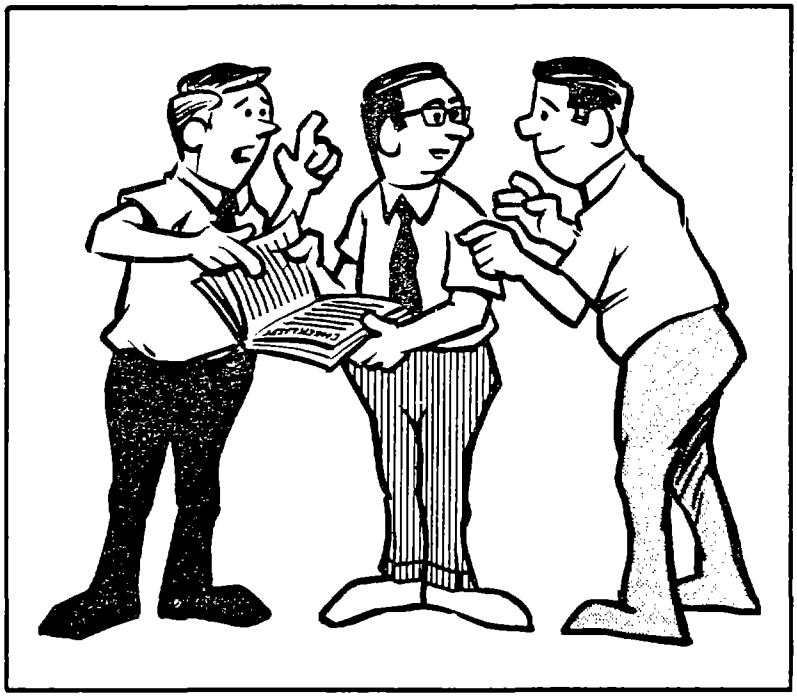
CHECKLISTS

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 should make 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"*.



NIOSH

CHECKLISTS (cont.)

	Yes	No
WALKING AND WORKING SURFACES		
AISLES AND FLOOR (29 CFR 1910.22)		
Are all places of employment kept clean and orderly?	☐	☐
Are floors, aisles, and passageways kept clean and dry and all spills cleaned up immediately?	☐	☐
Are floor holes, such as drains, covered?	☐	☐
Are permanent aisles appropriately marked?	☐	☐
Are wet surface areas covered with non-slip materials?	☐	☐
STORAGE LOFTS, SECOND FLOORS, ETC. (29 CFR 1910.22, .23)		
Are signs showing floor load capacity present?	☐	☐
Are platforms, storage lofts, balconies, alignment pits, etc. that are more than four feet above the floor protected with standard guardrails?	☐	☐
Are all platforms, lofts, and balconies (where people or machinery could be exposed to falling objects) guarded with standard four inch toeboards?	☐	☐
STAIRS (29 CFR 1910.24)		
Are there standard stair rails or handrails on all stairways having four or more risers?	☐	☐
Are all stairways at least 22 inches wide?	☐	☐
Do stairs have at least a seven foot overhead clearance?	☐	☐

NIOSH

CHECKLISTS (cont.)

	Yes	No
Do stairs angle no more than 50° and no less than 30°?	☐	☐
LADDERS (29 CFR 1910.25, .26, .27)		
Have defective ladders (e.g., broken rungs or side rails) been tagged as "DANGEROUS, DO NOT USE" and removed from service for repair or destruction?	☐	☐
Do portable rung ladders have non-slip bases?	☐	☐
Is it prohibited to use the top of an ordinary step ladder as a step?	☐	☐
Do fixed ladders have at least 3½ feet of extension at the top of the landing?	☐	☐
Is the distance between the centerline of rungs on a fixed ladder and the nearest permanent object in back of the ladder at least seven inches?	☐	☐
Do all fixed ladders have a preferred pitch of 75°-90°?	☐	☐
EGRESS (29 CFR 1910.36-.38)		
Are all exits marked with an exit sign and illuminated by a reliable light source?	☐	☐
Is the lettering at least six inches high with the principle letter strokes at least ¾ of an inch wide?	☐	☐
Is the direction to exits, when not immediately apparent, marked with visible signs?	☐	☐

NIOSH

CHECKLISTS (cont.)

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

OCCUPATIONAL HEALTH AND ENVIRONMENTAL CONTROL (29 CFR 1910.93, .94, .95)

Is management aware of the hazards caused by various chemicals used in the plant (caustics, acids, cements, and solvents)?	☐	☐
Is employee exposure to these chemicals kept within the acceptable levels?	☐	☐
Are eye wash fountains and safety showers provided in areas where chemicals, such as caustics, are used?	☐	☐
Are all containers, such as vats and storage tanks, labeled as to their contents?	☐	☐

NIOSH

CHECKLISTS (cont.)

	Yes	No
Are employees required to wear personal protective equipment when handling hazardous materials (gloves, eye protection, and respirators)?	☐	☐
If internal combustion engines are used, is carbon monoxide kept within acceptable levels?	☐	☐
Is employee exposure to welding fumes controlled by ventilation, use of respirators, exposure time, or other means?	☐	☐
Is vacuuming used wherever possible rather than blowing or sweeping dust?	☐	☐

OCCUPATIONAL NOISE EXPOSURE (29 CFR 1910.95)

If a noise problem is suspected, have noise levels been accurately measured?	☐	☐
If a noise problem exists, have plans to reduce noise levels by engineering methods been formulated (e.g., enclosure, maintenance, different methods of processing)?	☐	☐
If engineering controls cannot reduce the noise to safe levels:		
1. Have administrative controls, such as limiting worker-exposure in a given area, been started?	☐	☐
2. Are affected employees given annual audiometric tests, if necessary?	☐	☐
3. Do all employees in high-noise areas wear hearing protection?	☐	☐

NIOSH

CHECKLISTS (cont.)

	Yes	No
4. Are annual noise surveys made to re-evaluate the problem?	☐	☐

HAZARDOUS MATERIALS

FLAMMABLE AND COMBUSTIBLE LIQUIDS (29 CFR 1910.101)

Are all connections on drums and combustible liquid piping vapor and liquid tight?	☐	☐
Are flammable liquids kept in closed containers when not in use (e.g., parts cleaning tanks, paint thinners, etc.)?	☐	☐
Are all spills of flammable or combustible liquids cleaned up promptly?	☐	☐
Is combustible waste material (oily rags, etc.) stored in covered metal receptacles and disposed of daily?	☐	☐
Are bulk drums of flammable liquids grounded and bonded to containers during dispensing?	☐	☐
Are gasoline and other flammable liquids stored in approved containers?	☐	☐
Do storage rooms for flammable and combustible liquids have explosion-proof lights?	☐	☐
Do storage rooms for flammable and combustible liquids have mechanical or gravity ventilation (at least six air changes per hour)?	☐	☐

NIOSH

CHECKLISTS (cont.)

	Yes	No
Are storage cabinets for flammable and combustible liquids labeled "FLAMMABLE—KEEP FIRE AWAY"?	☐	☐
Is there never more than one day's supply of paint outside of approved storage cabinets or rooms?	☐	☐

PERSONAL PROTECTIVE EQUIPMENT (29 CFR 1910.132-.137)

Is personal protective equipment provided, used, and maintained wherever it is necessary?	☐	☐
Is employee-owned personal protective equipment, such as gloves, protective shoes, etc., adequate and properly maintained?	☐	☐
Is eye protection available and used where debris or flying objects could be a hazard?	☐	☐
Are ear plugs or muffs available and worn during noisy conditions?	☐	☐
Is slip-resistant footwear worn?	☐	☐
Are hard hats or safety shoes available where falling objects could be a hazard?	☐	☐

RESPIRATORY PROTECTION DEVICES (29 CFR 1910.134)

Are respirators provided when necessary?	☐	☐
Are there written standard operating procedures for respirator selection and use?	☐	☐

NIOSH

CHECKLISTS (cont.)

	Yes	No
Is the user instructed and trained in the proper use of respirators?	☐	☐
Where practicable, are respirators assigned to employees individually?	☐	☐
Are respirators cleaned and disinfected after use?	☐	☐
Are respirators stored in a convenient, clean, and sanitary location?	☐	☐
Are routinely-used respirators inspected during cleaning?	☐	☐

GENERAL ENVIRONMENTAL CONTROLS

SANITATION (29 CFR 1910.141-.149)

Are restrooms and washrooms kept in clean and sanitary condition?	☐	☐
Are covered receptacles for sanitary napkins provided in the women's restroom?	☐	☐
Are covered receptacles for waste food kept in clean and sanitary condition?	☐	☐
Is all water that is provided for drinking, washing, and cooking, suitable for drinking?	☐	☐
Are all water outlets that are not suitable for drinking, clearly posted as "UNSAFE FOR DRINKING, WASHING, OR COOKING"?	☐	☐
Are employees prohibited from eating in areas where toxic materials are present?	☐	☐

NIOSH

CHECKLISTS (cont.)

	Yes	No
Has pest control been exercised?	☐	☐
If employees are permitted to eat on the premises, are they provided with a suitable space for that purpose?	☐	☐
Are steam pipes guarded or insulated where employees could contact them?	☐	☐

MEDICAL AND FIRST AID (29 CFR 1910.151)

	Yes	No
Is at least one employee on each shift currently qualified to render first aid in the absence of a nearby clinic or hospital? (Some states require first aid trained persons regardless of nearby clinics or hospitals.)	☐	☐
Are first aid supplies readily available, inspected, and replenished?	☐	☐
Are first aid supplies approved by a consulting physician, indicating that they are adequate?	☐	☐
Are medical personnel readily available for advice and consultation on employee health matters?	☐	☐
Is there a first aid kit easily accessible to the work area?	☐	☐
Are emergency phone numbers posted?	☐	☐

NIOSH

CHECKLISTS (cont.)

	Yes	No
Where employees may be exposed to injurious corrosive materials, are they provided with quick-drenching and flushing facilities for immediate emergency use?	☐	☐

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

Are extinguishers selected for the types of combustibles and flammables in the areas where they are to be used? Class A. Ordinary combustible material fires Class B. Flammable-liquid or grease fires Class C. Energized-electrical-equipment fires	☐	☐
Are extinguishers fully charged and in their designated places?	☐	☐
Are extinguishers located along normal paths of travel?	☐	☐
Are extinguisher locations free from obstruction or blockage?	☐	☐
Are extinguishers not mounted too high? If less than 40 pounds, the top must be below 5 feet above floor; greater than 40 pounds, the top must be below 3½ feet above floor.	☐	☐
Have all extinguishers been serviced, maintained, and tagged at intervals not to exceed one year?	☐	☐

NIOSH

CHECKLISTS (cont.)

	Yes	No
Are all extinguishers checked monthly (by management or designated employee) to see if they are in place or if they have been discharged?	☐	☐
Have all extinguishers been hydrostatically tested according to schedules set for the type of extinguisher?	☐	☐
AUTOMATIC SPRINKLER (if applicable)		
Is there at least one automatic water supply of adequate pressure, capacity, and reliability?	☐	☐
Are water-flow alarms provided on all sprinklers?	☐	☐
Are the sprinkler systems periodically inspected and continuously maintained?	☐	☐
Is combustible material never piled within 36 inches of the sprinkler system except as mentioned below? 1. Solid piles 15 feet high or in piles 12 feet high with horizontal channels. 2. Commodities containing only small amounts of combustible material.	☐	☐
Is the storage of material, mentioned in No's. 1 and 2 above, never piled next to lights or within 18 inches of the sprinkler system?	☐	☐
DRY CHEMICAL SYSTEMS (if applicable)		
Does a competent inspector make annual inspections and perform tests on all dry chemical systems?	☐	☐

NIOSH

CHECKLISTS (cont.)

	Yes	No
Are the inspector's reports kept on file?	☐	☐
Are visual inspections regularly made?	☐	☐
Are all dry chemical systems maintained in full operating condition at all times?	☐	☐
CO_2 SYSTEMS		
Are CO_2 systems inspected and tested yearly?	☐	☐
Are the cylinders weighed or their pressure checked twice a year and refilled or replaced if they show a loss of 10% or more?	☐	☐
COMPRESSED AIR (29 CFR 1910.169)		
Are pulleys and belts on compressors and motors completely guarded?	☐	☐
Are flexible cords or plugs on electric motors periodically checked and replaced if in a deteriorated condition?	☐	☐
Do the pressure-relief valves operate properly?	☐	☐
Are air tanks drained regularly?	☐	☐
Is the pressure-relief device and gauge in good operating condition?	☐	☐

NIOSH

CHECKLISTS (cont.)

	Yes	No
MATERIALS HANDLING AND STORAGE (29 CFR 1910.176-.181)		
Is there safe clearance for equipment through aisles and doors?	☐	☐
Is stored material stable and secure?	☐	☐
Are storage areas free from tripping hazards?	☐	☐
Are only trained operators allowed to operate powered industrial trucks?	☐	☐
Are appropriate overhead guards installed on powered industrial trucks?	☐	☐
Is battery charging on electric units performed only in designated areas?	☐	☐
Are "NO SMOKING" signs posted near electric battery charging units?	☐	☐
Are dock boards (bridge plates) used when loading or unloading from dock to truck or dock to rail car?	☐	☐
Are wheel chocks used when driving forklifts onto truck beds?	☐	☐
Are racks and platforms loaded within the limits of their capacity?	☐	☐
Is all storage secured against sliding or collapsing?	☐	☐

NIOSH

CHECKLISTS (cont.)

	Yes	No
Are all vehciles shut off prior to loading?	☐	☐
Have aisles been designated and kept clear to allow unhindered passage?	☐	☐
If motorized equipment, such as lift trucks, is used, are aisles permanently marked, providing sufficient clearance for passage of the equipment?	☐	☐
Are specifications posted for maximum loads which are approved for floors (except slabs with no basements), roof of a building, or some other structure?	☐	☐
Are pallets with empty cardboard cartons stacked evenly?	☐	☐

MACHINE AND MACHINE GUARDING (29 CFR 1910.212)

Are belts, pulleys, and rotating shafts (air compressor, drill presses, etc.) properly guarded?	☐	☐
Are chains, sprockets, and gears properly guarded?	☐	☐
Are all in-going nip points properly guarded?	☐	☐
Are rotating shafts that are not smooth properly guarded?	☐	☐
Are all rotating parts (lubrication, fittings, etc.) recessed or covered with collars?	☐	☐

NIOSH

CHECKLISTS (cont.)

	Yes	No
Are all pieces of equipment with an electric motor or any electrical connection effectively grounded?	☐	☐
Are sprockets and V-belt drives within reach of platforms and passageways or less than seven feet from the floor completely enclosed?	☐	☐
Are fans less than seven feet above floor guarded, having openings ½ inch or less?	☐	☐
ABRASIVE WHEEL MACHINERY (Grinders) (29 CFR 1910.215)		
Is the work rest used and kept adjusted to within 1/8 inch of wheel?	☐	☐
Is the adjustable tongue on top side of grinder used and kept adjusted to within ¼ inch of wheel?	☐	☐
Do side guards cover the spindle, nut, and flange and 75% of the wheel diameter?	☐	☐
Are bench and pedestal grinders permanently mounted?	☐	☐
Are goggles or face shields always worn when grinding?	☐	☐
HAND AND PORTABLE POWER TOOLS (29 CFR 1910.242-.244)		
Are tools and equipment (both company and employee-owned) in good condition?	☐	☐
Have mushroomed heads on chisels, punches, etc. been reconditioned or replaced if necessary?	☐	☐

NIOSH

CHECKLISTS (cont.)

	Yes	No
Have broken hammer handles been replaced?	☐	☐
Have worn or bent wrenches been replaced?	☐	☐
Has compressed air used for cleaning been reduced to 30 psi when dead ended?	☐	☐
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?	☐	☐
Have deteriorated air hoses been replaced?	☐	☐
Are portable abrasive wheels appropriately guarded?	☐	☐
Have employees been made aware of the hazards caused by faulty or improperly used hand tools?	☐	☐
Are jacks inspected frequently or consistent with their usage:		
1. At least every six months for those in constant or intermittent use at one locality?	☐	☐
2. Each time they are sent out of the shop and returned for special work?	☐	☐
3. Before and after each use where they are subjected to abnormal load for shock?	☐	☐
Are loads on jacks cribbed, blocked, or secured at once?	☐	☐

NIOSH

CHECKLISTS (cont.)

	Yes	No
WELDING, CUTTING, AND BRAZING (29 CFR 1910.252)		
Are fuel gas cylinders and oxygen cylinders separated by 20 feet or a barrier five feet high having a ½-hour fire resistance rating?	☐	☐
Are cylinders secured and stored where they cannot be knocked over?	☐	☐
Are cylinder protective caps in place except when the cylinder is in use?	☐	☐
Are compressed gas cylinders kept away from heat sources, elevators, stairs, or gangways?	☐	☐
Are only instructed employees, who are judged competent by the employer, allowed to use oxygen or fuel gas equipment?	☐	☐
Do all cylinders (except those with fixed hand wheels) have non-adjustable wrenches, keys, or handles in place on valve stems while cylinders are in use?	☐	☐
Is welding always conducted at a safe distance from flammable liquids or dusty areas?	☐	☐
Are all compressed gas cylinders legibly marked to identify the content?	☐	☐
Are the valves shut off when the cylinder is not in use?	☐	☐
Are flash shields provided to protect nearby workers from the welding flash?	☐	☐

NIOSH

CHECKLISTS (cont.)

	Yes	No
Is there a fire extinguisher nearby?	☐	☐
Do the electrical leads not contain a splice within 10 feet of the electrode holder?	☐	☐
Is the arc welding equipment in good repair?	☐	☐
Is appropriate welding protective clothing worn?	☐	☐
Is the proper shade of lens used for the welding being done?	☐	☐
Are the welders protected from excessive welding fumes by the use of ventilation, respirators, etc.?	☐	☐

NATIONAL ELECTRICAL CODE

ELECTRICAL WIRING

Have exposed wires, frayed cords, and deteriorated insulation been repaired or replaced?	☐	☐
Are junction boxes, outlets, switches, and fittings covered?	☐	☐
Is all metal fixed electrical equipment grounded?	☐	☐
Does all equipment connected by cord and plug have grounded connections?	☐	☐
Are electrical appliances such as vacuums, blowers, and vending machines grounded?	☐	☐
Are all portable electrical hand tools grounded? (Doubly insulated tools are acceptable without grounding.)	☐	☐

NIOSH

CHECKLISTS (cont.)

	Yes	No
Are breaker switches identified as to their use?	☐	☐
Do flexible cords and cables not run through holes in wall or ceiling or through doorways or windows?	☐	☐
Are flexible cords and cables free from splices or taps?	☐	☐
Is electrical equipment accessible?	☐	☐
Are all conduit connections intact?	☐	☐
Do all extension cords being used have a ground wire?	☐	☐
Are all extension cords in use of appropriate wiring to carry the current being drawn?	☐	☐
Are multiple plug adapters not used?	☐	☐
In wet locations, is the electrical equipment properly protected?	☐	☐
Are flexible cords and cables never substituted for fixed wiring?	☐	☐
Are flexible cords and cables not attached to building surfaces?	☐	☐
Are flexible cords and cables fastened so that there is no direct pull on joints or terminal screws?	☐	☐

NIOSH

CHECKLISTS (cont.)

	Yes	No
RECORDKEEPING (29 CFR 1904.2-.8)		
Is employee poster (OSHA or equivalent state poster) prominently displayed?	☐	☐
Have occupational injuries or illnesses, except minor injuries requiring only first aid, been recorded on OSHA Form Nos. 100 and 101, or equivalent?	☐	☐
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?	☐	☐
Have all OSHA records been retained for a period of five years, excluding the current year?	☐	☐

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
- ☐ C1 National Electric Code
- ☐ Z4.1 Sanitation in Places of Employment

NATIONAL FIRE PROTECTION ASSOCIATION (NFPA)
470 Atlantic Avenue
Boston, Mass. 02110

- ☐ NFPA-10-1970
- ☐ NFPA-101-1970
- ☐ NFPA-13A-1971
- ☐ NFPA-17-1969

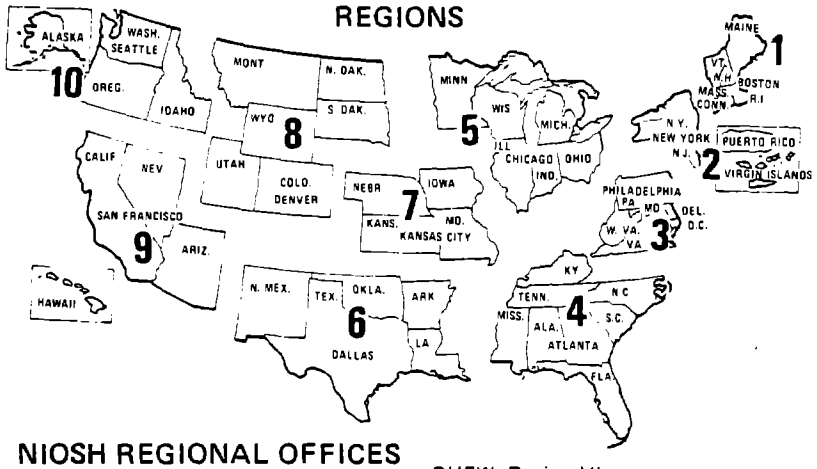
NATIONAL SAFETY COUNCIL
425 North Michigan Avenue
Chicago, Illinois 60611

NIOSH AND OSHA REGIONAL DIRECTORS

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

NIOSH AND OSHA REGIONAL OFFICES

The following pages list NIOSH and OSHA regional offices. Either of these facilities serving the state can 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.: 312/353-1710

DHEW, Region VI
1200 Main Tower Building
Dallas, Texas 75202
Tel.: 214/655-3081

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

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

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

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

OSHA REGIONAL OFFICES

Region I
U.S. Department of Labor
Occupational Safety and Health Administration
18 Oliver Street, Fifth Floor
Boston, Massachusetts 02110 . . . . . Telephone: 617/223-6712/3

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

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

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

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

Region VI
U.S. Department of Labor
Occupational Safety and Health Administration
7th Floor, Texaco Building, 1512 Commerce Street
Dallas, Texas 75210 . . . . . Telephone: 214/749-2477/8/9 or 2567

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

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

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

Region X
U.S. Department of Labor
Occupational Safety and Health Administration
1808 Smith Tower Building, 506 Second Avenue
Seattle, Washington 98104 . . . . . Telephone: 206/442-5930

KIND OF FIRE

DECIDE THE CLASS OF FIRE YOU ARE FIGHTING. . .

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

APPROVED TYPE OF EXTINGUISHER

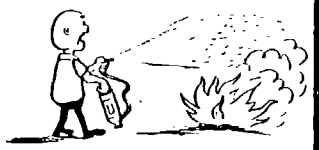
MATCH UP PROPER EXTINGUISHER WITH CLASS OF FIRE SHOWN AT LEFT

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

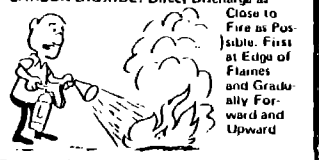
IMPORTANT: USING THE WRONG TYPE EXTINGUISHER FOR THE CLASS OF FIRE MAY BE DANGEROUS!

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

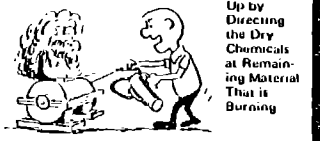
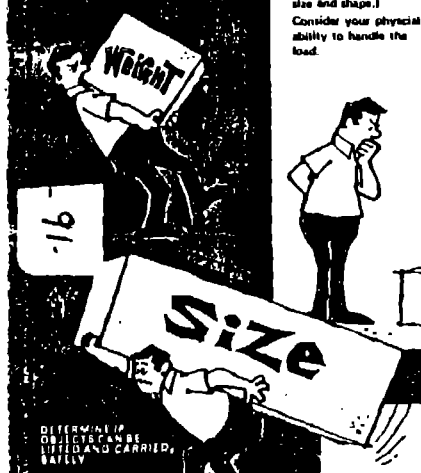


TABLE 1

HOW TO LIFT SAFELY

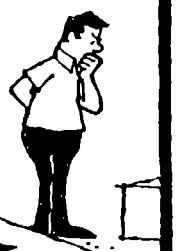
The following safe practices should be observed in order to avoid injury.

The factors that contribute to safe lifting are...

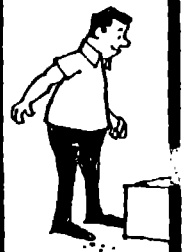


DETERMINE IF OBJECT CAN BE LIFTED AND CARRIED SAFELY

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.

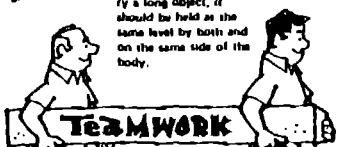
7. Setting the load down, is just as *important* as picking it up. Using leg and back muscles, comfortably lower load by bending your knees. When load *is* securely positioned, *release* your grip.

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

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

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

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



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

Avoid awkward positions or twisting movements while lifting.

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

Use a ladder instead of chairs, boxes, etc.

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