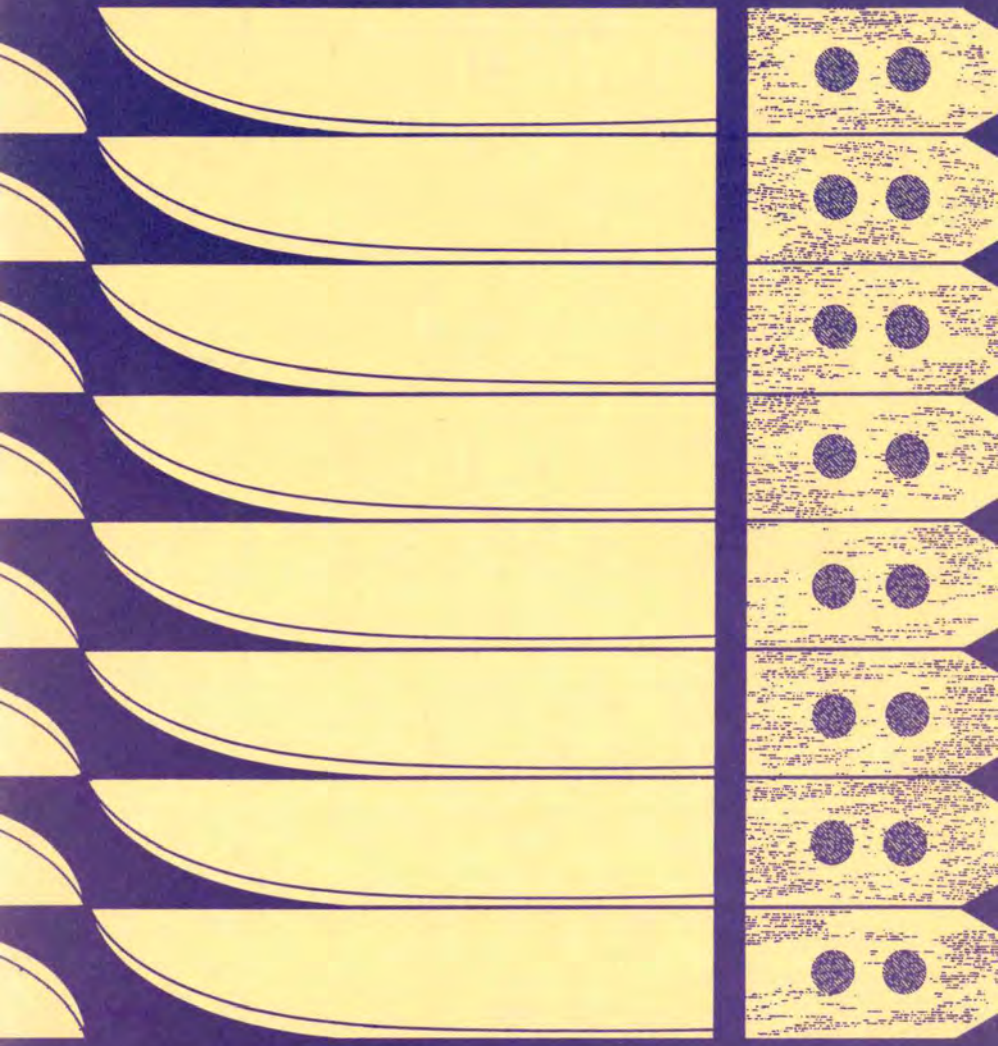
HEALTH AND SAFETY GUIDE FOR **MEAT PACKING, POULTRY DRESSING, AND SAUSAGE MANUFACTURING PLANTS**



U. S. DEPARTMENT OF HEALTH, EDUCATION, AND WELFARE
Public Health Service
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CONTENTS:

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) in the Department of Health, Education, and Welfare (DHEW) and the Occupational Safety and Health Administration (OSHA) in the Department of Labor (DOL). The Act provides for research, informational programs, education, and training in the field of occupational safety and health and authorizes the enforcement of standards. As part of these activities, surveys have been made by NIOSH to determine the most common health and safety problems in small businesses. This Guide was developed for those companies engaged in meat packing, poultry dressing, and sausage manufacturing and includes a "Guidelines" section and a section on "Frequently Violated Regulations."

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 the General Industry Standards (Code of Federal Regulations, Title 29, Part 1910 — Occupational Safety and Health Standards).

Words such as "must," "shall," "required," and "necessary," appearing in the text, indicate requirements under the Federal Regulations. Procedures indicated by "should," "suggested," 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 from federal standards, they must be at least as effective as the federal standards.

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

HEALTH AND SAFETY GUIDELINES

HEALTH AND SAFETY PROGRAM

Hazardous conditions or practices not covered by specific 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." The employer can meet this requirement by utilizing an ongoing health and safety program as an effective means to recognize, evaluate, and control hazards and potential hazards in the workplace.

Hazards may be identified by performing self-inspections, soliciting employee input (interviews, suggestions, and complaints), promptly investigating accidents, reviewing injury and illness records, and using material from this Guide and other sources.

The "Checklist" in the back of this book is of particular importance in identifying hazards. It should be customized to fit the needs of your program.

Reviewing records aids in hazard identification.

Situations that occur frequently or cause severe problems should be given priority for corrective action. This Guide contains many of the requirements and good practices needed to correct hazards. For more complex problems, such as those requiring engineering controls to reduce noise or airborne contamination, outside consultants may be needed.

Management leadership is necessary to insure success.

Management may assign safety and health responsibilities in the areas of both program development and implementation. Regular meetings and informal discussions can be held to discuss safety promotions, hazards, and injury and illness records. To ensure program success, management leadership and support are necessary. The employee assigned responsibility for carrying out the program must be given the necessary authority and must have management support. Likewise, everyone in the establishment should be made 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 employees will very likely show interest and a desire to participate.

EMPLOYEE TRAINING

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

1. Impress upon the employee 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.

3. Develop and maintain check points to be observed as a part of standard and emergency procedures.

4. Post appropriate warning signs and operating procedures.

5. Instruct employees in the use of portable fire extinguishers. (Refer to fold-out chart in this booklet and post in a conspicuous place.)

6. Have at least one employee trained in first aid on each shift.

7. Be sure only authorized employees use motorized equipment. Instruct these employees in the safe operation and potential hazards of this equipment.

8. Develop a "good housekeeping" awareness to reduce accidents and to develop the employees' sense of pride in their surroundings. Responsibilities for clean-up should be specifically assigned.

9. Instruct employees in safe lifting practices. Such instruction may prevent many injuries. An easily understood chart, "How to Lift Safely," which is included in the back of this book, may be removed and posted where it may be seen by all employees.

10. Special instructions to employees on personal hygiene, sanitation, and good housekeeping will prevent increased numbers of aerobic bacteria counts on processed meats and decrease the number of infectious diseases to employees.

11. Plant management should be aware of the importance of maintenance crews in meat processing plants. Their activities affect the safety of other workers as well as their own. Specific examples are in the areas of electrical and machinery maintenance.

A 20-minute film "I never had an accident in my —" which explains hazards in the meat processing industry is available from OSHA Regional Offices.

GOOD HOUSEKEEPING AND FIRE PREVENTION

Maintaining a clean and orderly workplace reduces the danger of accidents and fires. Rubbish should be disposed of regularly. If it is necessary to store combustible waste materials, a covered metal receptacle is required.

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

Some common causes of fires in all businesses are:

- electrical malfunctions
- friction
- open flames
- sparks
- hot surfaces
- smoking

Proper maintenance and continuing surveillance of the facility through a safety program can reduce these hazards.

Not only does good housekeeping contribute to a safer workplace by reducing the potential for fire, it also reduces accidents caused by slips, trips, and falls. Falls are one of the chief contributors to injury in the meat packing industry where one out of every five injuries is the result of a fall. Accumulations of waste and scrap, and spills of slippery material must be cleaned up promptly so that they do not constitute a hazard.

Good housekeeping also contributes to increased safety during materials handling and storage. An orderly workplace with unobstructed aisles and passageways can significantly reduce injuries and maintain production.

AUTOMATIC SPRINKLER SYSTEMS

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

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

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

3. The employer is responsible for the condition of the sprinkler system and must keep it in good operating order. Functional tests are required at least once each year.

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

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

OCCUPATIONAL HEALTH AND ENVIRONMENTAL CONTROL

In the occupational environment, employees may be exposed to excessive levels of a variety of harmful materials including gases, dusts, mists, vapors, fumes, certain liquids and solids, noise, heat, and cold. 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 should be conducted at each operation showing all chemicals used and all products and by-products formed. All hazardous substances should then be listed and evaluated. The most likely method of exposure should be noted (i.e., by mouth ingestion, by skin-absorption, or by inhalation). If the composition of a material cannot be determined, the information should be requested from the manufacturer or supplier. In many instances they can provide Material Safety Data Sheets for the products. These sheets contain information such as toxicity levels, physical characteristics, personal protective equipment requirements, emergency procedures, and incompatibilities with other substances.

After this analysis is completed, related activities such as maintenance and service operations should be examined for health hazard potential. Some examples of hazards to be aware of 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, hazardous exhaust gases such as carbon monoxide will be generated.

3. When certain cleaning agents are mixed, poisonous gases, such as chlorine, are sometimes formed.

After a thorough assessment of the hazard potential of the chemical substance or air contaminant, suitable methods to eliminate or reduce employee exposure to these hazards should be implemented.

Various control methods can be used to prevent or reduce employee exposure to toxic substances.

1. **Substitution** of less toxic materials.

2. **Change of a process** — for example, 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 and rotating two or more workers each day.

5. **Training** and education of employees — employees should be told what hazards they are exposed to and the ways to reduce or limit exposure (see "Employee Training").

6. **Personal Hygiene** cannot be over-emphasized. Persons should wash their hands before eating, smoking, or using toilet facilities. Chemicals such as alkalis, acids, solvents, and strong cleaning agents 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, by which contamination is removed at the point of generation, or general mechanical ventilation.

POWER TOOLS

Employees who operate power tools should be instructed to:

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

2. Select the proper tool for the job.

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

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

5. Keep guards in place and in working order.

6. Have ground prongs in place or use tools marked "double-insulated."

7. Maintain working areas free of clutter.

8. Keep alert to potential hazards in the working environment such as damp locations or the presence of highly combustible materials.

9. Dress properly to prevent loose clothing from getting caught in moving parts.

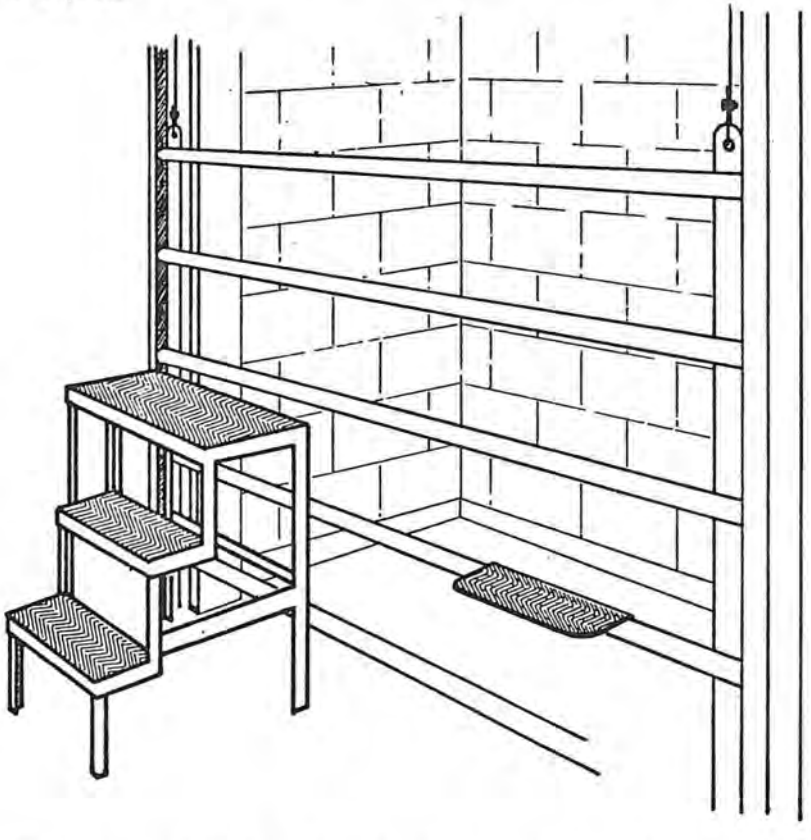
10. Use safety glasses, dust or face masks, or other protective clothing and equipment when necessary.

11. Not surprise or distract anyone using a power tool.

THE INDUSTRY AND ITS HAZARDS

The number and types of health and safety hazards vary somewhat from plant to plant, due to size, products, and production volume, as well as tools, machinery, and other equipment in use. Since this Guide is written to cover a broad area of the meat processing industry, some of the contents may not pertain to your particular operation.

Slips and falls are a major cause of injury in meat processing, causing more than 20% of total injuries. Personnel must be provided with slip-resistant footwear, especially in the kill area which is always wet and slippery during operations. When workers use sharp and pointed tools (knives, hooks) or work with powered cutting tools and machinery (splitting saws, band saws, grinders, slicers), the seriousness of slips and falls is multiplied.



The practice of climbing the rails of the stun pen can be hazardous. A better practice is for the operator to use a set of movable steps.

Electrically operated tools and equipment may be an electrical shock hazard. Wetness, metal fixtures, and frames, and an abundance of

water pipes raises the potential for electrical shock. All electrically operated tools and equipment must be effectively grounded. Only trained personnel should be allowed to use electrical stun apparatus.

Back injuries and muscle strains are common throughout industry. Even light loads can contribute to these injuries if lifting and handling techniques are faulty. Employees should use lifting equipment (hoists, pulleys, forklifts) whenever possible. Modern conveyors and overhead monorails have relieved much of the manual lifting and carrying but present "struck by" hazards in themselves. Hooks and pulleys sometimes derail, particularly at rail branches and rail stops. Conveyors sometimes pass through wall and floor openings which must be adequately guarded with standard rails. Safeguards are necessary to separate the worker from the paths of conveyors and their moving parts.

Employees must be protected from contacting hot surfaces. Hot water and steam lines, heated vats such as chicken pluckers and crackling vats are some examples of hot objects and surfaces which can cause burns.

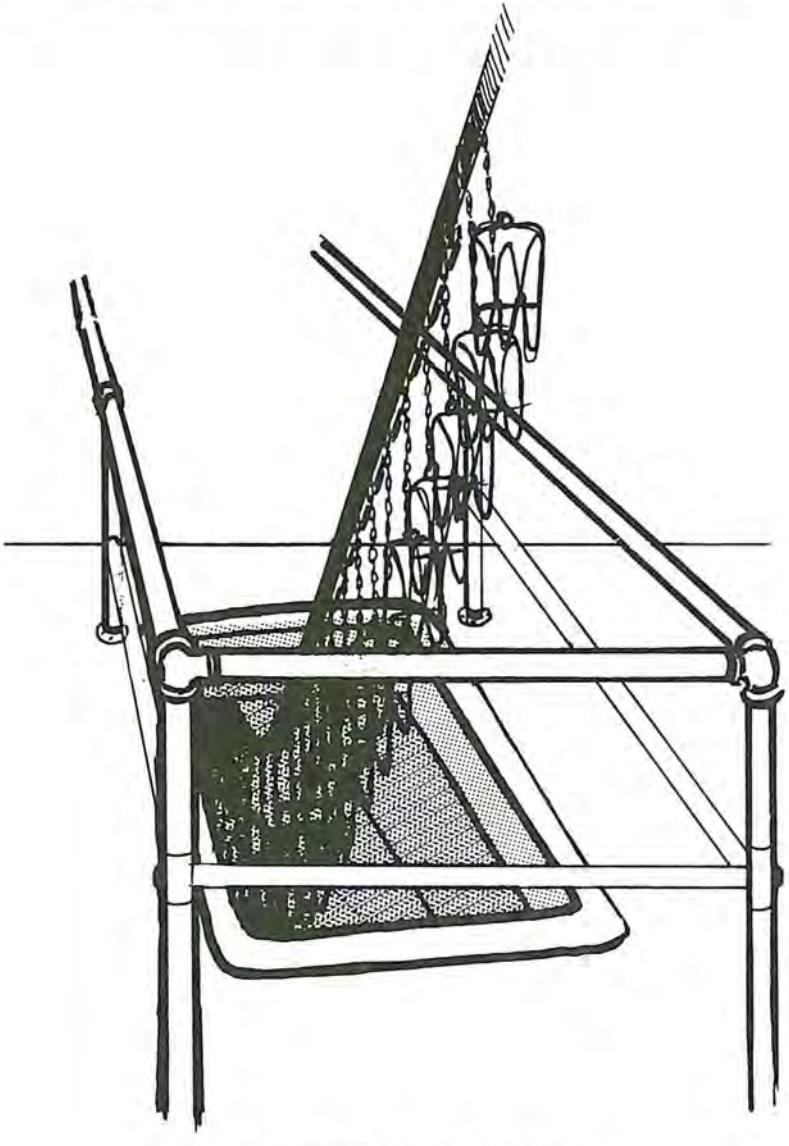
Noise is generally not a problem in most meat processing plants. However, plants with a large number of power operated tools and equipment which operate simultaneously may generate noise above the permissible level. A noise chart in the Frequently Violated Regulations Section compares noise sources. Excessive noise is a noise level higher than 90 dBA for continuous noise, or 140 dBA for impact noise. Potential noise sources are powered hoists, powered splitting saws, grinders, crushers, automatic pluckers, linters, band saws, and kill areas.

Machinery in motion always offers a potential for injury. It is generally recognized that machine guarding is of the utmost importance in protecting the employee. Blade guards on band saws and barrier guards which prevent the employee from inserting a hand into the hopper of a meat grinder are examples of required machine guarding. Powered machinery must be stopped and the power disconnected before any cleaning or adjustment is attempted.

Adequate ventilation is important in every workplace. Exhaust hoods and ducts must be cleaned regularly. Those meat packers who render animal fat must provide adequate ventilation for crackling vats for exhausting the vapors. Filters and exhaust systems serving rendering vats must be kept clean to reduce the potential for fire. Plants operating a smoke room should keep smoke and fumes out of the general ventilation system.

Other industrial hygiene considerations are associated with the use of cleaning and sanitizing chemicals (acids, caustics, chlorine compounds, and detergents). When using strong sanitizing chemicals, the employee must be protected against their adverse effects. Skin protection such as impervious gloves, aprons, and boots is required where the solutions would contact the worker. Eye and face protection is required where spray, splash, or spills could endanger the worker (goggles and/or a face

shield are needed). Where workers handle injurious chemicals, a readily available source of clean water is necessary for immediate flushing of the affected area. Due to a predominance of steam and scalding water sources common in meat packing, it is a good practice to specifically identify water to be used for flushing chemical contamination. An emergency shower and eye wash fountain are recommended.



Floor opening for poultry hanger guarded by standard rail.

FREQUENTLY VIOLATED REGULATIONS

This section outlines the OSHA regulations which are most applicable to general plant conditions and operations. The standards are listed in the same order as the OSHA regulations and the important points of each standard are summarized.

General conditions and controls are discussed. Your particular operation may vary, so some of these standards may not apply or additional standards may also be applicable. The control methods presented are only a brief, general suggestion as to how hazards may be corrected. For detailed information on controls for problems such as noise, air contaminants, and machine guarding, where specific designs must be implemented, you may need the services of a professional consultant.

WALKING AND WORKING SURFACES

GENERAL REQUIREMENTS

1. All work areas, passageways, storerooms, and service rooms must be kept clean, orderly, sanitary, and as dry as possible. All spills should be cleaned up promptly. Floors in work areas must be kept free of scrap, chips, oil, spills, and other debris.

2. Areas which are constantly wet should have non-slip surfaces or mats where employees must walk or work. Where wet processes are used, good drainage must be maintained.

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 clearance must be provided for foot and vehicular traffic.

5. No obstructions that could create a hazard are permitted in the aisles.

6. All permanent aisles must be easily recognizable.

7. Floorload capacities must be posted in a readily visible location (except for slab floors with no basement). The floorload capacity is the maximum weight which can be safely supported by a floor, expressed in pounds per square foot. If this information is not available, and when floorload capacity is in doubt, a competent engineer should be consulted.

WALKING AND WORKING SURFACES (cont.)

PORTABLE LADDERS

1. Portable ladders must be maintained in good condition at all times with tight joints, securely attached hardware and fittings, and freely operating movable parts. They should be kept coated with a suitable protective material.

2. They must be inspected frequently. Defective ladders must be tagged "Dangerous — Do Not Use" and removed from service for repair or destruction. Ladders with broken or missing steps, rungs, or cleats, cracked or broken side rails, or other faulty equipment must not be used.

3. Ladders should be stored where they will not be exposed to the elements; wood ladders should be stored where there is good ventilation.

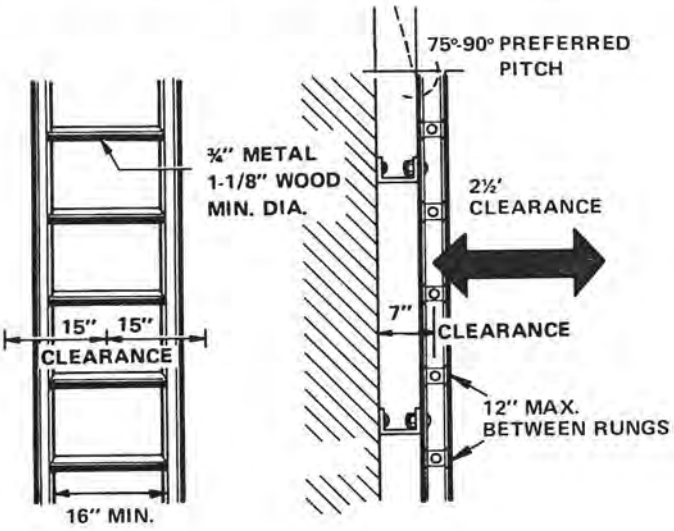
4. Metal ladders must not be used near energized electrical equipment.

5. All ladders must be placed so that they have a secure footing. They may not be placed on boxes, barrels, boards, bricks, or other unstable bases to obtain additional height. Nonslip bases should be used.

FIXED LADDERS

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

2. Rungs of metal ladders must have a minimum diameter of ¾ inch. Rungs of wood ladders must have a minimum diameter of 1⅛ inches.



WALKING AND WORKING SURFACES (cont.)

3. Rungs must be at least 16 inches wide, be spaced 12 inches apart, and be free of splinters and burrs.

4. Ladders, when their location so demands, must be painted or treated with a preservative to resist deterioration.

5. The preferred pitch for safe descent is 75° to 90° unless caged. Ladders with 90° pitch must have a 2½-foot clearance on the climbing side. There must be a 3-foot clearance on ladders with a 75° pitch.

6. There must be at least a 7-inch clearance in back of the ladder to provide adequate toe space.

7. Ladders must have cages if they are longer than 20 feet.

8. Landing platforms must be provided on ladders greater than 20 feet long. A platform is required every 30 feet for caged ladders and every 20 feet for unprotected ladders.

9. Side rails must extend at least 3½ feet above landings.

10. There must be a clear width of 15 inches on each side of the center line of the ladder, unless the ladder is equipped with a cage or well.

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 7 feet, measured from the leading edge of the tread.

WALKING AND WORKING SURFACES (cont.)

4. The minimum permissible width of a stairway is 22 inches. If the stairway is a means of exit access, it must be at least 28 inches wide.

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 9 inches wide, the risers should be open.

8. The following requirements apply to flights of stairs having four or more risers:

a) A stair railing is required on each open side.
b) If the stairway is less than 44 inches wide and both sides are enclosed, at least one handrail is required, preferably on the right side descending.
c) If the stairway is greater than 44 inches wide, a handrail is required on each enclosed side.
d) If the stairway is greater than 88 inches wide, an intermediate stair railing located midway is required.

9. The vertical height of a stair railing must be 30 to 34 inches, and it must be of construction similar to the standard guard railing.

THE STANDARD GUARD RAIL AND TOEBOARD

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

2. A standard guard 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.

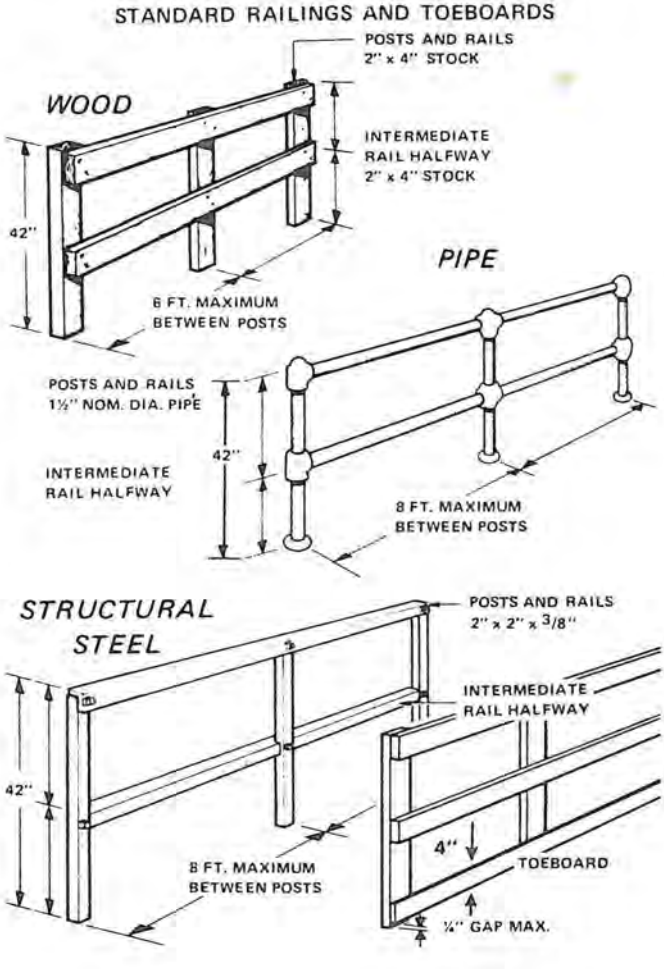
a) For wood railings, the rails and posts must be of at least 2-x 4-inch stock with posts spaced not more than 6 feet apart.
b) For pipe railings, rails and posts must be at least 1½-inch outside diameter pipe with posts spaced not more than 8 feet apart.
c) For structural steel rails, posts and rails must be of 2-x 2-x ⅜-inch angles or other metal shapes of equivalent strength with posts spaced not more than 8 feet apart.

3. The standard toeboard must be approximately 4 inches in height from the floor to the top edge, with no more than a ¼-inch gap between the toeboard and the floor. The toeboard may be constructed of any solid or perforated substantial material, as long as the openings are smaller than 1 inch.

WALKING AND WORKING SURFACES (cont.)

THE STANDARD GUARD RAILING AND TOEBOARD

As a general condition, a standard toeboard and guard 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).



EXITS AND EXIT MARKINGS

SIZE AND PLACEMENT OF SIGNS

1. Every exit must have the word "EXIT" in plain, legible letters not less than 6 inches high with the strokes of the letters not less than ¾ inch wide.

2. The visibility of the sign must not be impaired by decoration, furnishings, or other signs.

3. 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 with a sign indicating their actual use, e.g., "STORAGE ROOM" or "TO BASEMENT."

4. In areas where the direction to the nearest exit may not be apparent to an occupant, an exit sign with a directional arrow must be used.

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

EXITS AND EXIT MARKINGS (cont.)

GENERAL REQUIREMENTS

1. The exit route must lead to a public way.

2. Areas around exit doors and passageways leading to and from the exit must be kept free of obstructions.

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

4. A door from a room to an exit, or to a way of exit access, must be of the side-hinged, swinging type. It must swing out in the direction of travel if 50 or more persons occupy the room, or it is an exit from an area of high hazard potential.

5. No lock or fastening may be used which prevents escape from inside the building.

6. There must be at least two means of exit remote from each other where occupants may be endangered by the blocking of any single exit due to fire or smoke.

OCCUPATIONAL HEALTH AND ENVIRONMENTAL CONTROL

It is the responsibility of the employer to ensure that employees are not exposed to toxic (or otherwise harmful) levels of air contaminants or physical agents. Persons employed in the meat and poultry processing industry and in sausage manufacturing may be exposed to potentially hazardous concentrations of some gases and vapors, and noise. When workers are exposed to excessive amounts of health hazards, administrative or engineering controls must be utilized wherever feasible to prevent or limit exposure. When such controls are not feasible, protective equipment must be used.

Administrative controls limit the amount of time an individual is exposed to a hazard during a particular operation by rotating two or more workers on the job. The primary method of engineering control for air contaminants is ventilation. Local exhaust ventilation systems are designed to capture and remove excessive amounts of air contaminants before they escape into the workplace air. General dilution ventilation (when properly designed) will also remove contaminants from the air, but not as efficiently as local exhaust.

Skin problems (dermatitis) can occur as the result of contact with cleaning compounds, animal body fluids, and solvents. The use of proper personal protective equipment, good personal hygiene practices, and protective skin creams or lotions can often prevent skin problems.

The following are some examples of potential health hazards common to the meat processing industry:

CARBON DIOXIDE (CO_2)

Some meat processors anesthetize the animals before slaughter by routing them through a room saturated with CO_2 gas. Where solid CO_2 (dry ice) is used in some sausage manufacturing as part of the grinding process, the gas can possibly be present in high concentrations.

Since CO_2 is an asphyxiant, it replaces the oxygen in the blood and may reduce the amount of oxygen to dangerously low levels. CO_2 is both odorless and colorless. Inhalation of CO_2 causes an increase in the breathing rate, and may cause shortness of breath, dizziness, and vomiting.

In any area where a high concentration of CO_2 is suspected, employees should wear supplied-air or self-contained respirators. General dilution ventilation is usually an adequate control for low levels of CO_2. In areas of higher concentrations, local exhaust ventilation may be necessary. It is recommended that areas where CO_2 is used be monitored to ensure that levels are kept within the acceptable limits. CO_2 does not diffuse

readily, and may collect in confined spaces. (See "Entry to Confined Spaces.")

If solid CO2 is used in the grinding or packaging areas, employees must wear personal protective equipment to prevent contact with the cold.

CARBON MONOXIDE (CO)

CO is produced from incomplete combustion of fuel from gas-powered forklift trucks and from inadequately vented space heaters. It may also result from improperly designed venting systems from smoke rooms.

CO is colorless, odorless, and tasteless, and therefore gives no warning of its presence in the atmosphere. Headaches, dizziness, nausea and vomiting, and a general feeling of weakness are some symptoms of exposure to CO. CO is a simple asphyxiant, which replaces oxygen in the hemoglobin and thus limits the oxygen-carrying capacity of the blood.

Exposure to CO may be limited through the use of local exhaust or general dilution ventilation systems. The ventilation system for the smoke room should be inspected regularly to make sure it is functioning properly. Regular maintenance of heaters and gas-powered lift trucks will also limit the amount of CO present.

There are continuous monitoring devices available which sound an alarm when CO concentrations in the workroom air reach a hazardous level.

LIME

Lime (quick lime, caustic lime, calcium oxide) is sometimes mixed with hot water and used as an unhairing agent. Lime is a caustic and can rapidly burn the skin and eyes on contact. If pulverized lime is moistened, it forms calcium hydrate which generates heat. Flammable or combustible materials should not be stored near pulverized lime as they may be ignited from the heat produced. Employees must wear goggles and gloves when handling lime. Eye wash and emergency shower facilities must be available in the immediate area. "Hydrated pulverized lime" may be substituted for pulverized lime as it is not heat reactive, and is, therefore, less of a fire hazard.

HYDROGEN SULFIDE

Hydrogen sulfide is a colorless, highly toxic, and flammable gas, produced by the decomposition of sulfur-containing organic material. It may be found in enclosed spaces such as unventilated basements, or in pits, tanks, or vats which formerly contained organic matter.

The gas has a characteristic "rotten egg" odor. However, the use of odor as a warning of its presence is not reliable because continued exposure to the gas causes a loss of sensitivity of the sense of smell.

Hydrogen sulfide is both an irritant (in low concentrations) and an asphyxiant. Exposure to low concentrations produces irritation of the eyes, a "burning" sensation in the nasal passages and respiratory tract, headaches, and dizziness. If small amounts are absorbed, the gas acts as a nervous system depressant. Inhalation of high concentrations of the gas can be immediately fatal, as it causes paralysis of the respiratory center and results in suffocation.

Hydrogen sulfide is a dangerous fire hazard when exposed to heat and flame.

When employees detect the faintest odor of hydrogen sulfide (a "rotten egg" smell) they should immediately leave the area. Local exhaust ventilation is required to remove the gas at its source, and forced-air ventilation should be used in the area. Supplied-air (airline) respirators must be worn by employees who must work in atmospheres containing even small amounts of hydrogen sulfide gas. All tanks, vats, pits, and other enclosed spaces which have contained organic matter (e.g., hair, fat, skin, sludge) must be tested for the presence of hydrogen sulfide before employees begin cleaning operations. Even if they do not enter the area, but work from an opening in the top, it is a good idea to test for the presence of the gas. (See "Entry to Confined Spaces.")

METHANE

Methane is a colorless, odorless, tasteless gas produced by decomposing organic material. Methane may be found in tank, pit, sump, or drain cleaning operations, or wherever decaying organic material has accumulated.

Methane gas is highly flammable, and is also an explosion hazard. It is a simple asphyxiant, replacing the oxygen in the blood to cause suffocation. Symptoms of methane exposure are an increase in respiration rate, impaired muscular coordination, and diminished mental alertness. Nausea and vomiting may occur, as well as loss of consciousness and possible death.

All enclosed spaces which contain organic matter must be tested before employees enter. (See "Entry to Confined Spaces.") Periodic testing of the atmosphere while they work must also be performed, as cleaning operations may release methane into the atmosphere.

Forced air ventilation must be blown through the area, and employees must use supplied-air respirators where methane is present.

OCCUPATIONAL HEALTH AND ENVIRONMENTAL CONTROL (cont.)

SOLVENTS AND CLEANING COMPOUNDS

Solvents may be a potential health hazard for maintenance personnel who perform painting, degreasing, and cleaning operations. All organic solvents have some effect on the central nervous system and skin. The principal modes of exposure are through inhalation of the solvent vapors and by direct skin contact. Excessive inhalation of the vapors of some solvents may cause lack of coordination and drowsiness, which have no discernable health effects, but which may increase the risk of accidents. In other cases, exposure may result in serious damage to the blood, lungs, liver, kidneys, and gastrointestinal system.

Skin contact with solvents and cleaning compounds may cause dermatitis, ranging in severity from simple irritation to actual skin damage. Even the most inert solvents can dissolve the natural barriers of fats and oils, leaving the skin unprotected.

Employees must be instructed to avoid all skin contact with solvents, and to avoid breathing the vapors. Local exhaust ventilation systems may be needed to control the levels of solvent vapor. Impervious goggles, gloves, aprons, boots, and sleeves must be worn to protect employees who might be exposed to splashing or spraying of solvents or cleaning agents. If the cleaning agent is a caustic, an eye wash and shower are required in the immediate area.

ENTRY TO CONFINED SPACES

TANK ENTRY AND CLEANING

The following general rules apply whenever employees must enter vats, tanks, or other confined spaces:

- Completely drain the tank of all contents.
- Flush the tank thoroughly by filling with water, and, if necessary, hose down with steam to remove particulate matter (e.g., fats).
- Close and lock out all valves leading to the tank.
- Forced air ventilation is usually required, and should preferably be applied from the bottom.
- Test for the presence of toxic gases or explosive atmosphere.
- Test for sufficient oxygen.

Only when it has been determined that the atmosphere within the tank is free of toxic or explosive gases and contains sufficient oxygen, the listed procedures should be followed for tank entry:

- Written permission to enter the tank must be obtained from the supervisor and posted at the entrance to the tank.
- All electrical equipment, belt drives, mixers, and agitators connected to the tank must be locked out.
- Forced air ventilation must be applied through the tank.
- The person entering the tank must be equipped with a safety harness and lifeline, a supplied-air respirator, and other necessary personal protective equipment.
- There must be a stand-by person present, equipped with a self-contained respirator, who is familiar with emergency procedures.
- The worker in the tank must be visible to the stand-by person at all times.

All employees who either enter confined spaces or serve as stand-by workers must be thoroughly trained in the standard procedures as well as emergency procedures.

ENTRY AND CLEANING OF SEWERS

From time to time it may be necessary to enter sewers to clean them of waste products such as hair and scrap. As this organic matter decays, it produces toxic gases such as hydrogen sulfide, methane, and carbon monoxide. These products of decomposition replace the oxygen which may be present and the result is an oxygen-deficient atmosphere. Other toxic gases and vapors may also be present from the solvents and chemicals used in cleaning operations.

Whenever possible, sewers should be cleaned from the outside by pumping or dredging.

ENTRY TO CONFINED SPACES (cont.)

When it is necessary to enter a sewer for cleaning or repair the following procedure should be followed:

- If possible, flush the sewer with water or steam.
- Close and lock out all inlets to the sewer.
- Written permission from the supervisor to enter the sewer must be obtained and the permit posted.
- All flames and sparks or spark-producing equipment in the area of the cover must be extinguished or turned off.
- Only non-sparking tools may be used until tests have proven there are no explosive gases present in the sewer.
- Once the manhole cover is removed, a movable standard guard-rail must be placed around the floor opening.
- Forced air ventilation should be blown through the sewer.
- The sewer must be tested for the presence of combustible gases (use a combustible gas indicator).
- Test for the presence of hydrogen sulfide near the bottom of the sewer (hydrogen sulfide detector).
- Test to see if there is sufficient oxygen present (oxygen deficiency lamp or indicator).
- Test for the presence of carbon monoxide.

These tests must be performed at various levels in the sewer. For example, methane gas (explosive) is lighter than air and is usually found near the top. Solvent vapors, which may also be explosive, are heavier than air, and will be found near the bottom. Hydrogen sulfide (both highly flammable and exceedingly toxic) is usually found near the bottom. The oxygen deficiency and carbon monoxide tests must also be performed at various levels.

Only when tests have shown that there are no toxic or combustible gases present may the employees enter the sewer.

- Employees who enter the sewer must be equipped with air line (supplied-air) respirators and lifelines.
- Standby personnel must be equipped with self-contained respirators.
- Testing of the atmosphere in the sewer for combustible gases, toxic gases, and oxygen deficiency must be repeated at regular intervals as long as employees are working in the sewer.

Air sampling must be continued during the time employees work in the confined area. As they work, they may release hazardous gases into the air from under accumulated waste, or from the wastes as they are shoveled or hosed.

OCCUPATIONAL NOISE EXPOSURE

Excessive noise can cause permanent hearing damage, and the noise standard is one of the most commonly violated standards. It is management's responsibility to make sure employees are not exposed to noise levels in excess of the standard.

The current standard is 90 decibels, A-weighted (dBA), for an 8-hour exposure. Even at this noise level, hearing damage can be expected in some individuals. It may soon be a requirement, and it is considered good practice to have hearing checked (audiometric testing) on an annual basis, for all employees exposed to 85-90 dBA noise levels for 8 hours daily. If no hearing loss is observed, ear protection is not required.

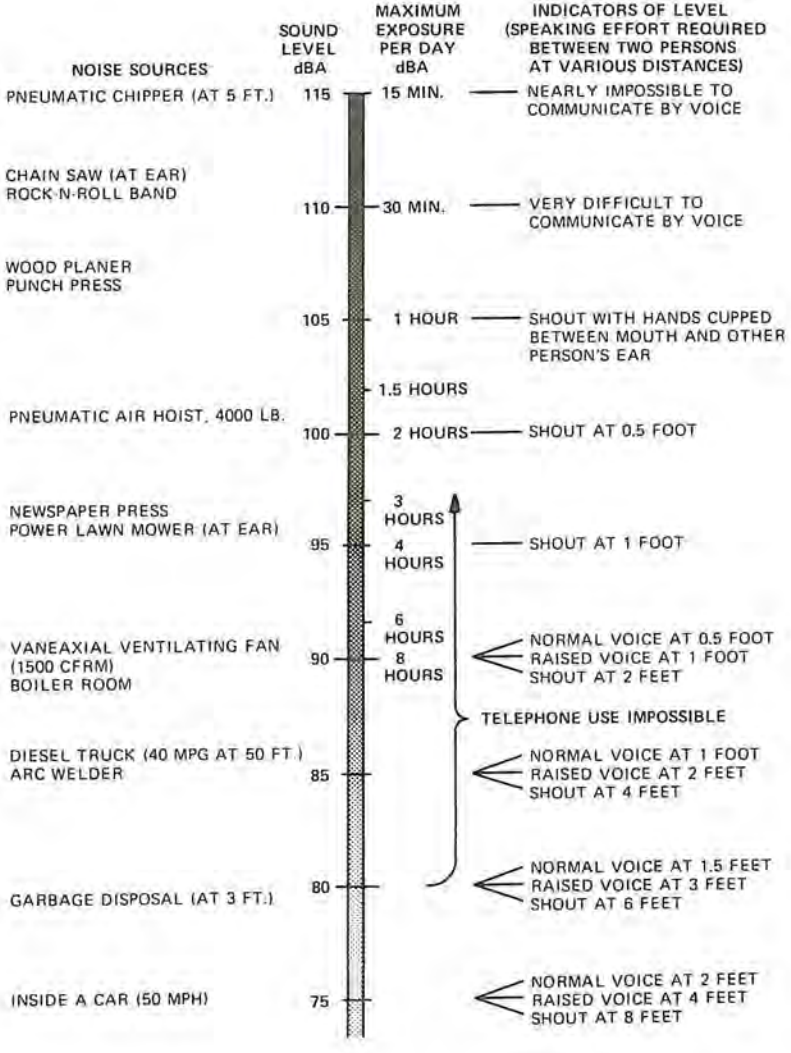
At greater than 90 dBA exposure (8 hours per day) or for higher noise levels in excess of the allowable time (e.g., 100 dBA for more than 2 hours) a continuing, effective hearing conservation program must be administered. Reference to the following table gives estimates of noise levels and the maximum allowable exposure times. It is required that either engineering controls, such as enclosing noisy equipment, or administrative controls, such as limiting time of exposure, be utilized to reduce noise levels or the exposure times 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 used such as ear muffs or 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 yet 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 engineering and administrative controls are implemented or a hearing conservation program is established.

FREQUENTLY VIOLATED REGULATIONS

OCCUPATIONAL HEALTH ENVIRONMENTAL CONTROLS (cont.)

PERMISSIBLE NOISE EXPOSURES



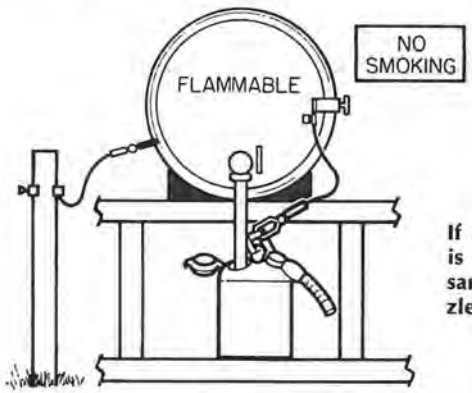
HAZARDOUS MATERIALS

FLAMMABLE AND COMBUSTIBLE LIQUIDS

The category of flammable and combustible liquids is determined by how easily they ignite (the flash point). Flammable liquids ignite more readily than combustible ones. Examples of flammables are gasoline, acetone, and lacquer thinner; examples of combustibles are kerosene, fuel oil, and Stoddard solvent.

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

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



If hose is non-conducting, bondwire is necessary. No bonding is necessary with a conducting hose and nozzle in contact with the container.

3. All spills of flammable and combustible liquids must be cleaned up promptly. Cleanup personnel must use appropriate personal protective equipment. If a major spill occurs, remove all ignition sources and ventilate the area. These liquids must never be allowed to enter a confined space, such as a sewer, because of the possibility of an explosion.

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

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

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

7. All storage areas must be posted as "NO SMOKING" areas.

HAZARDOUS MATERIALS (cont.)

STORAGE CABINETS

Storage cabinets must be distinctly labeled "FLAMMABLE — KEEP FIRE AWAY."

Metal cabinets must be constructed of at least no. 18 gauge sheet iron, double-walled with a 1½-inch air space and tight joints. Doors must have three-point locks and the sill must be at least 2 inches above the bottom of the cabinet.

Wooden cabinets must be constructed of at least 1-inch plywood. All joints must be rabbetted and fastened two-directionally with flathead screws.

INSIDE STORAGE AREAS

Each inside storage area must be prominently posted as a "NO SMOKING" area. Openings to other rooms or buildings must be provided with noncombustible, liquid-tight raised sills or ramps at least 4 inches in height. An open-grated trench inside the room which drains to a safe location is a permissible alternative to a sill or ramp. General exhaust ventilation (either gravity or mechanical) which provides for a complete change of air within a room at least six times each hour is required. All lights, electrical equipment, and wiring must be of the type approved for hazardous locations.

A fire extinguisher must be available (12B minimum) within 10 feet of the door.

OUTSIDE STORAGE AREAS

If flammable and combustible liquids are stored outside, the storage area must be graded to divert spills away from buildings. The storage area must be posted as a "NO SMOKING" area, and must be kept free of weeds, debris, and other combustible material. There must be a fire extinguisher available at the storage area.

LPG STORAGE AREAS

LPG storage tanks must be guarded to protect them from vehicular damage. The tank area must be posted "NO SMOKING" and there must be a fire extinguisher available in the area. Engines of vehicles must be shut down while being fueled.

PERSONAL PROTECTIVE EQUIPMENT

GENERAL

Personal protective equipment may not be used as a substitute for feasible engineering or administrative controls. If these control methods are not feasible, or while they are being implemented, personal protective equipment is required whenever employees are exposed to harmful levels of physical agents or toxic substances. Personal protective clothing and equipment must be of a safe design and construction for the work to be performed, and they must be maintained in a sanitary and reliable condition.

EYE AND FACE PROTECTION

Eye protection and/or face shields are required where there is a possibility of any injury from flying particles, chips, sparks, and splashes from liquids such as caustics and solvents. Employees must wear this equipment when they use grinders, power drills, or other equipment which produces dust and chips.

Eye and face shields must be designed to provide adequate protection against the particular hazards to which the employee is exposed. The equipment must be easy to clean and be capable of being disinfected. If goggles must be worn by employees whose vision requires corrective lenses, the goggles must fit over the glasses, or the corrective lenses can be mounted behind the protective lenses.

HEAD PROTECTION

Protective head covering (hard hats) is required in situations where workers may be subjected to impact or penetration from falling or flying objects.

FOOT PROTECTION

Safety shoes are recommended to prevent injury to the feet from falling objects and other hazards. They should be worn particularly where heavy stock is handled. They should also be worn where there are parts-handling, shipping, and receiving operations.

GLOVES, APRONS, AND LEGGINGS

Aprons and leggings may be necessary for some operations (e.g., welding) depending on the nature of the hazard generated by the operations. Gloves and arm protectors should be used to prevent lacerations from handling objects with sharp edges, to prevent contact with chemicals, or to prevent burns.

PERSONAL PROTECTIVE EQUIPMENT (cont.)

HEARING PROTECTION

Noise levels in meat packing plants are sometimes above the 90 dBA limit. While noise controls are being implemented, employees must be provided, and directed to wear, hearing protection. (See "Occupational Health and Environmental Control.")

RESPIRATORY PROTECTION

NIOSH-approved respirators must be provided by the employer when the workplace air is contaminated with excessive concentrations of harmful dusts, fumes, mists, gases, or vapors. Respirators may be used as a control only when engineering or administrative controls are not feasible, or while they are being implemented.

If respirators are used, a written respirator program must be established and must include the following requirements:

1. The respirators selected for use must be designed to protect against the specific hazards to which the employees are exposed.

2. Written instructions covering the selection and use of respirators must be available.

3. Employees must be trained in the use and limitations of respirators as well as their proper fitting and maintenance.

4. Respirators should be cleaned at the end of each use. They should be taken apart, washed, dried, and defective parts replaced.

5. If a respirator is used by two people, it must be cleaned and disinfected after each use.

6. When the respirator is worn, all straps must be adjusted and tied.

7. To ensure proper function of the respirator, a good face seal is necessary. Beards, long sideburns, and glasses may interfere with the fit.

8. Filters must be replaced when the respirator has been used for the specified lifetime of the cartridge, when an employee can smell vapors in the mask, or if breathing becomes difficult.

SANITATION

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

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

3. Restrooms must be kept in a clean and sanitary condition.

4. Separate toilet facilities must be provided for each sex. If only one person at a time uses a toilet room and the door can be locked from the inside, separate facilities are not required.

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, and individual hand towels or warm air blowers.

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

8. Employees working with toxic substances should wash and, where necessary, change from contaminated clothing before eating, drinking, or smoking.

MEDICAL AND FIRST AID

The employer who is interested in maintaining production, preventing loss of work time, and receiving efficient work performance and good morale from his employees should adopt ways to maintain the health of the employees. 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. Medical personnel must be readily available by phone or on-site for advice and consultation.

Emergency phone numbers must be posted near telephones. The Emergency Information Chart (printed inside the back cover of this Guide) may be helpful. 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 which is used for treatment of all injured employees in near proximity to the workplace 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.

2. First aid supplies approved by a consulting physician must be readily available. The 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,

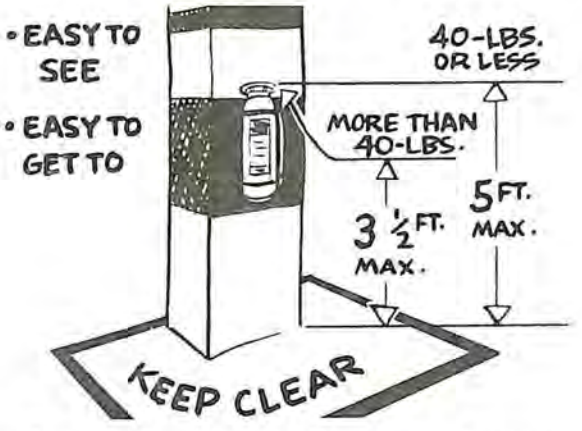
triangular bandages (to be used as slings), inflatable plastic splints, scissors, and mild soap for cleansing of wounds or cuts.

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

Some states have laws concerning medical practice which establish limits 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.

FIRE EXTINGUISHERS



Fire extinguishers must meet the following requirements:

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. If heavier than 40 pounds, they must not be mounted higher than 3½ feet.

5. Be inspected by management or a designated employee at least monthly to insure that they:
   - are in their designated places
   - have not been tampered with or actuated
   - do not have corrosion or other impairments

6. Be examined at least yearly and/or recharged or repaired to insure operability and safety. A tag must be attached to show the maintenance or recharge date and signature or initials of the person performing the service.

7. Be hydrostatically tested. Extinguisher sales representatives usually will perform this service at appropriate intervals.

8. Be selected on the basis of type of hazard, degree of hazard, and area to be protected.

9. Be placed so that the maximum travel distances, unless there are extremely hazardous conditions, do not exceed 75 feet for Class A or 50 feet for Class B.

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

COMPRESSED AIR EQUIPMENT

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

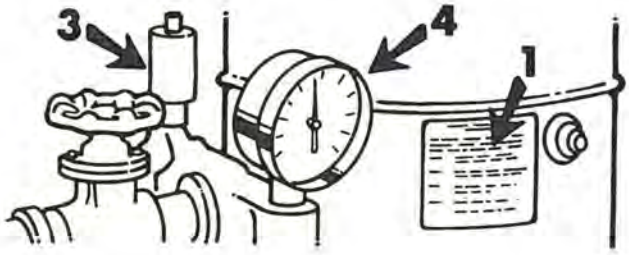
1. New air tanks must be constructed in accordance with the American Society of Mechanical Engineers (A.S.M.E.) Boiler and Pressure Vessel Code, Section VIII. The A.S.M.E. Code requires this information to be permanently stamped on the air tank.

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

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

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

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

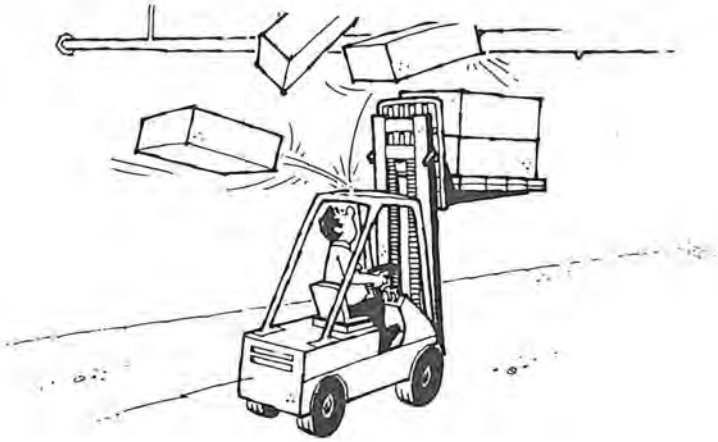


MATERIALS HANDLING AND STORAGE

POWERED INDUSTRIAL TRUCKS

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

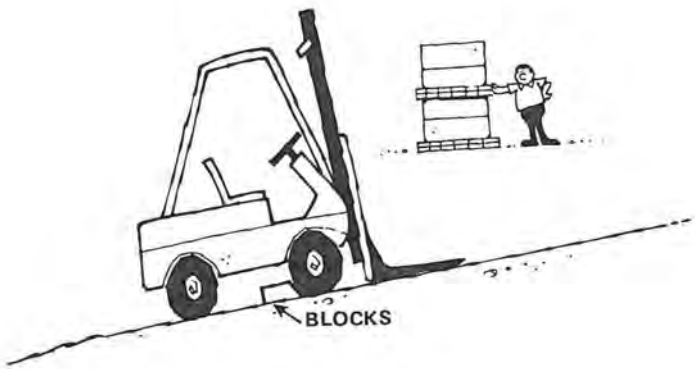
1. High-lift rider trucks must be fitted with an overhead guard to protect the operator from falling objects.



2. Methods must be developed and used to effectively train operators in the safe operation of powered industrial trucks, and only trained and authorized employees may operate the truck. Truck manufacturers and suppliers may provide training courses.

MATERIALS HANDLING AND STORAGE (cont.)

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



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

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

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

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

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 loads to be carried.

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

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

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

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

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

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

MACHINERY AND MACHINE GUARDING

GENERAL REQUIREMENTS FOR MACHINE GUARDING

One or more methods of machine guarding must be provided to protect the operator and other employees in the machine area from hazards such as those created by the point of operation, in-running nip points, rotating parts, flying chips, and sparks. All such hazards located 7 feet or less above the ground, floor, or working platform, must be guarded to prevent accidental contact. Guards must be attached to the machine if possible, or secured elsewhere if attachment to the machine is not possible. The guard must prevent the operator from having any part of the body in the danger zone during the operating cycle of the machine. Guards must not offer an accident hazard in themselves. Machines designed for fixed locations must be securely anchored to prevent "walking" or tipping.

The most common methods of machine guarding are

- enclosing the operation (preferred)
- interlocking devices
- remote control
- two-hand tripping devices
- electronic safety devices
- removal devices
- moving barriers.

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

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

The following pages contain examples of specific equipment that must be guarded. This listing is not intended to include all equipment that may require guarding, nor are the guarding methods suggested the only ones that may be effective.

MACHINERY AND MACHINE GUARDING (cont.)

ROTATING AND RECIPROCATING MOTION

Collars, couplings, cams, clutches, flywheels, shaft ends, spindles, 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.

CUTTING ACTION

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

Typical examples of cutting action are band and circular saws, trimmers, shavers, and grinders.

IN-RUNNING NIP POINTS

In-running nip points are a special danger created by the 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. Gears, feed rolls, conveyor terminals, and squeeze rolls are examples of nip points.

MACHINERY AND MACHINE GUARDING (cont.)

PUNCHING, SHEARING, AND BENDING ACTION

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

Typical examples of equipment involving punching, shearing, or bending action include power presses, shears, and stamping presses.

CLASSIFICATION OF GUARDS

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

ENCLOSURE GUARDS

Fixed enclosure guards should be used in preference to all other types. They always prevent access to dangerous parts by completely enclosing a hazardous operation, and can also be effective in controlling dust or chips generated by the operation. Because of limited feed-size openings, enclosure guards admit stock, but will not admit an employee's hand into the danger zone. They may be constructed so as to be adjustable to different sets of tools and dies, or varying thicknesses of stock, but once adjusted, they must be fixed. As a general rule, power transmission apparatus can be protected by enclosure guards.

INTERLOCKING GUARDS

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

An interlocking enclosure guard is not fixed; it may be opened to feed stock and adjusted as the operation requires. These guards utilize an electrical or mechanical interlocking connection with the operating mechanism which prevents the operation of the machine until the guard is returned to a closed position and the operator can no longer reach the point of danger.

MACHINERY AND MACHINE GUARDING (cont.)

AUTOMATIC GUARDS

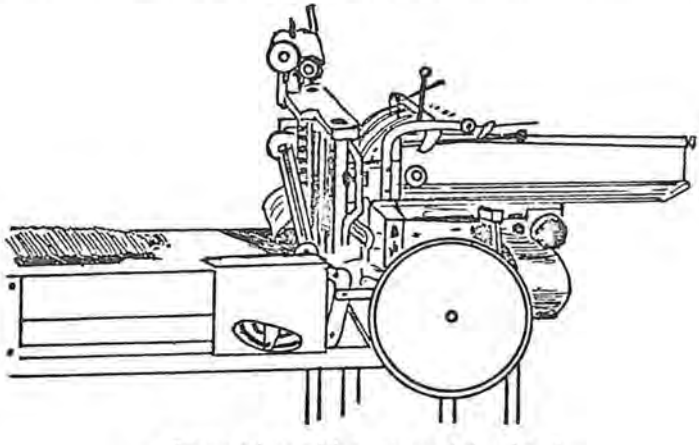
When neither an enclosure guard nor an interlocking guard is practicable, an automatic guard may be used. An automatic guard acts independently of the operator, repeating its cycle as long as the machine operates. This type of guard removes the operator's hands, arms, or body from the danger zone as the machine cycles. It is operated by the machine itself through a system of linkages connected to the operating mechanism.

Common types of automatic guards are sweep and push-away devices which create a moving barrier across the danger zone and push the operator's hand away from the area.

TWO-HANDED OPERATING DEVICES

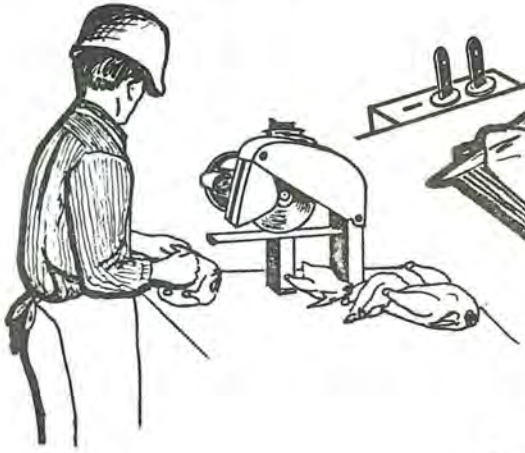
Two-handed operating devices, another category of guarding mechanism, are also designed to protect a machine operator from point of operation hazards. Although they are not guards in the technical sense, they accomplish the same effect.

These devices may be used to activate the machine cycle. They require simultaneous action of the operator's hands on electrical switch buttons, air control valves, mechanical levers, etc. The actuating controls must be located so as to make it impossible for the operator to move his hands from the controls to the danger zone before the machine has completed its closing cycle. The two-handed controls must be so designed as to prevent the blocking, tying down, or holding down of one control to allow one hand free access to the danger zone.



Bacon slicer with guard on infeed and cutting surface.

Poultry cutter with blade guard.



Wire mesh gloves provide hand protection.

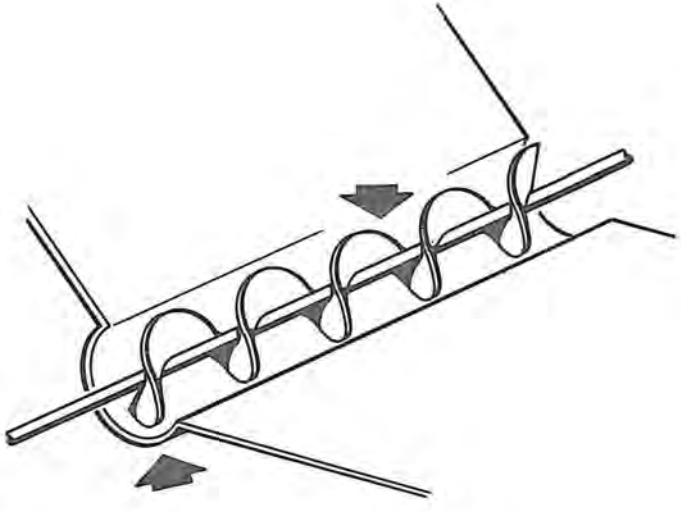
Proper knife storage — blades are covered.

Employee is protected by wire mesh apron — knives are held by a scabbard-guard.

ROTATING SCREW CONVEYOR

A rotating screw mechanism consists of a rotating screw (worm) or agitator blades or paddles located within a stationary case or shell. These are hazardous because in the back and forth or straight-line action, a worker may be struck or caught in a pinch or shear point between the fixed and moving parts. The principle of the rotating screw is used in most meat grinders. Fingers and hands must be prevented from reaching into the point of operation.

It is recommended that screw conveyors be guarded by enclosure guards. Hinged or removable covers on the enclosures will still allow access to the worm for cleaning.

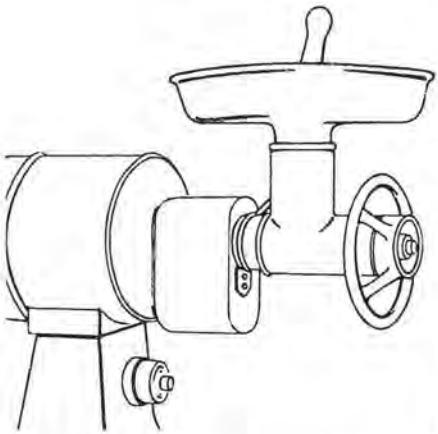


Rotating screw mechanism with hinged cover.

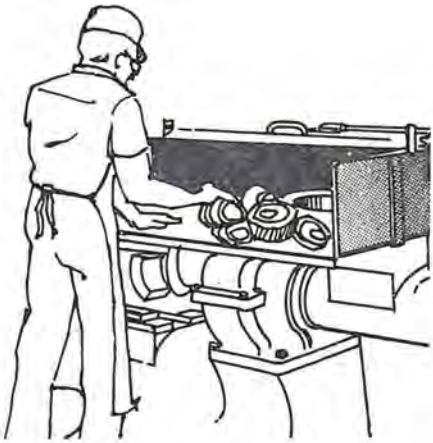
MACHINERY AND MACHINE GUARDING (cont.)

MEAT GRINDERS

These grinders must be provided with adequate protection to prevent the operator's reaching into the point of operation.



Hopper design with small neck prevents operator's fingers from contacting the worm.



Distance from the front of hopper to the feed opening prevents reaching into the worm.

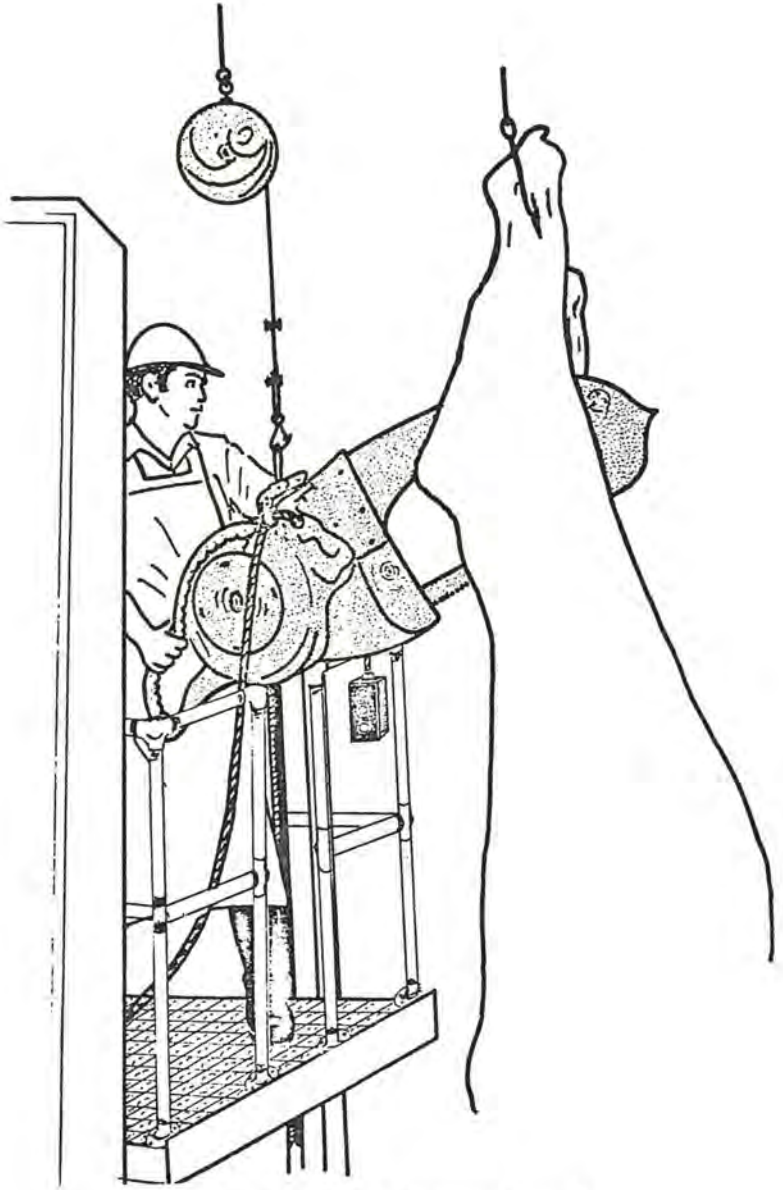
MACHINERY AND MACHINE GUARDING (cont.)

MEAT SAWS

All meat saws must be adjusted to the specific thickness of meat being sawed. The blade guard must be adjusted to the height of the piece to be cut, limiting the exposed area of the blade. All adjustments must be made with the power off and the machine stopped.

Properly guarded meat saw — guard is adjusted to the thickness of the cut.

MACHINERY AND MACHINE GUARDING (cont.)



Guard on splitting sawcovers unused portion of the blade.

HAND AND PORTABLE POWERED TOOLS

The following is a list of general requirements governing the use of hand tools:

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

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

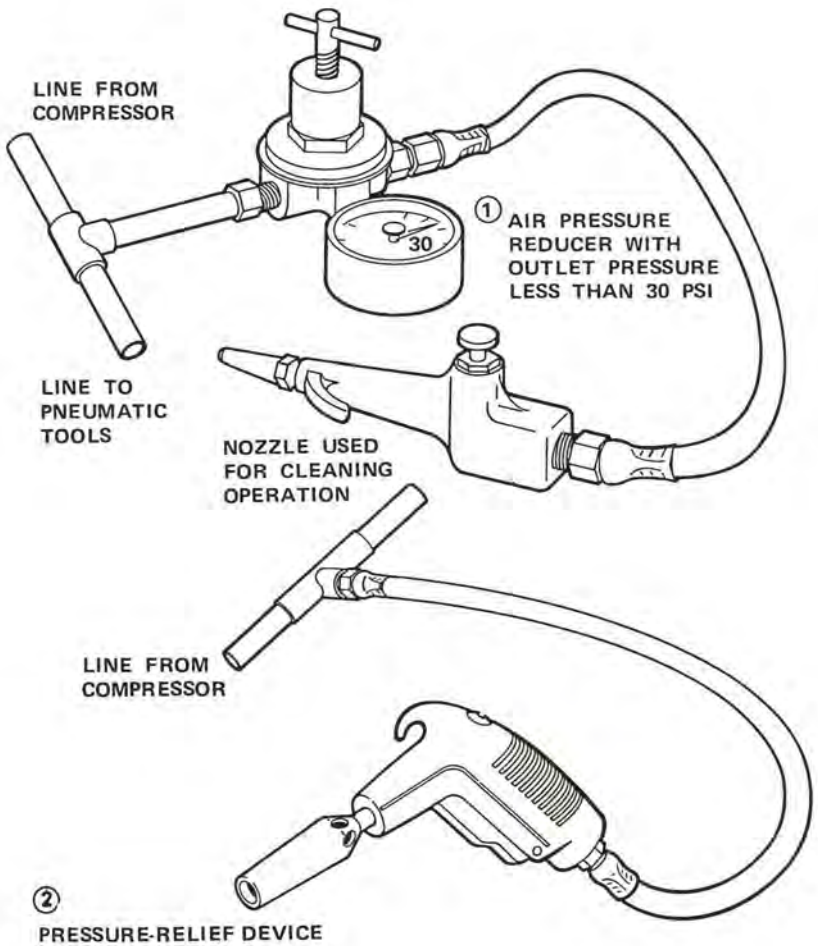
3. Most hand-held electrical tools must be equipped with a "dead-man" or "quick-release" control, so that power is shut off automatically whenever the operator releases the control.

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

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

HAND AND PORTABLE POWERED TOOLS (cont.)

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



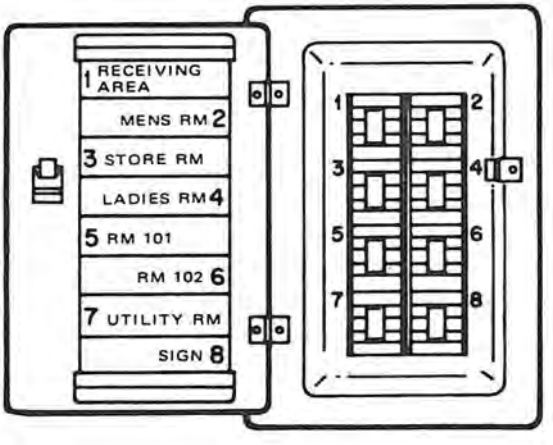
THE NATIONAL ELECTRICAL CODE (NEC)

ELECTRICAL REQUIREMENTS

More fires are caused by electrical malfunction than any other cause, and standards pertaining to electrical equipment and its use in all industries have been cited as violations more frequently than any others.

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

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



Proper labeling of circuit breakers.

THE NATIONAL ELECTRICAL CODE (NEC) (cont.)

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

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

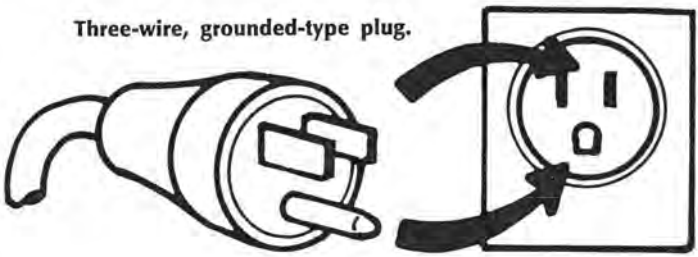
- in wet or damp locations
- if in electrical contact with metal
- if operated in excess of 150 volts to ground
- when in a hazardous location.

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

- portable hand-held motor-operated tools
- appliances
- any equipment operated in excess of 150 volts to ground.

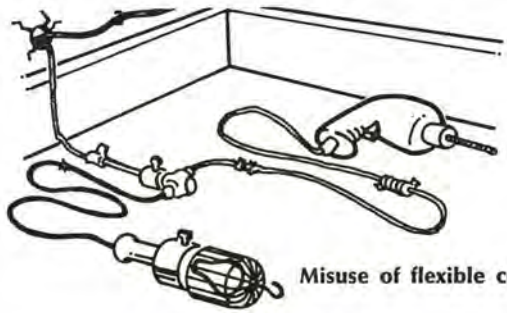
5. Outlets, switches, junction boxes, etc., must be covered.

Three-wire, grounded-type plug.



6. Flexible cords may not be:

- used as a substitute for fixed wiring
- run through holes in walls, ceilings, or floors
- run through doors, windows, etc.
- attached to building surfaces.



Misuse of flexible cord.

THE NATIONAL ELECTRICAL CODE (NEC) (cont.)

7. Flexible cord must be fastened so that there is no pull on joints or terminal screws. It must be replaced when frayed or when the insulation has deteriorated.

8. All splices in flexible cord must be executed by brazing, welding, or soldering, or by joining the conductors with suitable splicing devices. Any splices, joints, and the free ends of conductors must be properly insulated.

RECORDKEEPING REQUIREMENTS

Recordkeeping requirements under OSHA compile factual information about accidents that have happened. These records provide employers with a measure for evaluating the success of their safety and health activities and of identifying high risk areas of their businesses to which attention should be directed. Employers must report within 48 hours to OSHA (or a state agency in states which have operational safety and health plans) any incident or accident which results in hospitalization of five or more employees or a fatality.

Federal regulations require employers with 11 or more employees at any time during the preceding calendar year to complete OSHA Forms 100, 101 (or equivalent), and 102. The following cases must be recorded on the OSHA Form 100 (Log of Occupational Injuries and Illnesses): every death, every illness, and any injury which results in loss of consciousness, loss of time, restriction of work or motion, temporary or permanent transfer to another job, or medical treatment other than first aid. Illnesses and injuries are classified as to lost workdays, restriction of duties or "light duty," and no lost time.

A supplementary record must be completed for each recordable case. OSHA Form 101 may be used; a state workers' compensation report or other form is acceptable if it contains the equivalent information as the OSHA 101. Forms 100 and 101 must be kept current to within 6 days.

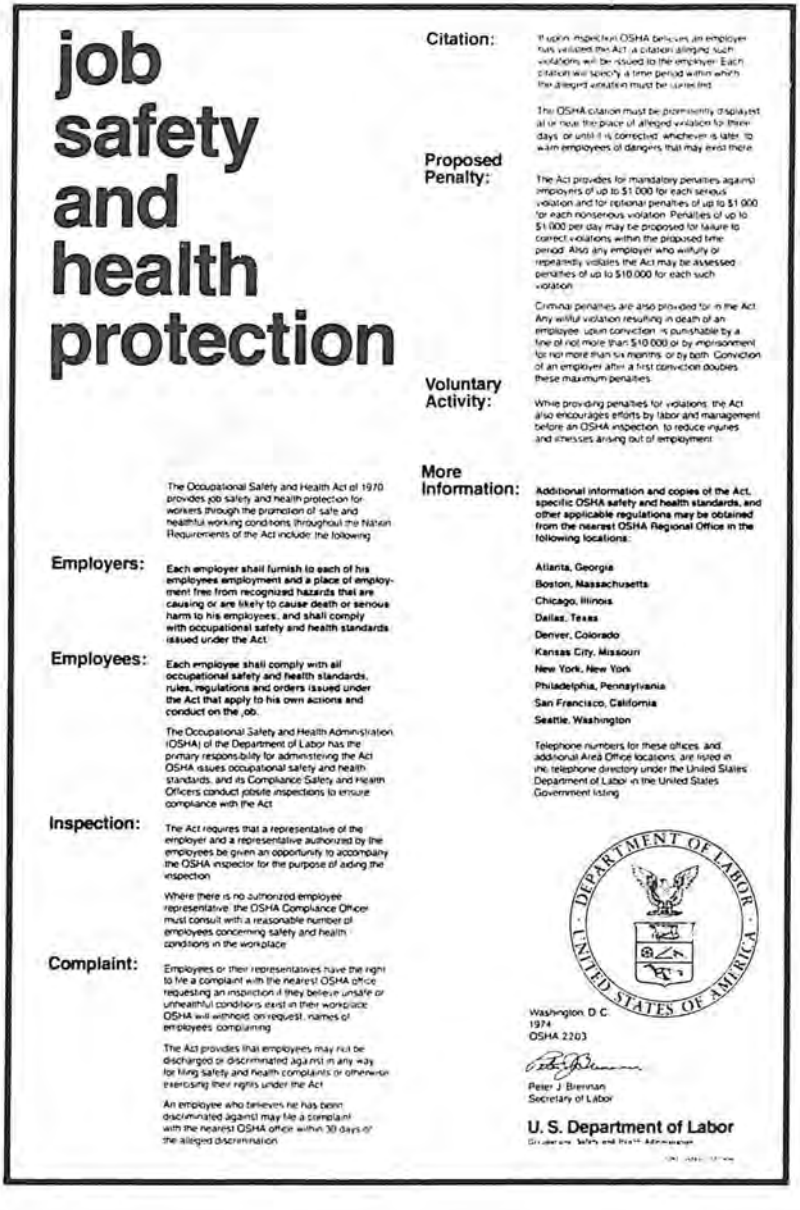
An annual summary, OSHA Form 102, must be posted for the entire month of February in a place where all employees are likely to see it. All of these forms (100, 101, and 102) must be retained for 5 years, excluding the current calendar year.

A booklet "Recordkeeping Requirements Under the Williams-Steiger Occupational Safety and Health Act of 1970" which provides a supply of forms and more detailed information is available from OSHA regional or area offices or from the regional offices of the Bureau of Labor Statistics.

Employers are also required to maintain accurate records of certain potentially toxic or harmful physical agents which must be monitored or measured and to promptly advise employees of any excessive exposure and the corrective action taken. In certain cases, physical examinations and testing are required. Examples of these agents are asbestos, ionizing radiation, etc. Any OSHA office can supply a list of these hazardous substances and explain what records may be required.

RECORDKEEPING REQUIREMENTS (cont.)

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



job safety and health protection

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

DEPARTMENT OF LABOR · UNITED STATES OF AMERICA ·

Washington, D.C.
1974
OSHA 2203

Peter J. Brennan
Secretary of Labor

U. S. Department of Labor

CHECKLISTS

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

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

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

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

WALKING AND WORKING SURFACES

AISLES AND FLOORS (29 CFR 1910.22)

	Yes	No
Are all places of employment kept clean and orderly?	☐	☐
Are floors, aisles, and passageways kept clean and dry and all spills cleaned up immediately?	☐	☐
Are floor holes, such as drains, covered?	☐	☐
Are permanent aisles appropriately marked?	☐	☐
Are wet and/or greasy areas covered with non-slip materials?	☐	☐
Are floor mats (rubber and wood) in good repair?	☐	☐

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

Are signs showing floor load capacity present?	☐	☐
Are platforms, storage lofts, balconies, etc. that are more than 4 feet above the floor protected with standard guardrails?	☐	☐
Are floor holes, through which a person can fall, guarded by standard guard rails and toe boards?	☐	☐

STAIRS (29 CFR 1910.24)

Are all stairways at least 22 inches wide?	☐	☐
Do stairs have at least a 7-foot overhead clearance?	☐	☐
Do stairs angle no more than 50° and no less than 30°?	☐	☐

LADDERS (29 CFR 1910.25, .26, .27)

Have defective ladders (e.g., with broken rungs or split side rails) been tagged as "DANGEROUS, DO NOT USE" and removed from service for repair or destruction?	☐	☐
Is the use of the top of an ordinary step ladder as a step prohibited?	☐	☐
Do portable ladders have non-slip bases?	☐	☐

	Yes	No
Is the distance between the centerline of rungs on a fixed ladder and the nearest permanent object in back of the ladder at least 7 inches or more?	☐	☐
Do all fixed ladders have a preferred pitch of 75°-90°?	☐	☐

EGRESS (29 CFR 1910.36–.38)

Are all exits marked with an exit sign and illuminated by a reliable light source?	☐	☐
Is the lettering at least 6 inches high with the principal letter strokes at least ¾ of an inch wide?	☐	☐
Is the direction to exits, when not immediately apparent, marked with visible signs?	☐	☐
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 kept free of obstructions?	☐	☐

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

Is management aware of the hazards caused by various chemicals used in the establishment?	☐	☐
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 handled?	☐	☐
Are all containers such as vats and storage tanks labeled as to their contents?	☐	☐
Are employees required to wear personal protective equipment (gloves, eye protection, or respirators) when handling hazardous materials?	☐	☐
If internal combustion engines are used, is carbon monoxide kept within acceptable limits?	☐	☐

OCCUPATIONAL NOISE EXPOSURE (29 CFR 1910.95)

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

HAZARDOUS MATERIALS

FLAMMABLE AND COMBUSTIBLE LIQUIDS (29 CFR 1910.106)

Are all connections on drums and combustible liquid piping vapor and liquid tight?	☐	☐
Are flammable liquids kept in closed containers when not in use (e.g., parts cleaning tanks or pans)?	☐	☐
Are all spills of flammable or combustible liquids cleaned up promptly?	☐	☐
Are bulk drums of flammable liquids grounded and bonded to containers during dispensing?	☐	☐
Are gasoline and flammable liquids stored in approved containers?	☐	☐
Are LP-gas storage tanks guarded to prevent damage from vehicles?	☐	☐
Are "NO SMOKING" signs posted on LP-gas tanks?	☐	☐
Are storage cabinets for flammable and combustible liquids labeled "FLAMMABLE — KEEP FIRE AWAY"?	☐	☐
Are all paints, lacquers, or thinners, kept for more than 30 days stored in approved metal or wooden cabinets or in storage rooms?	☐	☐

PERSONAL PROTECTIVE EQUIPMENT (29 CFR 1910.132–.137)

	Yes	No
Is personal protective equipment provided, used, and maintained wherever it is necessary?	☐	☐
Is employee-owned personal protective equipment, such as gloves and protective shoes, adequate and properly maintained?	☐	☐
Is eye protection available where debris or flying objects could be a hazard?	☐	☐
Are ear plugs or muffs provided and worn during noisy conditions?	☐	☐
Is slip-resistant footwear worn?	☐	☐

RESPIRATORY PROTECTION DEVICES (29 CFR 1910.134)

Are respirators provided when necessary?	☐	☐
Are there written standard operating procedures for the selection and use of respirators?	☐	☐
Is the user instructed and trained in the proper use of respirators?	☐	☐
Where practicable, are respirators assigned for use by employees individually?	☐	☐
Are respirators cleaned and disinfected after use?	☐	☐
Are respirators stored in a convenient, clean, and sanitary location?	☐	☐
Are routinely-used respirators inspected during cleaning?	☐	☐
Is the proper respirator in use for the hazards present? (For example, dust masks do not protect against solvent vapors.)	☐	☐

GENERAL ENVIRONMENTAL CONTROLS

SANITATION (29 CFR 1910.141—.149)

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

	Yes	No
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 outlets for water that is not suitable for drinking clearly posted as "UNSAFE FOR DRINKING, WASHING, OR COOKING"?	☐	☐
Are employees prohibited from eating in areas where toxic materials are present?	☐	☐
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 and hot vats guarded or insulated where employees could contact them?	☐	☐

MEDICAL AND FIRST AID (29 CFR 1910.151)

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

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

	Yes	No
Are extinguishers selected for the types of combustibles and flammables in the areas where they are to be used? Class A. Ordinary combustible material fires Class B. Flammable liquid or grease fires Class C. Energized electrical equipment fires	☐	☐
Are extinguishers fully charged and in 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 the weight does not exceed 40 pounds, the top must not be higher than 5 feet above floor. If greater than 40 pounds, the top must not be higher than 3½ feet above floor.	☐	☐
Have all extinguishers been serviced, maintained, and tagged at intervals not to exceed one year?	☐	☐
Are all extinguishers checked (by management or designated employee) monthly to see if they are in place or if they have been discharged, etc.?	☐	☐
Have all extinguishers been hydrostatically tested according to schedules set for the type of extinguisher?	☐	☐

AUTOMATIC 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 the clearance between sprinkler deflectors and the top of storage at least 18 inches?	☐	☐
Are the heads or nozzles pointed in the direction of the potential fire?	☐	☐

COMPRESSED AIR (29 CFR 1910.169)

	Yes	No
Are pulleys and belts on compressors and motors completely guarded?	☐	☐
Are flexible cords or plugs on electric motors periodically checked and replaced if in a deteriorated condition?	☐	☐
Do the relief valves operate properly?	☐	☐
Are air tanks drained regularly?	☐	☐
Is the pressure-relief device and gauge in good operating condition?	☐	☐

MACHINERY AND MACHINE GUARDING (29 CFR 1910.212)

Are belts, pulleys, and rotating shafts 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?	☐	☐
Are all pieces of equipment with an electric motor or any electrical connection effectively grounded?	☐	☐
Are sprockets and belt drives within reach of platforms and passageways or less than 7 feet from the floor completely enclosed?	☐	☐
Are fans less than 7 feet above the floor guarded with openings ½ inch or less?	☐	☐
Do mixers have devices available for moving mixing containers which are too heavy to handle manually (usually considered to be 80 lbs.)?	☐	☐
Are mixers equipped with interlocks which interrupt power when the mixing container is opened?	☐	☐

	Yes	No
Are slicers equipped with guarding devices to prevent the operator from placing a hand into the operating mechanism?	☐	☐
Are blade guards on meat saws always lowered to the height of the piece being cut?	☐	☐
Are splitting saws equipped with "dead man" switches to interrupt power if the switch is released?	☐	☐
Is all fixed machinery securely anchored to prevent movement?	☐	☐
Are screw conveyors covered or otherwise guarded (e.g., integral part of meat grinder)?	☐	☐

ABRASIVE WHEEL MACHINERY (Grinders) (29 CFR 1910.215)

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

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

Are tools and equipment (both company and employee-owned) in good condition?	☐	☐
Have mushroomed heads on chisels, punches, etc. been reconditioned or replaced if necessary?	☐	☐
Have broken hammer handles been replaced?	☐	☐
Have worn or bent wrenches been replaced?	☐	☐
Have deteriorated air hoses been replaced?	☐	☐
Have employees been made aware of the hazards caused by faulty or improperly used hand tools?	☐	☐

NATIONAL ELECTRICAL CODE (29 CFR 1910.308 & .309)

	Yes	No
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 all portable electrical hand tools grounded? (Double-insulated tools are acceptable without grounding.)	☐	☐
Are breaker switches identified as to their use?	☐	☐
Do flexible cords and cables not run through holes in walls or ceilings or through doorways or windows?	☐	☐
Are flexible cords and cables fastened so that there is no direct pull on joints or terminal screws?	☐	☐
Are flexible cords and cables never substituted for fixed wiring?	☐	☐
Are flexible cords and cables not attached to building surfaces?	☐	☐
Are electrical equipment controls accessible?	☐	☐
Are all conduit connections intact?	☐	☐

RECORDKEEPING (29 CFR 1903.2–1904.8)

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?	☐	☐

INFORMATION SOURCES

AMERICAN NATIONAL STANDARDS INSTITUTE (ANSI)

1430 Broadway
New York, N. Y. 10018

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

NATIONAL FIRE PROTECTION ASSOCIATION (NFPA)

470 Atlantic Ave.
Boston, Mass. 02210

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

NATONAL SAFETY COUNCIL

425 North Michigan Avenue
Chicago, Illinois 60611

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

NIOSH AND OSHA REGIONAL OFFICES

The following pages list NIOSH and OSHA regional offices which 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 publications.

NIOSH REGIONAL OFFICES

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

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

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

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

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

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

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

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

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

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

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

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

HOW TO OPERATE

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

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

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

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

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

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

TABLE I

OSHA REGIONAL OFFICES

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

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

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

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

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

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

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

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

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

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

☆ U.S. GOVERNMENT PRINTING OFFICE: 1977—757-052

HOW TO LIFT SAFELY

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

The factors that contribute to safe lifting are...

DETERMINE IF OBJECTS CAN BE LIFTED AND CARRIED SAFELY.

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

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

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

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

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

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

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

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

When lifting and carrying with another person—teamwork is important.
The load should be equally distributed. Movements must be coordinated so you both start and finish the lift action at the same time and perform turning movements together.

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

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

Avoid awkward positions or twisting movements while lifting.

Over-reaching and stretching to reach overhead objects may result in strains or falls.
Use a ladder instead of chairs, boxes, etc.

NATIONAL INSTITUTE FOR OCCUPATIONAL SAFETY AND HEALTH

EMERGENCY INFORMATION

FIRE

Telephone Fire Department _____

Nearest Alarm Box at _____

CRIME

Telephone Police _____

INJURY/ILLNESSES

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

Doctor _____

Office _____ Tel. _____

Residence _____ Tel. _____

_____

_____

Hospital _____

Address _____ Tel. _____

Ambulance _____

Address _____ Tel. _____

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

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

1. Name _____ Office Tel. _____

   Address _____ Res. Tel. _____

or

2. Name _____ Office Tel. _____

   Address _____ Res. Tel. _____

DEPARTMENT OF
HEALTH, EDUCATION, AND WELFARE
PUBLIC HEALTH SERVICE
CENTER FOR DISEASE CONTROL
NATIONAL INSTITUTE FOR OCCUPATIONAL SAFETY AND HEALTH
ROBERT A. TAFT LABORATORIES
4676 COLUMBIA PARKWAY, CINCINNATI, OHIO 45226

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