POWER ENGINEERING CONTRACTORS INC.

SAFETY AND HEALTH PLAN

FOR

SAN ANTONIO PUMP STATION IMPROVEMENTS

SAN FRANCISCO WATER DEPARTMENT
CONTRACT NO. WD-2062

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GENERAL COMPANY SAFETY PLAN

POLICY

IT IS THE COMPANY POLICY TO PERFORM WORK IN THE SAFEST MANNER POSSIBLE CONSISTENT WITH GOOD CONSTRUCTION PRACTICES. IT IS THE INTENT TO MAINTAIN EFFECTIVE STANDARDS TO GUARD AGAINST INJURIES AND ILLNESSES ON THE JOB. TO ACHIEVE THIS POLICY REQUIRES PROPER ATTITUDE AND EFFORT ON THE PART OF EACH EMPLOYEE AND CO-OPERTION WITH FELLOW EMPLOYEES FOR PREVENTION OF INJURIES AND ILLNESSES. A SAFETY PROGRAM HAS BEEN ESTABLISHED AND WILL BE FULLY IMPLEMENTED IN OUR BASE YARD AND ON EACH JOB SITE.

EACH EMPLOYEE HAS THE RIGHT TO EXPECT THAT HE OR SHE WILL BE PROVIDED WITH A PROPER PLACE IN WHICH TO WORK AND PROPER EQUIPMENT WITH WHICH TO DO THE JOB. A MUTUALLY PROFITABLE AND HARMONIOUS RELATIONSHIP DEPENDS ON THESE CONDITIONS.

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OBJECTIVE

The objective of the safety program is prevention of accidents. An accident as referred to in this program is any unplanned and unintended event that disrupts the orderly process of performing work. All accidents, by this definition, result in loss due to job disruption and delay, and often involve additional losses due to personal injury, equipment damage, property or material damage, or a combination of one or more of these factors. When an accident occurs, chance is largely the determining factor as to degree of loss. Therefore, prevention of all accidents must be the objective of safety effort, rather than only those where the potential for serious loss is most apparent.

Other than "Acts of God", accidents are preventable and the result of causes related to unsafe and inefficient procedures or methods, unsafe physical conditions, unsafe equipment, unsafe personal acts and usually one or more of these factors in combination. Since accidents usually result from the same deficiencies that adversely affect productivity, costs, employee relations and public relations, the safety record is a reliable guide to the general effectiveness of supervision.

RESPONSIBILITIES

The implementation of this Safety Program is a direct responsibility of line management. In discharging such responsibility, each supervisor and foreman will, within his area of control:

1. Establish and maintain a safe working environment for all employees.
2. Develop and implement appropriate safe operating procedures and working practices for all activities within his area of responsibility.
3. Provide the leadership and management effort not only to enforce the established conditions and practices, but also to establish in each employee the attitude that he work safely for his own protection and for the protection of his fellow employees.

Each employee is responsible for working in a safe manner in accordance with established operating practices and procedures.

COMPANY STANDARDS

Recognizing that the responsibilities for safety and health must be shared by all, the company further establishes the following:

The company accepts the responsibilities for enacting, maintaining and improving safety and health standards and expects full cooperation toward the prevention of job-related accidents, injuries and/or illnesses.

Supervisors are responsible for developing the proper attitudes toward safety and health in themselves and in those they supervise, and for ensuring that all operations are performed with the utmost regard for the safety and health of all personnel involved, including themselves. Their responsibilities include:

1. Compliance with U. S. Army Corps of Engineers Safety and Health Requirements Manual, EM 385-1-1, April 1981, including updated revisions.
2. Requirements for all employees to comply and cooperate with all safety and health rules as a condition of employment.
3. Conducting safety meetings to provide education and training on safety and health matters.
4. Conducting safety and health inspections to identify and eliminate unsafe working conditions and/or practices.
5. Promptly and thoroughly investigating every accident to determine what caused it and correcting the problem so that it will not happen again.

Supervisors will be responsible to see that all employees are promptly trained in the safe performance of their jobs.

Supervisors are responsible for proper and thorough documentation of all matters relating safety and health.

Employees are responsible for wholehearted, genuine cooperation with all aspects of safety and health including compliance with all rules and regulations and for continuously practicing safety while performing their duties.

BASIC SAFETY RULES

A. GENERAL SAFETY

1. All persons shall follow these safe practice rules, render every possible aid to safe operations, and report all unsafe conditions or practices to the foreman or project superintendent.
2. All employees shall be given frequent accident prevention instructions. Instructions should be given at least once a week.
3. All injuries shall be reported promptly to the project superintendent.
4. Hard hats will be worn at all times when working in the company yard or other locations (i.e.: cargo work, dredging, salvage, construction, etc.).
5. Safety belts will be worn when conducting work over six (6) feet from the ground unless adequate hand rails are present.
6. NO ALCOHOLIC BEVERAGES shall be available or consumed during pay and/or working hours of employment.
7. Construction equipment (i.e.: forklifts, Austin Western, 54-B, etc.) shall at no time be used as a taxi device for personnel.
8. Walking or standing under loads is an unsafe practice and shall be avoided to the maximum extent possible.
9. Ladders and gangplanks shall be in good condition, long enough and properly secured.
10. Know the location and proper use of fire equipment available.
11. Employees should be alert to see that guards and other protective devices are in proper places and adjusted, and shall report deficiencies promptly to the foreman or superintendent.
12. Workers shall not handle or tamper with any electrical equipment, machinery or air or water lines in a manner not within the scope of their duties, unless they have received instruction from qualified personnel.
13. Correct poor lifting habits among employees when observed and stress proper lifting habits at safety meetings.
14. Do not throw materials, tools, or other objects from structures.
15. Improper foot covering shall not be allowed. Proper covering shall be at the discretion of the project superintendent.
16. Proper protection for face and eyes will be mandatory during grinding, welding, chipping, or other operations subject to flying particles or eye damage.
17. Wash thoroughly after handling injurious or poisonous substances and follow all special instructions from authorized sources regarding this matter. Hands should be thoroughly cleaned just prior to eating if they have been in contact with paint, sterilizing materials, etc.
18. Arrange work so that you are able to face ladder and use both hands while climbing.

19. Gasoline shall not be used for cleaning purposes.
20. No burning, welding, or other source of ignition shall be applied to any enclosed tank or vessel until it has first been determined that no possibility of explosion exists (Gas Free Certificate), and authority for the work is obtained from the employer's representative.
21. Don't lift or lower portable electric tools by means of the power cord.
22. Don't leave the cords of portable electric tools where mooring cables will run over them.
23. Cranes, forklifts, and hoist will only be used within the lifting capacity in which they are rated. NO OVERLOADING OF LIFTING EQUIPMENT WILL BE TOLERATED! ASK WHAT IT WEIGHS!
24. Wire and fabric slings, ropes and rigging designed for the purpose of lifting will only be used within the capacity in which they were designed. In addition, they will be checked periodically for frayed and broken strands, and will be replaced as required.
25. Do not use a screwdriver as a chisel.
26. Wrenches should not be altered by the addition of handle-extensions or "cheaters".
27. Do not use pipe or stilson wrenches as a substitute for other wrenches.
28. Power is to be shut off before leaving a machine. If an employee is authorized to clean or repair machinery or equipment, the switch shall be pulled and the switch locked into the OFF position, and a "MEN WORKING" sign placed on the switch. There will be no deviation from this procedure. Disregarding this procedure is cause for immediate disciplinary action.
29. Compressed air is to be used only on work requiring its use. Do not use it to clean clothing, benches or other surfaces. All employees must be informed of the danger of releasing compressed air close to the body. Air hoses shall be immediately safety chained or wired upon connection.
30. Solvents such as brush wash, benzene, kerosene, etc., are to be used only for the specific jobs for which they are intended. Adequate ventilation must be provided when any harmful vapor-producing chemicals are used. Flammable liquids shall be kept in safety containers at all times.
31. Hand tools are to be used for the purpose for which they are designed. Defective tools will not be used and shall be removed from service and repaired. If tools cannot be repaired, they shall be condemned and permanently removed from the premises.
32. Company-provided tools shall not be modified by unauthorized personnel.
33. Each subcontractor will be notified to provide all safety equipment for his workmen before their arrival on the jobsite.

General Safety, continued.

34. Horseplay and any other conduct resulting in unsafe conditions will not be tolerated.
35. Workmen who continually or willfully violate safe working practices will be subject to dismissal. The workmen's immediate supervisor will be held responsible for seeing that such individuals are not allowed to continue endangering themselves and/or others.
36. Project superintendent will take disciplinary action at his discretion against supervisory personnel who fail to carry out the safety program.
37. A jobsite inspection will be held each week by project superintendent and report as per enclosed sample.
38. We will comply with all pertinent provisions of Corps of Engineers Manual EM385-1-1, dated April 1981, entitled "Safety and Health Requirements Manual" as amended.
39. Safety suggestions are appreciated by your company. Valid, significant modification or new safety steps or devices which are implemented will be rewarded by issuing a savings bond to the employee entering the suggestion.

B. MARITIME SAFETY

1. Work vests shall be worn when working on or about the deck of all floating equipment.
2. Hard hats will be worn at all times when working in the company yard, or when working off the premises (i.e.: cargo work, dredging, salvage, etc.).
3. Safety belt worn and connected when conducting any work or inspection over six (6) feet from ground when not protected by a handrail.
4. Dump scows are provided with protective fences and they shall be maintained in good repair at all times.
5. Scow men shall advise boat crew when he is going onto the scow and for what purpose. Care shall be exercised at all times in transferring from boat to scow. An adequate flashlight shall always be carried by the scowmen with use of life vest and hard hat essential.
6. Dredge crew night operation shall include prior notification of foreman for any project which would take a crew member out of sight of other members.
7. Flashlights will be available for all crew members.
8. Life rings are located on all marine equipment. Know their location.
9. All diving requirements shall be provided by a qualified, independent, diving contractor.

Maritime Safety, continued.

10. All employees are responsible to assure that all maritime operations are in compliance with Coast Guard regulations. Also, public safety should be of utmost importance to all crew members.
11. All personnel should sit or stand near the center of the crew boat or skiff.

C. EMERGENCY ASSISTANCE

Emergency assistance is generally best obtained through normal job operational channels. These channels are generally used to increase the speed and effectiveness of communication and action at the jobsite. Using normal (direct) channels also helps reduce confusion and promotes orderly reduction of problems.

The following emergency assistance form should be filled out upon arrival at a new jobsite.

EMERGENCY ASSISTANCE

Project Superintendent:

Name: _____

Number: _____

Police: _____

Fire Department: _____

Hospital: _____

Location: _____

_____

_____

Coast Guard Emergency: _____

Tugboat Assistance: _____

Helicopter Service: _____

Note: Emergency phone numbers will be posted in each of the construction staging areas in accordance with EM-385-1-1, Section V.

First aid kits and fire extinguishers will be located in all derrick barges and tugs.

Should a medical problem occur, all employees shall notify the project superintendent. The injured employee will be transported to proper medical

Emergency Assistance, continued.

facilities or given the medical attention according to the seriousness of the injury.

D. EQUIPMENT INSPECTION AND MAINTENANCE

1. It is our policy to maintain equipment in top operating condition at all times.
2. Before the machinery or mechanized equipment is put into service on the job, it shall be inspected and tested by a qualified mechanic and certified to be in safe operating condition.
3. Equipment will be inspected at regularly scheduled intervals and deficiencies reported immediately and corrections made before the equipment is put back in operation.
4. Hoisting equipment operators will be experienced personnel, over 21 years of age and performance supervised to assure safe operations for the duration of the job.
5. Report all equipment problems to the foreman or superintendent.

EMPLOYEE TRAINING AND DEVELOPMENT

A. HIRING

Care should be taken in the selection of new employees. Hiring people whose physical, mental or emotional abilities are not suited to the task is unfair to the employee as he is the potential accident victim.

Drugs and Medications:
All personnel will be asked to furnish information concerning the use of any drugs or medication that they may be taking in an effort to expedite any medical attention that may be required on the job.

B. INDOCTRINATION

All new employees shall be instructed about and receive a "Safety Program" during the sign up procedure.

Such instructions shall include:

1. Emergency services and telephone numbers.
2. First aid.
3. Basic safety practices.
4. Accident reporting practices.
5. Job hazard analysis.

C. TOOL BOX MEETINGS

Employees will be assembled weekly for a "Tool Box" safety session by the foreman, whose name will be posted on the wall of the project superintendent's office along with the phone numbers of emergency medical and fire. Such meetings will be used to reinforce safety policy and procedures already in effect and establish new methods as the need arises.

1. Schedule regular meetings for same day and time each week.
2. Start on time. Limit to 10 minutes.
3. Keep control - concentrate on safety.
4. Plan the meeting. Use notes on accidents that occurred and unsafe practice noted during the week and hazards and safe practices for work ahead.
5. Encourage suggestions and discussion.
6. Keep notes on items discussed and decisions made (see foreman tool box reports).
7. Follow up to see that decisions are carried out.

Superintendent should attend a different tool box meeting each week, rotating among crews.

D. ATTITUDE DEVELOPMENT

Most individuals can be considered "average" in the matter of human imperfections. The "average" man forgets, is sometimes nervous, acts impulsively on occasion, has emotional upset and may be lulled into a false sense of security. These imperfections cannot be eliminated, but compensating actions can be taken to minimize the extent of accidents that occur when things get "out of control". This good attitude development is essential to good safety performance.

1. Conduct all operations in accordance with good, sound, safe, construction practices.
2. Keep work areas clean and orderly.
3. If you don't understand an operation, ask your supervisor.
4. Wear protection devices for your <u>own</u> safety.

PERSONAL PROTECTIVE EQUIPMENT

As almost 63% of all injuries are concentrated on the hand, foot, eyes and back of employees, it is to your advantage to wear protective equipment. All employees engaged in construction activities which require special protective devices will be provided with such devices by the company. Employees will be cautioned of the importance in using these items, and failure to do so will be cause for immediate discharge from employment.

The following is a list of the required special protective devices:

1. Head Protection
   All construction areas are "Hard Hat" areas on this project. Employees, as well as outside visitors to the project site, will wear approved hard hats at all times within the designated hard hat areas. Extra hard hats will be on hand for visitor use.
2. Life Vests
   Their use is mandatory when working on the deck of all floating equipment, including crew boat transfer. Vests shall be provided for all employees with additional vests provided for all visitors.
3. Eye Protection
   Employees, while engaged in work activities that could result in eye injury from flying objects such as chips, dust, broken drill bits, acid, and chemical splash, will be provided with safety glasses and/or full face shields.
4. Hand Protection
   Gloves will be provided to employees to protect the hands while working with potentially hazardous equipment, such as chainsaws, jack hammers, heavy-held drill motors, and any other equipment that could result in injury to the hands.
5. Ear Protection
   Where noise levels exceed 85 DB continuous or 140 DB impulse, employees will be furnished with ear plugs and/or ear muffs.
6. Respiratory Protection
   Dust masks and respirators will be provided to employees subject to harmful concentration of dust, gases, fumes, mists, and toxic materials. Ref: EM385-1-1, Para. 07.B.01.
7. Foot Protection
   Shoes protecting the foot and toes shall be worn.

REPORTING ACCIDENTS AND INJURIES

All accidents shall be reported in compliance with the Corps of Engineers Manual EM385-1-1 dated April 1981, Section II. Every employee is directed to report all accidents of every nature to the project superintendent which results in injury to persons or damage to property. (Instructions for accident procedure are included herein.) In addition, any accident that occurs that does not result in injury or damage will be discussed so that we can learn from them.

The project superintendent shall complete an accident investigation form within 24 hours of the accident. (A sample of the complete form is attached.)

The superintendent will:

1. Summon qualified first aid assistance by calling the emergency telephone number as posted on the bulletin board for this project.
2. If injured employee is capable of driving his or her automobile, furnish employee with the name, address and telephone number of the doctor that they are to report to.
3. If injured employee is unable to drive or does not have transportation, but does not require emergency ambulance service, then it is the responsibility of the project superintendent to see that that employee receives proper medical attention by a doctor.
4. If equipment breakdown contributed to the injury, the project superintendent will secure subject equipment and will call a factory service representative to investigate and repair as required before equipment will be used.
5. If the accident resulted in serious injury or death, notify the owner's representative and Smith-Rice Company office immediately.
6. Investigate the circumstances of the injury and prepare an Employee's Report of Industrial Injury.
7. All accidents are government reportable. The project superintendent will complete necessary accident investigation forms.

INCIDENT INVESTIGATION REPORT

NAME OF INJURED WORKER -- _____

DATE OF INCIDENT -- _____

TIME INCIDENT OCCURED -- _____

LOCATION OF OCCURENCE -- _____

JOB OF INJURED PARTY -- _____

LENGTH OF TIME ON JOB -- _____

- ☐ ACCIDENT REQUIRING MEDICAL TREATMENT
- ☐ ACCIDENT REQUIRING 1ST AID ONLY
- ☐ NEAR MISS
- ☐ OTHER (SUCH AS DISEASE, FATALITY, ETC) _____

SUPERVISOR -- _____ TITLE -- _____

1. WHAT HAPPENED? DESCRIBE HOW INCIDENT OCCURRED. _____

2. WHY DID IT HAPPEN? DEVELOP CAUSE BEHIND THE INCIDENT. FOCUS ON PEOPLE, MATERIAL, EQUIPMENT AND POLICIES THAT CONTRIBUTED TO THIS INCIDENT.

3. WHAT SHOULD BE DONE TO PREVENT THIS FROM HAPPENING AGAIN?

4. WHAT HAS BEEN DONE SO FAR? _____

PERSON COMPLETING THIS REPORT -- _____ DATE _____

LC FORM 1152, ED 6/84

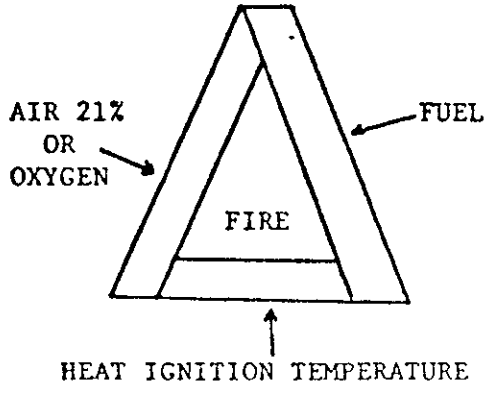
FIRE PREVENTION AND PROTECTION

A. Fire Prevention

1. Proper storage will be provided for all inflammable material.
2. The jobsite will be maintained in a neat, orderly fashion. All debris that may constitute a fire hazard will be removed for prompt and proper disposal.
3. No burning of debris.
4. Fire fighting equipment will be provided at proper locations and personnel instructed in their proper use.

B. Fire Triangle

Fire is primarily defined as rapid oxidation accompanied by heat and light. In general, oxidation is the chemical union of substance with oxygen. The rusting of iron is an example of slow oxidation; heat is generated, but it is a slow process. Burning may occur as a result of the chemical action of chlorine and other chemicals, but for practical purposes only the fire that involves heat, fuel and oxygen is discussed. Fire can only take place when oxygen in some form, fuel to combine with the oxygen, and sufficient heat to cause combustion are united in the correct proportions. The removal of any one of these three factors will result in preventing a fire from occurring or extinguishing a burning fire. The classic "fire triangle" in which each leg represents one of the three factors necessary for combustion to occur is illustrated below.



FIRE TRIANGLE

A. Fuel

Fuel may be in a gaseous, liquid or solid state, but fire can occur only when fuel is in the gaseous, or vapor, state. Solids and some liquids must therefore have energy applied - usually some form of heat - to vaporize them before oxygen can react with the fuel to cause combustion.

CAUTION: Some liquids give off vapors at ambient temperatures that are sufficient to support combustion. Gasoline, acetone and ether are examples.

Fuel must be controlled or eliminated if not necessary for an operation. Combustibles must be kept to a minimum in all areas. When burning liquids or when gases are being fed by a controlled flow, the first step to stop burning is to stop the flow of fuel. Solid combustibles must be controlled and are frequently removed to eliminate the fuel supply.

B. Heat

Heat (energy) for ignition can come from many sources - open flames, arcs and sparks, friction, hot surfaces, compression, chemical storms, etc. The chemical action of combustion varies with each type of fuel. Every substance has its own ignition temperature (temperature to which a substance must be heated in order to cause self-substained combustion, independent of another heat source). By heat control in the presence of oxygen fuel, combustion can be eliminated. In the event of fire, the burning may be extinguished by cooling the fuel below its ignition temperature.

C. Oxygen

Air at sea level contains approximately 21 percent oxygen. If the oxygen content is reduced to 15 percent, combustion cannot occur. Some materials contain enough oxygen in some form that it is easily liberated to support combustion independent of any other source of oxygen. These materials are known as oxiders and include such compounds as nitrates, chlorates and peroxides. These materials require strict control and handling. Pure oxygen, liquid and gaseous, also requires extreme care in use and handling. Materials such as vegetable fibers, oil rags, paint residue, lacquer, etc., are subject to spontaneous combustion and must be kept in closed safety containers. In the event of fire there are several chemicals approved (UL) for fire fighting that eliminate or displace the oxygen

Fire Triangle, continued.

supply-foam, CO_2, dry chemical and halogenated hydrocarbons.

SUPERVISION

All company supervisors are required to:

1. Identify the most likely sources of fire in their areas of supervision.
2. Establish rules and regulations covering the prevention of fire for each of these likely fire sources.
3. Implement and instruct (publicize) the rules and precautions concerning fire hazard potentials.
4. Enforce all fire prevention rules and regulations.
5. Ensure that all fire fighting equipment has direct access.
6. Contact the telephone operator (dial zero) in the event of a fire and report the location.

SHOP AREA HOUSEKEEPING

1. Housekeeping standards for shop areas are beneficial through preventing injuries and illness. In addition, orderly and clean working conditions promote good morale and economy of operations.
2. Aisles shall be kept open unless blocked by long feed stock extending from a machine. If the aisle must be used, a warning sign must be placed in the aisle in each direction from the obstruction.
3. Floors around machines shall be kept swept up or mopped to avoid walking in chips or on slippery liquids. Leaky equipment must be repaired as soon as possible.
4. Chips or metal-turning ribbons must be removed from the working metal so as not to clutter the area or cause injury to nearby personnel.
5. Coolant and cutting fluid systems must be kept sanitary to prevent spoilage of the fluid and dermatitis to employees handling metals wetted by the fluid.
6. Fire extinguishers, fire hoses, stretcher and first aid kits shall be kept in designated locations when not in use, and access to them must never be obstructed.
7. Storage areas shall be set up so as to ensure good housekeeping.
8. Storage cabinet doors shall be kept closed when not being used to eliminate the possibility of employees and vehicles running into them.
9. Storage of raw materials or parts around a machine shall be confined to appropriate carrying devices such as skids, tubs or tote pans. Such carrying devices shall be placed or stacked in a safe manner which will not interfere with employees' safe movements or protrude into aisles. Stockpiling materials at a machine must be avoided.
10. Space between machines in a row must not be used as a walkway/shortcut to the next aisle.
11. Tools, jigs, fixtures and other auxiliary equipment shall be returned to the appropriate storage or issue area as soon as not needed.
12. Brooms, shovels, mops, brushes and dust pans must be returned to designated storage areas when not actually in use. This type of equipment shall never be left on the floor, against a machine or in any manner so as to constitute a trip hazard.
13. Cigars, cigarettes and pipe ashes must be disposed of only in appropriate containers and never discarded on burnable surfaces.
14. Protective safety equipment such as safety glasses, goggles, face shields and gloves must be frequently cleaned. Many substances that they may come in contact with are irritating to the skin and will cause dermatitis in many individuals.
15. Flammable substances, solvents, etc., utilized in shop areas shall be stored in safety cans.
16. Waste oil, solvents and other fluids shall be disposed of in containers marked for the material. Indiscriminate mixing of materials may spoil their salvage value or perhaps cause explosion, fire or hazardous fumes.

Shop Area Housekeeping, continued.

17. Electrical cords must be frequently checked (always prior to use) for breaks or cracks in the insulation. Cords must be coiled or limited to the length needed to prevent walking/tripping hazards.
18. Air hoses shall be coiled and hung on brackets when not in use.
19. Compressed air must never be used to blow off dirt from clothing.
20. Cracked or split wooden handles on tools shall be replaced, not taped.
21. Packing and shipping materials shall be discarded promptly when containers have been emptied.
22. Air hose fittings/coupling devices shall be safety wired any time they are not in use.

CRANE OPERATIONS

A. HOISTING APPARATUS

1. Although many types of cranes and hoisting apparatus are used at Power Engineering Co safe operating procedures do not vary greatly.
2. Standard signals must be thoroughly understood by both operator and signalman. Supervisors must assign only one man as signalman for each crane, and the crane operator must be instructed to obey this employee's instructions only.
3. Personnel working with or near a crane must keep out from under the load, must be alert at all times, and must watch warning signals closely. At a warning signal, personnel must move to a safe place immediately.
4. No crane may be loaded beyond its rated load capacity, and the weight of all auxiliary handling devices such as hoist blocks, hooks and slings must be considered to be part of the load rating. Substantial and durable rating charts with clearly legible letters and figures are to be fixed to the crane cab in a location easily visible to the operator while seated at his control station.
5. Hoist chain or hoist rope must be free from kinks or twists and must be wrapped around the load, and loads must be attached to the load block hook by means of a sling or other approved device. Care must be taken to make certain the sling clears all obstacles. The load must be well secured and properly balanced in the sling or lifting device before it is lifted more than a few inches. Before starting to hoist, make certain multiple part lines are not twisted around each other.
6. Hooks must be brought over the load slowly to prevent swinging. During hoisting operations, ensure that there is no sudden acceleration or deceleration of the moving load and that the load does not contact obstructions.
7. Cranes must not be used for side pulls unless specifically authorized by a supervisor who can determine that the stability of the crane is not endangered and that the various parts of the crane will not be overstressed.
8. There must be no hoisting, lowering or traveling while any employee is on the hook, and the operator must not carry loads over people. On overhead cranes a warning device must be sounded when starting the bridge and when the load or hook approaches near or over a person.
9. Brakes must be tested each time a load approaching the rated load is handled, and loads must not be lowered below the point where less than two full wraps of rope remain on the hoisting drum.
10. When two or more cranes are used to lift a load, one qualified, responsible employee must be in charge of the operation. He must analyze the operation and instruct personnel involved in the operation as to the proper positioning, rigging of the load and movements to be made.

Hoisting Apparatus, continued.

11. An operator must not leave his position at the controls while load is suspended. All personal clothing and necessary belongings must be stored in the cab in such a manner as to not interfere with access or operation.
12. Tools, oil cans, waste and other necessary articles must be kept in a tool box and not allowed to lie loose in or about the cab.
13. Cranes in regular service must be inspected periodically, at intervals dependent upon the nature of the critical components of the cranes and the degree of its exposure to wear, deterioration or malfunction. Daily inspections must be made of all control mechanisms for maladjustment interfering with proper operation including deterioration or leakage in air or hydraulic systems.

B. MOBILE CRANES

1. All mobile cranes have booms with load hoists and boom hoists. In most instances the rig swings or rotates on a turntable which rests on a chassis or tub.
2. Every crane must have on it a capacity plate or a sign plainly legible to the crane operator, signalman and rigger stating the safe loads at various radii from the centerpin of the turntable. A plate can be mounted on the side of the boom near the hinge with a pointer actuated by gravity suspended freely in front of it. The safe loads are painted on the plate at proper places so that the pointer will directly indicate the safe load for any angle of the boom.
3. The determination of load ratings, with booms of stipulated lengths at stipulated working radii for truck and wheel-mounted cranes, is established by taking 85 percent or less of the load that will produce a condition of tipping or balance with the boom in the least stable direction relative to the mounting.
4. Often the weight of the load to be lifted is not accurately known, and the operator will make a test lift over the end of the machine to determine safe lifting boom angle or boom radius. If the load is critical, this can lead to tipping when the load is shifted across the side. Caution must be exercised to prevent tipping.
5. The operator must have safe access to and egress from his cab or seat, regardless of position of the crane boom. To work in safety, he must have an unobstructed view of the load hook and the point of operation at all times. The operator must also be able to see ahead of the crane when it is traveling on the ground whether the chassis is moving forward or backward. On some cranes visiblity ahead is obstructed and the operator must use extreme caution.
6. A crane operated after dark should have clearance lights. Floodlights should illuminate the area beneath the boom, and lights mounted on the underside of the boom are recommended.

7. A warning bell or horn and an automatic back-up alarm are necessary equipment for a mobile crane.
8. Employees must always be kept beyond the range of the cab swing and out from under the load.
9. A load must never be picked up when the weight, supported by the chassis, rests on springs over the axles. It would be difficult to control the load and its movement could be dangerous. For instance, the boom on a truck crane may be swung high to one side of the chassis when it picks up the load. As the strain is taken on the boom, the springs on that side of the truck will compress while those on the opposite side will ease up somewhat. As a result, the top of the boom will move outward and the load will swing. To prevent this hazard, all loads will be taken off the springs of the vehicle by means of built-in jacks or outriggers, or blocks and wedges.
10. A boom must never be swung too rapidly. If it is, the suspended load will be swung outward by centrifugal force so that the crane may rock or even be upset, and the load may swing and strike a person or object.
11. Operating a crane on soft or sloping ground or close to the side of trenches or excavations is dangerous. The crane must always be level before it is put into operation. Outriggers can be relied upon to give stability only when used on solid ground. Heavy timber mats must be used when there is doubt as to stability of the soil on which a crane is to be operated.
12. The use of makeshift methods to increase the capacity of a crane such as timbers with blocking or adding counterweight will not be permitted.
13. If a crane tips when hoisting or lowering a load, the operator should lower the load as quickly as possible. Therefore, employees must never be allowed to ride a load that is being hoisted, swung or transported.
14. When operating a crane with the boom at a high angle, the operator must take care that the suspended load does not strike the boom and bend the steel lattice bars on its underside. Bending these members will weaken the boom, and when it picks up the next heavy load it may collapse. If the main members of the boom are bent even slightly, the strength of the boom may be significantly reduced.
15. When using a boom tip extension or jib, the allowable load on the jib is limited. Its capacity must be known by the operator and care must be used when swinging with a load, particularly when the jib is lowered at an angle to the main boom.
16. The load hook must be centered over the load to keep it from swinging while being picked up. Employees should keep hands and feet away from pinch points while holding the hooks or slings in place when the slack is being relieved. A hook or even a small piece of wood may be used for this purpose. If an employee must use his hand, he should place it flat against the sling to hold it. The rigger, hook-on helper and other personnel must be clear prior to the load being lifted. A tag line must be used when necessary to guide the load.

Cables, Slings, Chains, Shackles: always inspect slings, chains, and

other rigging equipment before using to assure it is in good condition.

17. A heavy load must never be taken off a truck by hooking a crane to the load and driving the truck out from under it. If the load happens to be too heavy, the crane will tip. The load must be lifted clear of the truck and the operator must ensure that the crane can safely handle the load prior to moving the truck.
18. Whenever the load is unknown, such as that found during pile removal or other underwater work, the boom of the crane must be at the most stable position and at an angle no greater than 60 degrees above horizontal. This will eliminate likelihood of a buckled boom. Also, use Martin-Decker load indicator to establish load.
19. Never jerk piling with a crane. If piling cannot be pulled by a steady, straight effort, a pile extractor must be employed. The angle on a pile extractor must be kept below 60 degrees from the horizontal.

C. ELECTRIC WIRES

1. The boom and cables of all cranes must be kept clear of electric wires regardless of their voltage. Regulations state that, except where the electrical distribution and transmission lines have been de-energized and visibly grounded at the point of work or where insulating barriers, not a part of or an attachment to the crane, have been erected to prevent physical contact with the lines, cranes must be operated in accordance with the following:

   a. For lines rated 50 kv or below, minimum clearance between lines and any part of the crane must be 10 feet.
   b. For lines rated over 50 kv, minimum clearance between lines and any part of crane must be either 10 feet plus 0.4 inches for each 1 kv over 50 kv, or twice the length of line insulator but never less than 10 feet.
   c. In transit and with no load and boom lowered, the clearance must be a minimum of 4 feet.
2. Any overhead wire should be considered an energized line until either the person responsible for the line or the electrical utility authorities indicate that it is not energized.
3. If a crane boom contacts a conductor, the hazard is the greatest to the rigger or others who may touch the load or crane.
4. If the boom or cables accidently come into contact with a wire, the operator should swing the crane to get clear. If the wire has been broken and the boom cannot be cleared from it, the operator must stay in the crane.

Electric Wires, continued.

5. Stepping from the crane to the ground is often fatal when contact has been made with energized electrical equipment, because one hand and one foot may be in contact with the crane when the other foot touches the ground. The operator should remain on the crane until an emergency crew from the electric company frees the crane from the live wire.

D. MANLIFT OR AERIAL BASKETS

To reduce accidents due to equipment failures, the following are musts.

1. Aerial baskets must be of proper design and built for the intended work.
2. Equipment must be used for its intended purpose.
3. Daily inspections of equipment being utilized must be conducted to eliminate defects before an accident.
4. Only qualified personnel shall conduct maintenance and repairs.
5. Adequate instructions and training by qualified supervisory personnel are required. Equipment capabilities must be explained and close supervision performed to ensure that limitations are not exceeded.
6. It is not safe to assume that an operator familiar with one type of aerial basket or equipment can operate all other types.
7. Job briefing and follow-up on training are essential for safe operation.

PILEDRIVING

1. During the piledriving operations, the piledriving crew foreman will give all hand signals to crane operator.
2. The foreman or superintendent will see that any work performed above six feet will require that the man doing the work be tied off securely with a safety belt or equivalent (EM385-1-1, Para. 22.a.18).
3. The foreman or superintendent will see that ear protection is worn by piledriving crew during the driving of pile (EM385-1-1, Para. 32.a.01).
4. Stop blocks must be provided for the leads to prevent the hammer from being raised against the block.
5. Safety support must be provided for placement of the hammer when employees are working under the hammer.
6. Guards must be in place across the head block.
7. Fixed leads must be provided with a ladder and rings.
8. Steam hoses must be provided with safety chains at least 1/4 inch in diameter at each connection.
9. Quick acting shutoff valves must be installed within easy reach of the operator.
10. Workmen must be at least twice the distance from the piledriving when cutting operations are in progress.
11. All pressure valves must be inspected and certified.
12. Proper protection must be provided for workmen when working with creosote piling.
13. Steam line controls must be equipped with a quick acting shut off in easy reach of the operator.
14. Banks must be sloped or shored when necessary where piling is being driven in excavated areas.

ELECTRICAL

The foreman or superintendent will see that all electrical equipment is installed and grounded in accordance with the engineering department's standards and all existing federal, state and local codes. Only electricians or other authorized persons shall be permitted to work on, install or repair equipment. Work must NEVER be performed on live or "hot" lines unless absolutely necessary and approved by the project superintendent.

A. SAFE CLEARANCE PROCEDURE

28.A.01 A safe clearance procedure will be established and approved by the superintendent prior to work on or near electrical equipment or lines, mechanical equipment, pressure systems, and vessels and lines or equipment containing dangerous or hazardous material which can be energized, pressured, activated, or released remotely or inadvertently.

B. ELECTRIC TOOLS

Portable and semi-portable tools and equipment will be inspected by the foreman or superintendent to insure that they are multiconductor cord having an identified grounding conductor and a multicontact polarized plug receptacle (EM385-1-1, Para. 15.c.03).

C. ELECTRICAL INSTALLATIONS

1. The foreman or superintendent will inspect to make sure that all installations shall comply with the National Safety Code, National Electrical Code, or Coast Guard regulations (EM385-1-1, Para. 15.2.02).
2. All work shall be done by personnel familiar with code requirements and qualified for the class of work to be performed (EM385-1-1, Para. 15.1.03).
3. The foreman or superintendent will insure that live parts of wiring or equipment shall be guarded to protect all persons or objects from harm (EM385-1-1, Para. 15.a.04).
4. The foreman or superintendent will insure that operations adjacent to the overhead lines shall not be initiated unless power has been shut off and positive means are taken to prevent the lines from being energized (EM385-1-1, Para. 15.a.04).
5. Operations adjacent to the overhead lines shall not be initiated until coordinated with the utilities officials.
6. Any overhead wire shall be considered energized unless and until the person owning such line or operating officials of the electrical utility supplying the line assures that it is not an energized line and it has been visibly grounded (EM385-1-1, Para. 15.e.11).

WELDING AND CUTTING

1. The foreman or superintendent will see to it that all welding equipment shall be equipped with compatible fire extinguishers. Before any welding or cutting is done in locations where combustibles or flammable materials are located, inspections and written authorization shall be obtained.
2. Employees will be instructed by the superintendent to insure that cylinders will be kept beyond range of sparks, hot slag, or flame. They shall be always chained in an upright position with protective caps for valves always in place.
3. The foreman or superintendent will see to it that welders shall wear protective clothing and approved goggles. Caution shall also be taken to protect the general public from arc flash; signs will be posted and removable partitions will be placed around the welder.
4. Cutting torches will not be used on drums which contain or did contain combustible materials.
5. All welding will be done in accordance with EM385-1-1, Para. 14.a.

WORKING IN CONFINED AREA

Prior to all work in a confined space or compartment, a chemist's "Gas Free Certificate" shall be provided and varified by the superintendent.

1. The foreman or superintendent will see that persons working in confined or enclosed spaces shall have a safety harness and life line with an attendant if the atmosphere has oxygen deficiency or contamination sufficient to require respiratory protection.
2. Enclosed spaces shall be tested for contaminates and periodic check tests shall assure a non-explosive and safe, breathable atmosphere.
3. Mechanical exhaust ventilation sufficient to maintain an uncontaminated and non-explosive atmosphere shall be provided.
4. Protective clothing and respiratory protection shall not be used as a substitute for cleaning and ventilating of spaces.
5. Disconnects for the power to any apparatus in or containing enclosed spaces shall be tagged and left open whenever people are in the enclosed space.
6. Local exhaust ventilation shall be provided to eliminate contaminants from welding and other operations within enclosed spaces.

ACCIDENT COST

The reduction of accidents is in everyone's best interest. The employee remains healthy, fit and employed as his company can reduce its insurance costs and, therefore, makes it more competitive in today's market.

A. INDIRECT COSTS

Research by insurance companies and universities discloses that hidden costs may be as much as ten times the direct costs. Some of these hidden costs are as follows:

1. Wages paid to injured employees while going to the doctor - reduced efficiency of injured employees.
2. Cost of time lost by other employees who stop work:
   a. out of curiosity;
   b. out of sympathy;
   c. to assist the injured.
3. Cost of inefficient performance by crews following the accident due to:
   a. lowered morale;
   b. fear;
   c. disruption of routine;
   d. loss of the skills of the person or persons injured.
4. Cost of time lost by supervision:
   a. assisting the injured employee;
   b. taking him to the doctor;
   c. investigating the accident;
   d. securing and training a replacement;
   e. preparing accident reports, going to hearings, etc.
5. Cost of job delays because of:
   a. down-time on equipment;
   b. lack of materials or supplies;
   c. damaged construction facilities.
6. Cost of loss of good will:
   a. owner;
   b. community;
   c. union;
   d. employee.

B. COST TO THE EMPLOYEE

The big loser is the employee, particularly in case of serious accidents that prevent him from working for weeks or months, or leave him with a permanent disability that keeps him from working at his trade in the future.

C. COST TO THE GENERAL PUBLIC

Yearly accident costs in the United States exceed 25 billion dollars. This cost is reflected in tax rates and the price of all commodities purchased.

FED & CAL/OSHA EXCERPTS

GENERAL

Article 10, Appendix A (California Safety Orders)

1. All injuries are to be reported to the immediate supervisor promptly so that adequate medical attention may be given.
2. Compressed gases are not to be used for purposes other than designated uses. They are not to be used to clean clothing, machines, tools, empty containers of liquids or for ventilation.
3. Good housekeeping must be maintained at all times aboard ship and adjacent berth or dock. Aisles and passageways in shops, warehouses and yard areas are to be kept clear of materials. Welding leads, burner hoses, air hoses and other temporary lines must be arranged so that they do not produce a tripping hazard on staging, walkways, ladders, stairways and companionways.
4. Deck openings are not to be covered by loose material. All openings are to be protected so that no one can step or fall into them.
5. All safety precautions are to be followed against harmful and explosive gases when entering tanks, voids or compartments. If in doubt, the supervisor should have the area certified safe by authorized personnel.
6. Obey all rules, regulations and signs placed for protection of personnel and equipment.
7. Safety devices are not to be tampered with nor are warning tags placed on them to be removed except by the person(s) placing them.
8. Workmen shall keep out from under crane lifts at all times.
9. Cranes are to be equipped with effective warning devices. In congested areas the signal should be automatically operated to sound continuously while the crane is in operation. If the device becomes inoperative, it shall be brought to the attention of the supervisor and repaired immediately.
10. Shipyard traffic rules will be strictly obeyed while operating a vehicle, regardless of type.
11. Wiping cloths and oily waste must be disposed of in properly covered metal containers.

COMPRESSED AIR — NO JOKE!

Compressed air is a necessary tool in our everyday work; however, we must realize that it can be dangerous, even to the point of death.

Experience has shown that a blast of air at 40 pounds per square inch can rupture an ear drum at a distance of four inches. Much worse, it can cause a brain hemorrhage and be fatal.

It can be very dangerous to use compressed air to blow dust or dirt from your body or clothing. As little as 12 psi can "pop" an eyeball from iis socket. Air can enter the naval, even through a layer of clothing, and inflate and rupture the intestines. Compressed air, under 80 pounds pressure, has struck a small wound on a person's hand and blown the arm as round as a grapefruit and caused shooting pains from the fingers to the shoulder. It can cause bubbles of air to enter the bloodstream.

There is absolutely no place for horseplay in using compressed air equipment. A reliable authority advises us that it has been estimated that as little as four pounds of pressure can rupture the bowel. Directed at the mouth, it can rupture the lungs and the intestines.

Compressed air tools can be safe and reliable pieces of equipment. But the above examples clearly demonstrate that compressed air can be a lethal weapon if used improperly.

The fact that compressed air is "only air" sometimes leads people to think it is harmless. It is just air—but, air driven at a high velocity. A hurricane or a tornado are also "only air" but they can be deadly.

When used to operate equipment, compressed air can be our friend, a very valuable work-saving device. But when improperly or carelessly used, it can be very dangerous.

Always wear prescribed personal protective equipment. Continuously check the condition of tools and air hose to make sure that they do not show evidence of damage or failure, and that connections and couplings are tight. A loose air hose under 80 pounds of pressure makes a pretty effective bullwhip.

We caution you to never look into, or to point toward any part of the body, yours or others, the business end of any compressed air apparatus. This is as foolish as looking down the barrel of a gun or pistol.

CONCRETE

Anyone working around or with concrete should be aware of the hazards and safety precautions related to this operation.

Employees working more than 6 feet above any adjacent working surface, placing and typing reinforcing steel in walls, piers, columns, etc., shall use a safety belt or equivalent device.

Employees shall not be permitted to work above vertically protruding reinforcing steel unless it has been protected to eliminate the hazard of impalement. In other words, the rebar has to be protected from the worker.

Handles on bull floats shall be of nonconductive materials or insulated with a nonconductive sheath when used around energized electrical conductors.

When using a powered or rotating-type troweling machine, the control switch will automatically shut off the power when the operator removes his hands from the handle — DO NOT USE "TIE-DOWNS" on the control switches.

Riding concrete buckets for any purposes shall be prohibited.

Vibrator crews shall be kept out from under concrete buckets suspended from cranes or cableways.

When discharging on a slope, make sure the ready-mix trucks wheels are blocked and the brakes set to prevent movement.

Personal protective equipment shall be used when needed.

All equipment, hand and power, shall be checked and in safe working condition before use — replace or repair all defective tools.

If concrete splatters on the skin, wash off as soon as possible.

ACETYLENE AND FUEL GASES

There are so many fires and explosions each year from failure to use and handle acetylene and fuel gases safely that I figured I ought to talk about them. I won't have time today to do more than hit the high spots, but I'll try to cover the more important points.

First of all, it's easy to keep out of trouble with these gases if you'll just use your head. Perhaps the trouble is that people don't take the hazards seriously enough.

All these gases catch fire very easily. Any spark will set them off. That means "no smoking" around them. Keep them away from fire or anything very hot. It doesn't take red heat to set them off. From 600° to 800° will do it.

The lower explosive limits of these gases (the smallest amount which, mixed with air, is explosive) are low, about 2 to 3 per cent mostly—not much higher than the lower explosive limit of gasoline (1.5 to 2 per cent). Also, the explosive ranges of the liquefied petroleum (LP) gases are not much different from the explosive range of gasoline.

Acetylene and hydrogen are something else again. All mixtures with air that have between 4 percent and 74 per cent hydrogen are explosive. Acetylene is worse still, for its explosive range is 2.6 to 80 per cent. Such wide explosive ranges spell extra hazard because when either of these gases gets to air you're almost certain to have an explosive mixture.

All the LP gases are shipped and handled in cylinders under pressure. In most cases, the pressure is less than 300 pounds because at ordinary temperature it doesn't take much pressure to make them change to liquids. But hydrogen won't do that, so the cylinders are filled to 2,000 pounds pressure. The cylinder pressure for acetylene is 250 pounds. There's a point about this that I want to emphasize.

Acetylene is likely to blow up all by itself if you compress it. Up around 25 pounds it becomes what the chemists call "unstable". It doesn't need a spark or flame to explode. It may not blow as soon as it is compressed, but it will, given time enough. So 15 pounds per square inch has been set as the highest safe pressure for acetylene as a gas. But under pressure, acetone, a close relative of the acid of vinegar, dissolves acetylene in big amounts. In the acetone, which is a liquid, it doesn't explode under pressure. So an acetylene cylinder is full of a porous substance filled with acetone. It gives up the acetylene as the pressure is bled off.

Somehow or other, even some welders don't know about this. At any rate, once in a while some guy blows himself up trying to compress acetylene. For example, a welder decided to set up his own shop. He figured that he was being charged too much for acetylene. So he got an acetylene generator, a small second-hand air compressor, and a good strong water tank, and hooked them up. The apparatus worked fine for a few days, and then it let go and the whole place came unstuck. They buried what was left of that fellow.

Acetone loses its ability to hold the acetylene if you heat it up much; so the cylinders have fusible plugs that will melt at about the boiling point of water. If an acetylene valve freezes up, thaw it out with lukewarm water, never hot water. Pour the water over the valve, not the cylinder. Never use a flame of any kind. That goes, too, for any compressed gas cylinder, though it's most important for acetylene.

Since the LP gases are liquid under pressure, the cylinders should be used valve end up only. Otherwise you may get shots of the liquid. The same thing applies to acetylene. A shot of acetone won't help the welding job a bit. Hydrogen does not liquefy under pressure.

The LP gases are all much heavier than air. If there's a leak, they'll go down more than up, but they'll spread out through the air (diffuse), too. Acetylene is just a little lighter than air—not enough to count. Hydrogen, though, is about fourteen times lighter than air. That means that if you turn it loose it will go upstairs fast. So look up under the ceiling for hydrogen, down at or under the floor for LP gas.

Handle all compressed gas cylinders carefully. Remember that the metal is fighting pressure all the time unless the cylinder is completely empty. Also, don't forget for a minute that the wallop a cylinder gets if it's dropped onto a concrete floor can break the valve assembly off. If that happens, there's real trouble. If you bang two cylinders together hard, both might let go.

Finally, if you're going to do any welding or use any LP gases for any purpose whatever,

RESPECT OXYACETYLENE

Recently a representative of a manufacturer of welding supplies stated his belief - "only 10 per cent of the people using oxygen-acetylene equipment really know what they are handling or have any formal training". Listed below are ten facts about oxyacetylene that should be brought to the attention of all employees and supervisors:

1. Acetylene has an explosion range of 2.5 to 80. (The widest explosion range of any commonly used gas)
2. Acetylene cylinders are not hollow. (Packed with diatomaceous earth, saturated with acetone)
3. Acetylene cylinders should never be used from a horizontal position. (Loses liquid acetone from cylinder - gums guages, ruins hoses)
4. Acetylene should never be used at a hose pressure guage in excess of 15 p.s.i. (Defeats the purpose of the acetone in the cylinder making it safe to store and use)
5. Any amount of acetylene in an oxygen guage is an explosive situation. (It can't stand the over 2,000 pounds pressure under which oxygen is stored)
6. Oxygen under pressure is explosive upon contact with oil or grease. (A little dab from the hands while changing cylinders could cause such an explosion)
7. Acetylene cylinder valves should be closed when leaving the job unattended. (Defective hoses are the most likely places for gas to escape into the room where a spark from any source can explode it)
8. Each cylinder has several heat safety plugs at both ends that will come out at the temperature of boiling water. (Don't store next to furnaces or allow slag to touch them)
9. These safety plugs are thin brass shells sometimes protruding from the cylinder in recessed tops. (Storage of tools in the top could break them off causing a fire from the hole in direct proportion to the pressure in the tank)
10. Carbide should be stored in a moisture-proof area and only one can opened at any given time. (One drop of water in a can of carbide will generate acetylene to escape into the room)

IT TAKES ONE...
minute to build a safety thought
hour to make a guard
week to study plant conditions
month to develop a safety program
year to make it operate
lifetime to make a good safe workman
second to destroy it with one accident
anonymous

HAZARDOUS CYLINDERS

Everyone knows that gas cylinders are exposed to many dangers. If we can follow these common sense rules, we may be able to eliminate some of the hazards.

1. Cylinders should be placed in a rack and secured in an upright position to guard against tipping over.

2. When the cylinder is empty it should be tagged or otherwise marked as such and the valve completely closed off and the cap replaced.

3. Keep cylinders from contact with electrical wire or sources of heat.

4. Shield from sparks or flames from welding or cutting.

5. Do not store anything on top of cylinders.

6. When you move a cylinder make sure the valve is closed and the cap is on.

7. Never use valves or caps for raising or lowering.

8. Use a suitable rack or cradle for raising or lowering.

9. Never use a flame if the outlet valve on any type of cylinder becomes clogged with ice or snow. Use warm water.

10. Do not lay the valve in any area where oil or dirt can come into contact with any part of the valve.

11. Always "HANDLE WITH CARE" — do not drop or jar.

FIRE PREVENTION AND FIRE FIGHTING

Always obey smoking regulations. These are made for the protection of you and of others. Usually the "No Smoking" sign indicates that there are flammable materials or conditions in the area. You cannot see the vapors, but lighting a match could involve you in a fire.

Dispose of all flammable wastes quickly and efficiently. Flammable scrap, wiping rags, or rubbish go in metal containers provided. Gasoline, kerosene, oil, or other flammable liquids go in special containers provided—never pour down drains or sewers.

Know where and how to turn in a fire alarm. Know where the fire extinguishers are kept in your area and know what type fire they are meant for. Know the fire exit you should use in an emergency. Help emergency fire brigades, but do not get in their way.

Change your clothes right away if they get soaked with oil, kerosene, naphtha, or other flammable liquid. Not only will changing prevent skin troubles, but it will prevent a bad burn if the retained vapor catches on fire.

FIRE EXTINGUISHERS

Have you inspected your fire extinguishers lately? Are they fully charged, strategically located, accessible and ready for use? Or, are they laden with dust, obscurely hidden in some off corner affording a false sense of security?

So often, fire extinguishers are purchased with enthusiasm, a vital need; and then, suddenly, because they are not regularly used, they are relegated to a secondary position in our operation.

The fact that fire extinguishers are our first line of defense in event of fire should warrant a periodic and thorough inspection. Fire extinguishers must be kept clean to attract attention, they must be kept accessible to eliminate lost time when needed, and the rubber hose, horn or other dispensing component must be checked to assure against blockage.

The following is a brief resume of the classification of fire and the recommended extinguisher to be used on each:

CLASS "A" FIRES: Ordinary combustibles such as rubbish, paper, rags, scrap lumber etc. These are fires that require a cooling agent for extinguishment. Recommended extinguishers are — Water through use of hose, pump type water cans, pressurized extinguishers and soda-acid extinguishers.

CLASS "B" FIRES: Flammable liquids, oils and grease. Fires that require a smothering effect for extinguishment. Recommended extinguishers — Carbon Dioxide, Dry Chemical and Foam.

CLASS "C" FIRES: Electrical equipment. Fires that require a non-conducting extinguishing agent. Recommended extinguishers — Carbon Dioxide and Dry Chemical. Many sources recommend the use of vaporizing liquid (carbon-tetrachloride) on electrical fires. However, because of the danger involved through the generating of a phosgenic type gas, I would advise against the use of this type of extinguisher.

WELDING AND BURNING SAFETY

The greatest hazard of welding and burning operations is the possibility of eye injuries. Ulta-violet radiation is generated during these operations. After expesure to excessive ultra-violet radiation, eyes may develop sharp pains, become red and irritated. Without proper protection it is possible to damage eyes permanently.

The following are recommended shades of lenses for various welding and burning operations:

OPERATION	SHADE NUMBER
Soldering	2
Torch Brazing	3 or 4
Light Cutting up to one inch	3 or 4
Medium Cutting, one to six inches	4 or 5
Heavy Cutting, six inches and over	5 or 6
Gas Welding (light) up to 1 / 8 inch	4 or 5
Gas Welding (medium) up to 1 / 8 to 1 / 2 inch	5 or 6
Gas Welding (heavy) 1 / 2 inch and over	6 or 8
Shielded metal-arc welding, 1 / 16 to 5 / 32 inch electrodes	10
Inert-gas metal-arc welding (nonferrous, 1 / 16 to 5 / 32 inch electrodes	11
Inert-gas metal-arc welding (ferrous), 1 / 16 to 5 / 32 inch electrodes	12
Shielded metal-arc welding 3 / 16 to 1 / 4 inch electrodes	12
Shielded metal-arc welding 5 / 16 to 3 / 8 electrodes	14
Carbon-arc welding	14

It must be remembered that some plated and / or painted metals can give off harmful fumes or vapors when subjected to the high temperatures of welding or burning. These fumes or vapors could cause a health problem if breathed for too long. Welding and burning should be performed in a well-ventilated area or if working outside position yourself "up-wind" from the point of operation.

When chipping slag, be sure to wear eye protection!

In all welding and burning operations be sure the necessary fire protection measures are taken.

Do not store oxygen and acetylene bottles in the same area and protect them from physical damage.

LIFTING

In spite of the increased use of machinery and equipment in construction work, most of the materials put into a structure are moved by hand during some phase of its building. The human body is subject to severe damage in the form of back injuries and hernia if caution is not observed in this handling process. Each worker should know the proper method of lifting heavy objects.

The general guidelines for lifting are:

Get a good footing.

Place feet about shoulder width apart.

Bend at the knees to grasp the weight.

Keep the back straight.

Get a firm hold.

Keep the back as straight as possible.

Lift gradually by straightening the legs.

When the lift is too heavy or bulky for you to lift comfortably —GET HELP!

When putting the load down, reverse the procedure.

Remember: LIFT PROPERLY — THINK — THINK

CHISELS

There are many misconceptions about chisels and chiseling which results in misuse and abuse and could lead to possible injury.

Here is a list of do's and don't's compiled by the Hand Tools Institute for the safe use of these tools:

Before doing any kind of chiseling, put on safety goggles for eye protection. Also make sure the work is securely braced or clamped.

Then check the condition of the chisel. It should have a sharp, properly ground cutting edge, not only to do a better job but to accomplish the work safer and quicker. Also check the head or striking surface. If the head is mushroomed, chipped or badly battered, the chisel should not be used.

Next, never use a common nail hammer to strike a cold chisel because chipping of the hammer or chisel could result, causing eye or other bodily injury. Instead, use a ball peen hammer of the proper size or a hand sledge. The face of the hammer should be larger than the head of the chisel.

Finally, make sure you are using the proper chisel for the job. Cold chisels are used for cutting and chipping metal, and they should never be used on stone or concrete. Brick chisels are designed for scoring and cutting brick. They should be struck with a heavy hand drilling hammer not a bricklayer's hammer which is used for cutting masonry. A brick chisel should never be used on metal.

USING A COLD CHISEL

Keep safe practices in mind when you use a chisel.

First, the hazards of chisel work—the ways that men get hurt using these ools. Chips from mushroomed heads give the doctors a lot of business and ıow and then give some to manufacturers of glass eyes. Chips from overtempered chisels or from the material being chiseled sometimes do ihe same.

Fingers get smashed and knuckles skinned or even broken when the chisel isn't held correctly or the hammer isn't kept in the groove. If a chisel is too short, the hazard is increased. It should be long enough to allow a full four-finger grip with clearance of at least 2 inches from the head of the chisel and similar clearance from the work.

Be fussy about the chisel. Don't use it if the head is mushroomed or the cutting edge is nicked (that means it's too hard). And make sure the hammer handle is not split and the head is on firmly. Check the condition of the hammer face, and try the hammer for balance.

The number of injured and lost eyes has proved many times over that eye protection should always be worn on chisel jobs. Probably most safety men prefer goggles to face shields, but many men who object to goggles are willing to wear face shields. There's one thing for sure—a face shield that is faithfully worn is a lot safer than goggles that are now on, now off.

There's some difference of opinion as to the safest way to hold a chisel. Some say you hold it in the hollow of your hand with the palm up, with the first and second fingers back of it and thumb and third finger in front of it. Others prefer a full four-finger grip. Whatever grip you use, the important thing is to keep the chisel steady so that the properly handled (grooved) hammer will always meet it squarely.

A hammer is said to be grooved when blow after blow goes through exactly the same path (the same swing) and the hammer is held so that the force of the blow is always directly down through the center line of the chisel to the work. That way you smash no knuckles, strike no glancing blows, and get the most work done.

A properly balanced hammer with a handle the right size and shape to fit a man's hand right is easy to groove, but it takes practice. Once you've learned to groove your hammer and to hold your chisel properly, you'll never miss; the hammer will find the chisel every time.

Don't forget to look out for your footing. You need good balance, and you can't keep it if your feet aren't solidly and comfortably placed. You need plenty of room for your hammer swing and hand and finger room to hold the chisel steady. You have to be able to see the work. And don't forget your eye protection.

One last point—before you start to work—figure out which way any chips or the cut-off ends may fly and be sure they can't hit someone.

DEFENSIVE DRIVING

While a good offense may be the best defense in football, this doesn't hold true in driving. A Professional Driver is a top Defensive Driver! He seems to have eyes (or mirrors) in the back of his head! He stays out of the other fellow's way!

The Professional Driver:

(1) Knows and obeys the company rules for the operation of his vehicle.

(2) Knows and obeys the traffic rules and regulations applicable to the area in which he is driving.

(3) Is aware of the traffic situations far ahead on both sides and to the rear of his vehicle.

(4) Is constantly alert to illegal acts and errors of others.

(5) Is willing to yield the right-of-way to prevent accidents and does not tail-gate.

(6) He is particularly cautious approaching intersections. He lessens the odds of an accident by taking his foot off the gas and putting if on the brake to shorten his reaction time for stopping.

(7) Knows and adjusts his driving to the special hazards of: (a) pedestrians (b) the road (c) weather (d) traffic (e) degree of light and (f) the added dangers brought on by his own emotions such as anger and worry.

(8) Requires an ATTITUDE of confidence that he can drive without ever having an accident. He is POSITIVE about accident prevention.

(9) He drives as though every child in the street is his own and every motorist is a dear relative or friend.

(10) He knows the secret of safe driving: DO IT THE SAFE WAY EVERY TIME.

MATERIAL HANDLING EQUIPMENT

These rules apply to the following types of earthmoving equipment: scrapers, loaders, crawlers or wheel tractors, bulldozers, off-highway trucks, graders, agriculture and industrial tractors and similar equipment (this does not include compactors and rubber-tired "skidsteer" equipment).

1. Anytime equipment or its parts are suspended by use of slings, hoists or jacks, they shall be blocked or cribbed to prevent falling or shifting before employees are permitted to work under or between them.

2. Dozer and scraper blades, end loader buckets, dump bodies and similar equipment, shall either be fully lowered or blocked when being repaired or when not in use.

3. All controls shall be in neutral position with the motors stopped and brakes set unless work being performed requires otherwise.

4. Seat belts need not be provided for equipment which is designed only for stand-up operations; i.e., graders, or for equipment which does not have roll over protection structure (ROPS) or adequate canopy protection. In other words, if you have overhead protection you must wear a seat belt unless it is designed for stand-up operations.

5. Check the braking system on all equipment — it must be capable for stopping and holding the equipment fully loaded.

6. Watch for changing road conditions — icy and wet roads should be used with extreme caution.

7. Keep ladders, walkways and tracks clear of mud, ice, snow, etc. to insure proper footing.

OPERATING RULES FOR LIFT TRUCK OPERATORS

A. RESPONSIBILITY

Safety rules are work rules and as such are part of your responsibility for efficient production.

(1) The operator is in charge of his own vehicle. As such he is responsible for his own safety, his truck, his load, company property and equipment, and other employees or pedestrians.

(2) Only qualified drivers may operate trucks. This will be determined by the supervisor. Also, these rules will be interpreted in the same manner.

(3) Wear hard hat, safety glasses and safety shoes as required.

(4) Horseplay is prohibited.

(5) Report all accidents immediately.

B. TRAFFIC

In general, observe the usual traffic rules and regulations wherever possible. This includes:

(1) Keep to the right on roadways and wide aisles.

(2) Drive at a reasonable speed depending on location and condition of surface.

(3) Slow down at intersections, corners, ramps and other danger points.

(4) Leave plenty of space between trucks when traveling.

(5) Use horn in "blind" spots but don't overdo it.

(6) Watch in turning that you don't cut short.

(7) Be alert for wet and slippery surfaces while driving.

(8) Give pedestrians the right of way. Assume they are not thinking about lift trucks.

(9) Stop at all stop signs.

(10) (a) When parking do not block traffic.
(b) Park with forks on the floor.
(c) turn off the power and take the key with you.

CONSTRUCTION, USE AND MAINTENANCE OF REFUELING EQUIPMENT

A survey made recently of the 50 states indicates that few of the jurisdictions queried have a code specific to the construction, maintenance and use of refueling equipment.

It is almost universal that each state requires contractors to comply with the basic rules for refueling equipment:

1. Shut off motors before refueling
2. Make sure that the nozzle of the dispensing unit makes contact with the filler cap
3. No smoking in refueling area
4. Use ALL possible care to prevent running fuel tank over. Should gasoline be spilled, be sure that no fuel is on the equipment before restarting.
5. Fill the tank from the windward side whenever possible to prevent excessive burns in the event of ignition.
6. Allow a sufficient vapor space in the fuel drum or tank to permit expansion of the liquid with changing temperatures. Gasoline expands at the rate of one percent for each 14 degree F. rise in temperature.
7. Equip electric motors having sparking contacts with explosion proof enclosures.
8. Install adequate hold down devices to anchor each drum or tank in a suitable manner to prevent movement. Turnbuckles, tie rod and eye bolt connections or similar positive action devices for drawing the tank or drum down tight on the truck bed are recommended.
9. Mark each side and rear of the refueling truck with the words "Flammable — NO Smoking" in letters three inches high. Each container should be marked as to its contents.
10. Equip each vehicle with at least one suitable size extinguisher having a C rating.
11. Take precautions to prevent ignition in locations where flammable vapors are present. Sources of ignition may be open flames, smoking, cutting and welding and hot surfaces.

COVERS OVER FLOOR AND ROOF OPENINGS

Safely covering an opening with a piece of plywood requires more than just laying the material over the hole.

1. The hole should be covered securely with a cover large enough and rigid enough to prevent failure.

2. It should be marked with a danger warning.

3. Every employee on the job should be warned about the hazard.

4. Never leave an opening uncovered or unprotected.

If covering a hole is impractical, guardrails shall be installed with toe boards.

Ladderway floor openings or platforms shall be guarded by standard railings and toe boards on all exposed sides, except at entrances to openings. The entrance shall also be protected so that a person cannot walk directly into the opening.

How many times have you hard of someone picking up a piece of plywood off the floor, thinking it was just loose materials, and discovering to their dismay (as they were falling through the hole) that the plywood was actually covering a hole?

THE DANGEROUS FOUR

Falls — Falls disable 400,000 workers a year. Of every 100 workers hurt, 20 fall down. Almost as many happen on the level as from elevated places. If you are on the level, you should:

1. Watch out for slippery spots such as oil, grease or water spills.
2. Use aisles. Don't take shortcuts through storage and machinery areas.
3. Look out for objects on the floor that can roll, slide or trip you up.

If you are higher up:

1. Don't run on stairs. Use the handrail.
2. Inspect safety belts and lines before using them.
3. Never jump from work stages, trucks or loading docks.
4. Use ladders the right way.

LADDER SENSE

1. Inspect a ladder for cracks and loose rungs.
2. Choose a ladder long enough so you can stay off the top rungs.
3. Climb with both hands holding the rungs. Hoist tools and materials by hand line.
4. Don't overreach. Be sure of your balance by keeping your belt buckle between the rails.
5. A ladder should have safety feet. Use a board on soft earth or to level the feet.
6. The 4 to 1 rule: Set the ladder one foot out for every four feet up to the point of support. Rungs are one foot apart so it's easy to figure the angle.

Weak Spot:. Inattention is the weak spot in the defense against falls. ..... Watch where you are going!

LADDERS

General requirements — the use of ladders with broken or missing rungs, broken or split side rails, or other faulty or defective construction is prohibited.

Portable ladder feet shall be placed on a substantial base, and the area around the top and bottom of the ladder shall be kept clear.

Ladders shall not be used in a horizontal position as platforms, runways, or scaffolds.

JOB MADE LADDERS

Ladders shall not be placed in passageways, doorways, driveways or any location where they may be displaced by activities being conducted on any other work, unless protected by barricades or guards.

The side rails of ladders shall extend not less than thirty-six inches above the landing. When this is not practical, grab rails, which provide a secure grip for an employee moving to or from the point of access, shall be installed.

Portable ladders shall be tied, blocked or otherwise secured to prevent movement.

Portable metal ladders shall not be used for electrical work.

A double cleated ladder shall not exceed twenty-four feet in length.

A single cleated ladder shall not exceed thirty feet in length and be at least fifteen inches wide but no more than twenty inches between rails at the top.

All ladders shall extend thirty-six inches above the landing.

SAFETY WITH LADDERS

1. Inspect ladders at frequent regular intervals; if any ladder is found defective, red tag it until it is repaired or discarded. NEVER use a defective ladder.

2. Use shellac, varnish or two coats of oil as a preservative; paint conceals defects.

3. Avoid the use of metal ladders when the possibility of contact with electrical power exists.

4. Clean mud or greasy substances from your shoes before climbing up a ladder.

5. Place the ladder securely, against a solid backing, at a safe angle of about 75 degrees with the horizontal.

6. Always face the ladder and hold on with both hands, whether climbing up or down.

7. Carry tools in suitable pockets, or have tools and other objects hoisted with rope and bucket.

8. Work facing the ladder and hold on with one hand.

9. Use a safety belt if the type of work requires it.

10. It is dangerous to reach out too far from a ladder in any direction; move the ladder as the work requires.

11. It is unsafe to use a ladder as a horizontal member of a scaffold.

SAFETY BELTS

A safety belt, purchased for the sole purpose of preventing injury, was recently observed lying on the ground partially covered with a large cement block. This important piece of equipment, prior to the days end would be used to afford lifesaving benefits to a trusting worker once more lulled into a false sense of security.

If we are to expect maximum results from personal protective equipment as vital as a safety belt, we certainly must render it the maximum care as follows:

1. Inspect and test your belt and hardware carefully before use to be sure there are no defects; use a belt that you know is entirely safe. Any safety belt subjected to in-service loading, shall be removed from service.

2. Do not permit acids, caustics or other corrosive materials to get on leather or ordinary web belts.

3. Never weaken the belt or strap by cutting or roughpunching extra holes in it.

4. Handle your belt with care; never drop it on the ground; keep it away from sharp tools or other objects which might scratch or cut it.

5. Wipe a wet leather belt with a clean dry cloth; let it dry slowly at a temperature no higher than your hand can bear. Do not expose any wet belt to extreme cold or heat.

6. Store belts in separate dry compartments or hang them so they will not be crushed, worn or creased.

7. Apply a light coating of neatsfoot oil occasionally to a leather belt especially after it has been wet; use only special dressing on fabric belts.

8. Oil, wash with saddle soap, and thoroughly inspect leather safety belts at least once every 90 days; never use gasoline or other drying solvents to clean any belt.

9. If the belt is accidentally cut or damaged, turn it in for repair or for salvage of usable parts.

STEEL SCAFFOLDING SAFETY RULES

Following are some common sense rules designed to promote safety in the use of steel scaffolding. These rules are illustrative and suggestive only and are intended to deal only with some of the many practices and conditions encountered in the use of scaffolding. The rules do not purport to be all-inclusive or to supplant or replace other additional safety and precautionary measures to cover usual or unusual conditions.

I. POST THESE SCAFFOLDING SAFETY RULES in a conspicuous place and be sure that all persons who erect, dismantle or use scaffolding are aware of them.

II. FOLLOW LOCAL CODES, ORDINANCES and regulations pertaining to scaffolding.

III. INSPECT ALL EQUIPMENT BEFORE USING — Never use any equipment that is damaged or deteriorated in any way.

IV. KEEP ALL EQUIPMENT IN GOOD REPAIR. Avoid using rusted equipment — the strength of rusted equipment is not known.

V. INSPECT ERECTED SCAFFOLDS REGULARLY to be sure that they are maintained in safe condition.

VI. CONSULT YOUR SCAFFOLDING SUPPLIER WHEN IN DOUBT — scaffolding is his business. NEVER TAKE CHANCES.

A. PROVIDE ADEQUATE SILLS for scaffold posts and use base plates.

B. USE ADJUSTING SCREWS instead of blocking to adjust to uneven grade conditions.

C. PLUMB AND LEVEL ALL SCAFFOLDS as the erection proceeds. Do not force braces to fit — level the scaffold until proper fit can be made easily.

D. FASTEN ALL BRACES SECURELY.

E. DO NOT CLIMB CROSS BRACES.

F. ON WALL SCAFFOLDS PLACE AND MAINTAIN ANCHORS securely between structure and scaffold at least every 30' of length and 25' of height.

G. FREE STANDING SCAFFOLD TOWERS MUST BE RESTRAINED FROM TIPPING by guying or other means.

H. EQUIP ALL PLANKED OR STAGED AREAS with proper guard rails and add toeboards when required.

I. POWER LINES NEAR SCAFFOLDS are dangerous — use caution and consult the power service company for advice.

J. DO NOT USE ladders or makeshift devices on top of scaffolds to increase the height.

K. DO NOT OVERLOAD SCAFFOLDS.

(Continued)

L. PLANKING:

1. Use only lumber that is properly inspected and graded as scaffold plank.

2. Planking shall have at least 12" of overlap and extend 6" beyond center of support or be cleated at both ends to prevent sliding off supports.

3. Do not allow unsupported ends of plank to extend an unsafe distance beyond supports.

4. Secure plank to scaffold when necessary.

SCAFFOLDS

No scaffold shall be erected, moved, dismantled, or altered except under the supervision of competent persons.

These general requirements for scaffolds should be followed to have a safe working platform:

1. Guardrails and toe boards shall be installed on all open sides and ends of platforms more than ten feet above the ground or floor (EXCEPT NEEDLE BEAM SCAFFOLDS AND FLOATS).
2. Scaffolds four feet to ten feet in height, having a minimum horizontal dimension in either direction of less than forty-five inches, shall have standard guardrails installed on all open sides and ends of the platform.
3. Guardrails shall be 2 X 4 inches, or the equivalent, and approximately forty-two inches high. Supports shall be at intervals not to exceed eight feet. Toe boards shall be a minimum of four inches in height.
4. When persons are required to work or pass under the scaffold, they shall be provided with a screen between the toe board and the guardrail — extending along the entire opening, consisting of No. 18 Gauge U.S. Standard Wire and one half inch mesh or the equivalent.
5. Any employee working on a needle beam scaffold shall be protected by a safety belt and lifeline.
6. Planking for scaffolds shall be secured.
7. All parts of the casters for the rolling scaffolds should be in good working condition.

SAFETY RULES FOR POWER TOOLS

KNOW YOUR POWER TOOL — Read the owner's manual carefully. Learn its applications and limitations as well as the specific potential hazards peculiar to this tool.

GROUND ALL TOOLS — UNLESS DOUBLE-INSULATED — If tool is equipped with three-prong plug, it should be plugged into a three-hole electrical receptacle. If adapter is used to accommodate two-prong receptacle, the adapter wire must be attached to a known ground. Never remove third prong.

KEEP GUARDS IN PLACE and in working order.

KEEP WORK AREA CLEAN — Cluttered areas and benches invite accidents.

AVOID DANGEROUS ENVIRONMENT — Don't use power tools in damp or wet locations. Keep work area well lit.

STORE IDLE TOOLS — When not in use, tools should be stored in dry, high or locked up place.

DON'T FORCE TOOL — It will do the job better and safer at the rate for which it was designed.

USE RIGHT TOOL — Don't force small tool or attachment to do the job of a heavy-duty tool.

WEAR PROPER APPAREL — No loose clothing or jewelry to get caught in moving parts. Rubber gloves and footwear are recommended when working outdoors.

USE SAFETY GLASSES with most tools. Also face or dust masks if cutting operation is dusty.

DON'T ABUSE CORD — Never carry tool by cord or yank it to disconnect from receptacle. Keep cord from heat, oil and sharp edges.

SECURE WORK — Use clamps or a vise to hold work. It's safer than using your hand and it frees both hands to operate tool.

DON'T OVERREACH — Keep proper footing and balance at all times.

MAINTAIN TOOLS WITH CARE — Keep tools sharp and clean for best and safest performance. Follow instructions for lubricating and changing accessories.

DISCONNECT TOOLS — When not in use; before servicing; when changing accessories such as blades, bits, cutters, etc.

REMOVE ADJUSTING KEYS AND WRENCHES — Form habit of checking to see that keys and adjusting wrenches are removed from tool before turning it on.

AVOID ACCIDENTAL STARTING — Don't carry plugged-in tool with finger on switch.

OUTLETS — ELECTRICAL

BEFORE USING — make a safety check for loose cable connections, bare wires, cracked outlets and missing or damaged face plates.

WHEN USING — be sure plug fits firmly and check for any signs of heating caused by faulty connections.

TO REMOVE CORD -- GRAB AT PLUG

Yanking a cord from an outlet can:
- —Break cord insulation and wires
- —Pull loose wire connections
- —Bend plug prongs
- —Spread clips inside outlet

ABOUT THE THREE (3) PRONG PLUG

Guard it! It is your shock LIFEGUARD. Never cut off the third prong to fit an older two-hole outlet. Never use a two-wire extension cord with this three-prong plug. If using an adapter at a two-hole outlet, be sure the pigtail is attached to face plate screw (NOTE: Screw must be tested for known "ground source".)

ELECTRICAL SAFETY

/ith electricity we are dealing with something that cannot be seen and is till the most useful power controlled by man. It is useful but can be a ery destructive power to both man and material if the proper recautions are not taken. The danger is always there and we must know /hat means of protection can be used to eliminate the hazards.

Portable Power Tools

n construction portable power tools with defective wiring cause many njuries. The following safe practices are recommended:

(1) Use tools with three wire plug and make sure connections are tight
(2) Check tool, equipment and cables frequently for safe condition
(3) Disconnect tool before making adjustments or repairs
(4) When using power tools in a wet area, use caution. The shock hazard is increased.

Temporary Electrical Installations

Only skilled electricians should be allowed to perform any kind of electrical work. Foremen have the responsibility of making certain that electricians are provided with and use the proper protective equipment. The following are safety suggestions for installation and use of temporary electrical systems:

(1) Do not overload circuits
(2) Use proper size wire for amps to be carried and also for grounding
(3) All circuits must be fused or circuit breakers installed to give adequate protection
(4) All circuits must be properly grounded
(5) Wire must be protected from vehicle traffic
(6) Temporary wiring must not be hung over nails, re-bar or other metal objects
(7) Periodic inspections should be made of all temporary electrical systems to ensure they are in a safe condition
(8) If a circuit is de-energized for any reason, tag and or lock it "out of service" until it can be safely returned to service.

Know the hazards of electricity. It will help prevent injuries or even death!

ELECTRICAL

The following regulations apply only to electrical installations used on ıe jobsite, both temporary and permanent:

1. Extension cords used with portable electrical tools and appliances shall be of three-wire types. Grounds are never to be removed from the extension cords.
2. Temporary lights shall be equipped with guards to prevent accidental contact with the bulb. Guards are not required when the reflector is constructed in such a way that the bulb is deeply recessed.
3. Temporary lights shall not be suspended by their electric cords unless cords and lights are designed for this means of suspension.
4. Splices shall have insulation equal to that of the cable.
5. Electrical and extension cords or cables are not to be laid on floors, in walkways, etc., unless it is impractical to do otherwise. They should be suspended or secured in such a way as not to block or hang in walkways, doorways or work areas.
6. Panel boxes shall have a cover on them at all times, except when being serviced and when a temporary cover is in place it should be marked "HOT" to denote live current.
7. Explain to the employees which ground fault system your company has in effect, either GROUND FAULT CIRCUIT INTERRUPTERS OR ASSURED EQUIPMENT GROUNDING CONDUCTOR PROGRAM.

CRANE BOOM LOADING

Crane and rigging safety is of extreme importance to the construction industry. Much of this type of work is performed in congested areas where the general public can easily become involved in an accident.

Hazardous loading of crane booms, which could lead to either overturning the crane or to buckling the boom, can be avoided if you understand crane ratings. Every construction crane should be provided with a chart showing its rated capacity. This rated capacity can be safely handled if you pay attention to the following points:

(1) The safe load depends upon the boom length and the radius. Make sure that you know what length of boom you are using. Remember that radius is measured from the center of rotation not from the boom foot pin.
(2) The published load does not include the weight of the hook or materials handling devices. Subtract the weight of equalizer jobs, concrete buckets, or job extension from the rated loads to determine the weight of material that can be handled.
(3) Ratings are based on operating on firm ground and in the case of mobile cranes with the outriggers fully extended. Make sure that the crane is not operating on ground that is too soft or with outriggers that are not properly blocked and extended.
(4) Ratings are based on operating on level ground. Operating on grades increases boom stress. If you pick up a load on the high side of a slope and swing to the low side, the radius will increase and can cause the crane to tip. If operating at high boom angles, a swing from the low side to the high side can cause the boom to collapse over the cab.
(5) Avoid fast operations. Fast swings cause the load to swing out, thus increasing the radius. Rapid hoisting or braking of the load increases the boom stresses and can overload the rigging.
(6) Do not handle heavy loads with a large surface area when there are high winds. Wind gusts can create an unstable condition.
(7) Make sure the crane is properly rigged, that it has the correct counterweight, the proper boom, the right boom mounting position, the gantry properly rigged, and has adequate parts of line.
(8) Avoid traveling with a heavy load. The boom is subjected to shock and bending stresses if moving over uneven ground and swinging of the load creates inertia forces which can cause collapse of the boom.
(9) Do not use a crane with a bent or damaged boom. Booms must be straightened and in good repair.
(10) If in doubt as to the ability of a machine to lift a load, make sure that you attempt the lift in the most stable position. For example, with a truck crane, pick the load up over the rear where stability is greatest and then boom up before swinging over the side.

HOISTING SAFELY

Hoisting if done improperly can present hazards to the operator and other workers in the vicinity. But, if proper precautions and techniques for operation, inspection, maintenance, and repair are followed, the risks can be reduced.

Using hoists safely can be broken down into several areas the most important being SAFE OPERATION.

Operators of hoists should be told to:

- Know and do not exceed the safe load limit of the hoisting equipment
- Check controls to see that the proper reaction results from the operation of a certain control
- Check pendant control cable for cuts, kinking, or signs of wear
- Visually check hoist cables for fraying, kinking, crushing, and twisting of the cables between the cable and the drum
- Look at the hoist drum for proper cable alignment, stacking of the cable on the drum, and cable alignment in the drum guides
- Visually inspect the hook for cracks, bending, or distortion, and the safety latch for proper operation
- Not operate the hoist if not physically fit
- Not attempt to lengthen or repair the load chain
- Read and follow manufacturer's instructions and all instructions and warnings on the hoist
- Position the hoist directly over the load
- Avoid swinging of load or hook when traveling the hoist
- Pull in a straight line so that neither hoist body nor load chain or rope are angled around anything
- After the hook is placed in the lifting ring, apply slight pressure to the hoist to ensure that the lifting ring is seated in the bottom of the hook and that the hook is properly aligned
- Between lifts, check to see that the rope is properly reeved on the drum
- Attach sufficient guide ropes to control the unit being moved
- Check the intended movement path to see that it is clear of people and obstructions and to see if the intended destination is ready to receive the load
- Not tamper with any part of the hoist
- Check brakes for excessive drift
- Be sure there is proper clearance for movement
- Get positioned on the pendant side of the hoist to get maximum clearance from the load and to prevent entanglement of cables
- Avoid sudden starts, stops, or reverses to avoid shock loading
- Raise the load only high enough to avoid obstructions
- Not hoist loads over workers — wait until area is vacated
- Not permit the operator or guide rope handlers to become distracted
- Be alert for any variation of hoist operation and any possible malfunction
- Not leave a load suspended in the air — if a short delay is unavoidable, lock the controls
- Not allow unqualified personnel to operate hoists
- Never carry anyone on the hook or load
- Not operate hoist to extreme limits of chain or rope
- Avoid sharp contact between two hoists, between hoist and end post, and between hooks and hoist body
- Never use the hoist rope or chain as a sling
- Not use chain or rope as ground for welding nor touch a live welding electrode to the chain or rope

GENERAL CONSTRUCTION SAFE PRACTICES #1

Keep oily cloths away from oxygen (explosion danger)

Always light torch with a "torch lighter" (never use a match or cigarette — and never in a keg or drum)

Open compressed gas cylinders slowly to avoid valve damage

Keep salamanders or other portable heating equipment away from combustible materials

Make sure engines in buildings are away from combustibles — and exhaust is properly ventilated

After work, check clothing for hidden hot slag or molten metal. Do not wear oil-soaked clothing

Check for clear path first. Then have clear view while carrying load

Face ladder when climbing. Use both hands. Use hand line or material hoist to lift loads

Use only sturdy ladders on firm base. Where possible angle out base one-fourth of ladder working length. Keep area clear of debris.

Have ladder reach at least three feet above landing for easy access. Tie off ladder at top (secure bottom and brace long ladders)

Use scaffold if solid footing or safe ladder access is not possible; made of straight-grained lumber, free of defects and knots. Test plank strength.

Platform planks should overlap supports not less than six inches nor more than twelve inches; be secured from shifting.

Consider all wires "live" until checked and locked out. Keep safe distance from "live" electricity.

Have electrical power tools and equipment properly grounded.

Do not use electrical power tools or equipment while standing in water.

All electrical power tools and extension cords should have rubber insulation. Damaged cords should be replaced not repaired.

Only qualified personnel should make electrical repairs or installations. Do not use metal ladders and hats near high-powered electricity.

Have all cords, leads, hose, etc., placed to avoid tripping hazards or getting damaged — and away from oil, grease.

Remove or clinch nails in old lumber.

Oil, grease and water spills must be cleaned up right away. Delay can cause an accident.

Keep loose materials off stairs, walkways, ramps, platforms, etc.

GENERAL CONSTRUCTION SAFE PRACTICES #2

Report to work rested and physically fit to perform your job.

Wear clothing suitable for weather and your work. Torn or loose clothing, cuffs, neckwear are hazardous.

Wear approved safety footwear suitable for your trade...in good condition.

Use gloves, aprons or other suitable skin protection when handling rough materials, chemicals, hot or cold objects. Replace if worn.

Jewelry (rings, bracelets, neck chains, etc.) should not be worn.

Special safety equipment is provided for your protection. Use when required. Keep in good condition. Report loss or damage immediately.

In or near old construction locate gas, power and water sources before starting work. Contact utility companies.

"No Smoking" signs stand guard near fire dangers. Obey them — always!

Know location and use of fire extinguishing equipment and how to give fire alarm.

Flammable liquid containers should be clearly labeled and stored in a protected, separate area.

Flammable liquids should be used only in small amounts and in approved metal safety cans.

Do not refuel a hot or running engine. Clean up spills before starting.

Do not block aisles, traffic lanes, fire exits.

Have safe access to work areas — the safe way is the right way.

Avoid shortcut — use ramps, stairs, walkways, ladders, etc.

Properly brace or shore up excavation side wall if not sloped.

Place excavation spoil far enough away to avoid load strain on walls. Remove surface rocks that may fall in.

Do not permit vehicles too close to edge of cut.

Bend knees, keep back nearly straight when lifting. Leg muscles, not your back, should do the work.

Get help with heavy or bulky materials to avoid dropping load or getting thrown off-balance.

Have just one person give commands when team-lifting big loads.

Intoxicants and non-prescribed drugs are NOT PERMITTED — cause for disciplinary action.

Rely on your supervisor's knowledge and experience if you do not understand any rule or work operation.

Work with care and good judgment at all times to avoid accidents — whether or not a specific rule is contained in this manual.

Give your wholehearted support to safety activities. Preventing your accident depends mostly on YOU!

GENERAL CONSTRUCTION SAFE PR..CTICES NO.3

Never adjust or repair machinery while it is in motion. "Lock out" when maintenance job requires.

Operate machinery and vehicles within rated capacity and at safe speeds.

Report defective power tools or machinery to supervisor immediately.

Never point an air hose at anyone or use it to clean clothing — extremely dangerous!

Be sure you have clear area behind you before swinging sledgehammer, other tools or materials.

Keep constant check on blocks, cables, clamps and other tackle. Repair or replace if defective.

Store oily wiping rags in covered metal containers or dispose of them safely.

Never use an air hose or pressure to empty gasoline drums.

Welding, cutting operations should be closely supervised. Remove or shield nearby combustibles.

Keep a fire watch with adequate fire extinguishers during and after "hot work" as job location requires.

Do not look at welding or cutting operations without wearing proper eye protection.

Check hose, fittings, valves for leaks (use soapy water).

Keep all tools and materials away from edge of scaffolds, platforms, shaft openings, etc.

Do not use tools with split, broken or loose handles.

Have tools with burred or mushroomed heads dressed. Keep cutting tools sharp — and carry in a container (not in your pocket).

Know correct use of hand and power tools before using. Use the right tool for the job.

Only qualified personnel should operate or service power tools, vehicles and other machinery.

Before starting machinery, opening valves, switches, etc., check safety of workmen. Have all safety guards attached.

GENERAL CONSTRUCTION SAFE PRACTICE NO.4

When entering different work areas, familiarize yourself with any required safety precautions.

Be sure your footing is well supported before stepping. Watch out for overhanging planks, slippery spots, loose objects, etc.

Be aware of work going on around you. Keep clear of suspended loads, traffic areas, etc.

Always have enough light on stairs, aisles, basements, work areas, etc.

Place barricades and signs to warn of traffic, overhead dangers, etc. Have warning lights, flagman or watchman, if necessary.

Place fencing or barricades at excavations, floor openings.

Do not ride on vehicles or mobile equipment unless specifically authorized.

Always be seated when riding authorized vehicles (unless designed for standing).

Report any injuries immediately. Even small cuts can become seriously infected.

Report any unsafe conditions or equipment to your supervisor.

Keep "horseplay" and roughhousing away from the job. Practical jokes often become painful injuries.

Keep your mind on your job — and temper under control — always!

Hard hats must be worn in all areas indicated (visitors included).

Wear proper eye protection if exposed to flying objects, dust, hot splashing metal, harmful rays, chemicals.

Wear proper respiratory equipment when spray painting, burning, exposed to dust or other toxic hazards — as required.

Keep materials orderly. Prevent piles from falling or shifting (tie down or support, if necessary).

Shavings, dust, scraps, oil or grease must not accumulate. Make good housekeeping part of the job.

Refuse piles must be removed as soon as possible.

PREVENTING COMMON INJURIES

The largest number of injuries occur to fingers and hands. Here are some pointers on how to avoid those common injuries.

1. Inspect materials for slivers, jagged edges, burrs, rough or slippery surfaces.
2. Get a firm grip on the object.
3. Keep fingers away from pinch points, especially when setting down materials.
4. When handling lumber, pipe, or other long objects, keep hands away from the ends to prevent them from being pinched.
5. Wipe off greasy, wet, slippery, or dirty objects before trying to handle them.
6. Keep hands free of oil and grease.

In most cases, gloves have to be used to prevent hand injuries.

If injuries do occur, report such injuries and have them treated. Cuts or scratches can become infected unless properly cared for.

In addition to the specifics just related to, here are some general rules that should be adhered to in order to prevent injuries to yourself or your fellow worker.

1. Order is the first step in doing anything right. Practice good housekeeping everywhere. A work area is in order when there are no unnecessary objects about and everything is in its place.
2. Learn the right way to do your job. That will be the safe way. If you are not sure you thoroughly understand the job, ask your super for further instructions.
3. Work at a safe speed. Foolish hurry such as running in passage-ways or on stairs, is dangerous.
4. Jumping from an elevation such as a table, bench or platform is liable to result in serious injury. Don't do it.
5. Work clear of suspended loads. If a load is moved above where you are working, stand aside until it has passed by.
6. Obey warning tags and signs. They are posted to point out hazards.
7. Avoid practical jokes and horseplay. Such actions lead to accidents and are forbidden on the job site.
8. Make suggestions that will assist in safe performance of work. Bring to the supers attention any unsafe condition found in the job or on the job site.

SAFE PRACTICES FOR CARPENTERS

1. Erect scaffolds and supports from sound material of ample strength to carry the load. Construct platforms of sound lumber. Secure toe boards and handrails in place.

2. Use both hands to hold on to side rails when going up or down a ladder. Use rope to raise or lower material or tools.

3. Sharp cutting tools are safer to work with than dull ones. Do not use tools with defective handles or mushroomed heads. Keep saws properly set.

4. Keep boards with nails in them out of passageways and working spaces. Nails should be pulled out, or boards piled out of the way.

5. Never leave loose boards or tools on scaffolds, runways or platforms where they may be knocked off onto people below or cause workers to trip.

6. Keep work shoes in good condition so that your footing will always be solid and secure. Turn trouser cuffs up inside and sew.

7. Do not carry sharp-edged tools in your pockets unless the edges are protected in a sheath.

8. Clean up all loose material at the end of each work day.

9. Place an adequate number of red lights or warning devices in place to indicate material piled close to a walk or passage-way used at night. Barricade passage-ways where there is danger of objects falling from overhead.

PERSONAL PROTECTIVE EQUIPMENT

Hard hats shall be worn at all times, even on coffee and lunch breaks
n the jobsite.

Hearing protection shall be provided and used whenever it is not
easible to reduce the noise levels or duration of exposures. A safe
orking condition is 90 dBA for eight hours.

Eye and face protection shall be worn when there is present danger of
njury.

The following rules are good safety practices:

1. Don't wear pants with cuffs or bell bottoms.
2. Shirt sleeves should be buttoned and not left hanging.
3. Nylon shirts and jackets should not be worn around welding or cutting operations.
4. Wear safety shoes (steel toe) when lifting materials either by machine or manually.
5. Wearing "sneakers" or tennis shoes, high heel platform shoes, etc., should be prohibited on a construction site or in a shop area.
6. Gloves should be worn when work requires such.
7. Lift with your legs — not your back.
8. Report all injuries, no matter how minor, to someone in authority.

FALLING OR MOVING OBJECTS

Falling or Moving Objects — Falling or moving objects disable more than 260,000 workers a year. Of every 100 workers hurt, 14 get hit by something.

WEAR PROTECTIVE EQUIPMENT

Safety glasses will save your eyes from misguided missiles! Always wear safety glasses or shields when the job calls for them. Keep glasses clean and have them adjusted.

HARD HATS

Head protection is a must on certain jobs especially around overhead work or where there might be falling objects. Be hard-hatted — not hard headed!

SAFETY SHOES

That hidden steel toe cap often is the difference between a crushed foot and no injury at all. It's really foolish not to wear safety shoes at work no matter what your job.

PROTECT YOURSELF

1. Stay out from under cranes, suspended loads and overhead work.
2. Stand clear when you hear warning bells or horns or power trucks and overhead equipment.
3. Keep clear of barricaded areas.
4. Wear protective equipment as required.

PROTECT THE OTHER GUY

1. Warn unauthorized personnel away from danger areas.
2. Take care that tools or material don't fall from overhead work.

Weak Spot: Failure to wear personal protective equipment "just this once."

HEAT STROKES, HEAT EXHAUSTION: WOULD YOU KNOW WHAT TO DO?

It's time again for all contractors and subcontractors to familiarize themselves with the symptoms and treatment for those hot weather dangers: heat strokes and heat exhaustion.

Any time the temperature rises above 90 degrees, the danger exists that persons exposed to the direct sun may be affected with heat exhaustion or heat stroke. It is important that you — and your foremen — know the symptoms and emergency treatment of these two different types of illness.

HEAT STROKE

The symptoms of heat stroke often appear quite suddenly and are characterized by collapse, delirium or coma. Certain characteristics include diminished, sweating; dry, hot skin and flushed face; rapid pulse; headaches, dizziness and irritability, nausea and vomiting; an extra high body temperature ranging from 105 to 110 degrees; and an extremely rapid pulse.

The heat stroke victim should be taken to a hospital or doctor immediately. Attempts also should be made to lower the body temperature. This can be done by removing all the patient's clothes except for shorts and sprinkling his entire body with water. A fine spray of water evaporates more rapidly and produces a better cooling effect.

During transportation, windows should be left open so that air passing over the patient's body will evaporate the water.

The patient's arms, legs and trunk should be rubbed briskly to increase circulation to the skin. If ice is available, an ice bag or towel wrung out in ice water should be applied to the head.

HEAT EXHAUSTION

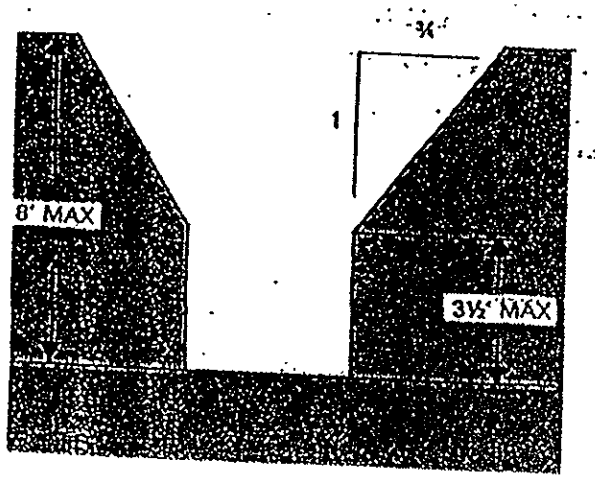
The symptoms of the slightly less serious heat exhaustion are different from heat stroke in that the patient's skin *normally* is cold, clammy and covered with perspiration instead of hot and dry. The face is pale; other symptoms include a headache, loss of appetite, drowsiness, cramps of the limbs and abdominal muscles, faintness or unconsciousness. The pupils of the eyes sometimes are dilated.

To treat heat exhaustion, move the patient to a cool place where he may rest and keep him lying down with head level low. If you have salt available, give him small amounts mixed with water. It's not a bad idea to send the patient to the doctor for a checkup after he rests a few moments.

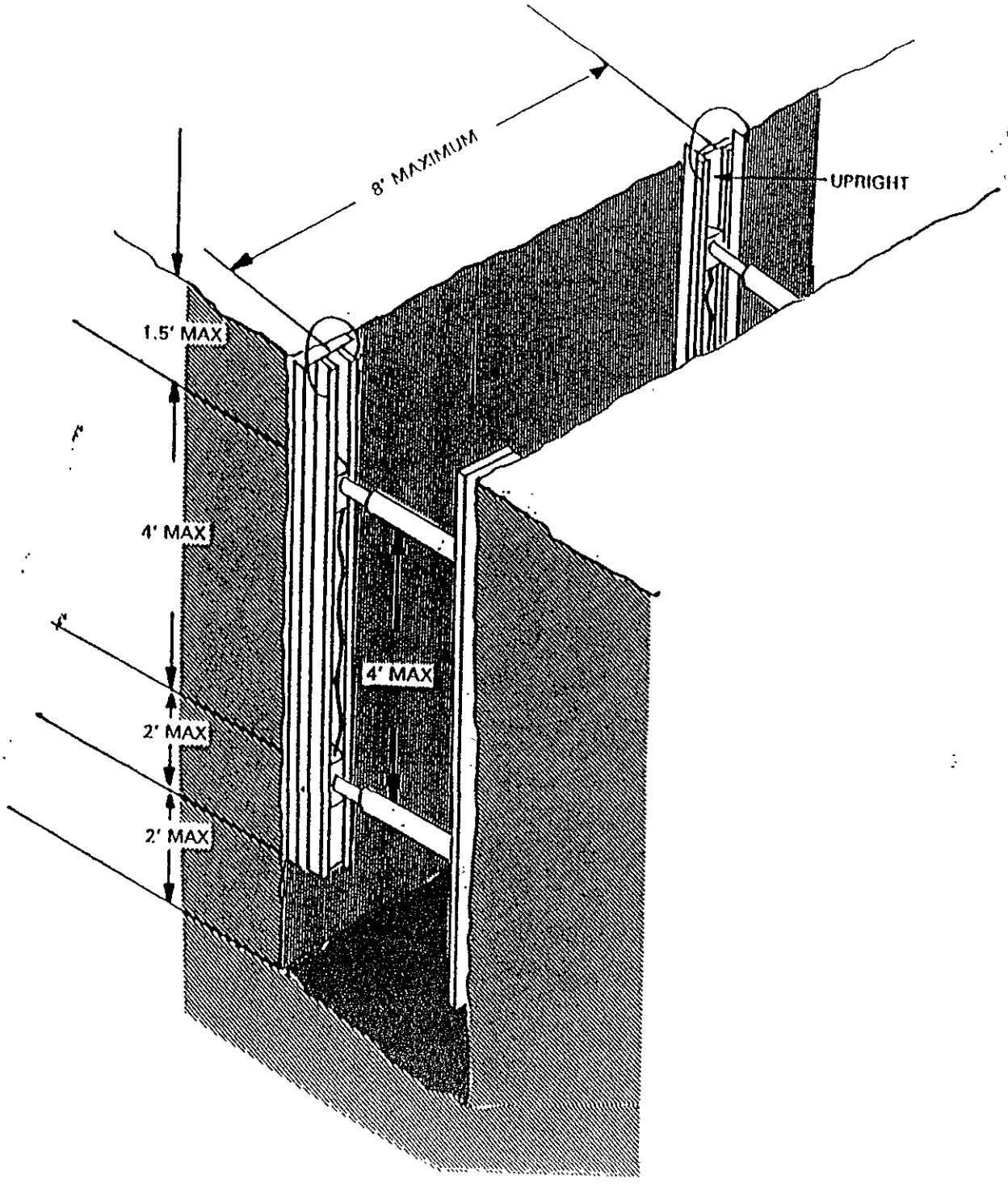
SLOPING OR BENCHING SYSTEMS. When sloping is used as a substitute for shoring, the slope should be at least ¾ horizontal to 1 vertical unless the instability of the soil requires a flatter slope.

Exceptions:

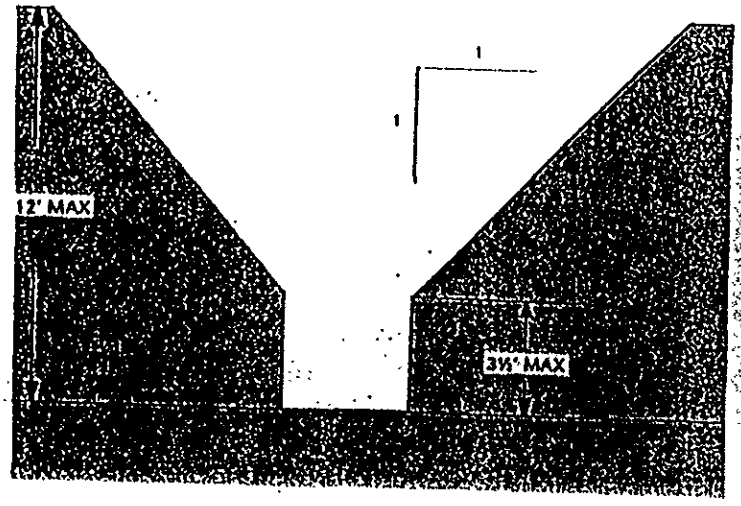
In hard, compact soil where the depth of the excavation or trench is 8 feet or less, make a vertical cut of 3½ feet with a slope of ¾ horizontal to 1 vertical.



MINIMUM SHORING REQUIREMENT IN HARD COMPACT SOIL—HYDRAULIC



In hard, compact soil where the depth of the excavation or trench is 12 feet or less, make a vertical cut of 3½ feet with a slope of 1 horizontal to 1 vertical.



When benching in hard, compact soil, use a slope ratio of ¾ horizontal to 1 vertical, or flatter.

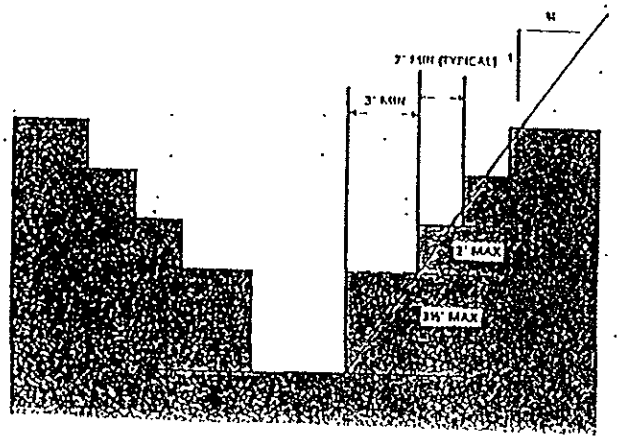


TABLE 2

HYDRAULIC SHORING FOR HARD COMPACT SOIL

	UPRIGHTS		STRINGERS (WALER)		BRACES (STRUTS)		
DEPTH (FEET)	HORIZONTAL SPACING (FEET)	SIZE ALUMINUM RAIL	SIZE ALUMINUM RAIL	VERTICAL SPACING (FEET)	HYDRAULIC CYLINDERS	HORIZ. SPACING (FEET)	MAX. E WID (FEE
5 to 7	8 *	8" Wide Standard ***	6" Wide Standard ***	5	2" ID-2½" OD	8 oc	12
Over 7 to 12	8 *	8" Wide Standard ***	6" Wide Standard ***	5	2" ID-2½" OD	8 oc	9
Over 12 to 16	6 *	8" Wide Standard or HD	6" Wide Standard or 8" Wide HD	5 5	2" ID-2½ OD 2" ID-2½" OD	8 oc	9
Over 16 to 20	6 *	8" Wide Standard or HD	6" Wide Standard or 8" Wide HD	4 4	2" or 3" ID or 2½" or 3½" OD	4 oc	9
Over 20	See Section 1541(a)(6)						

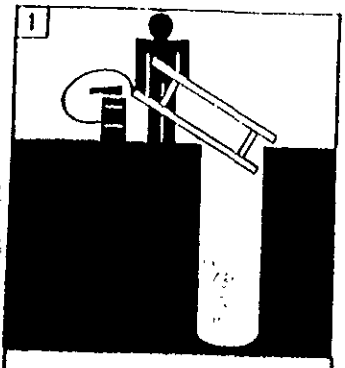
DO NOT ENTER A TRENCH WITH UNSTABLE GROUND OR OVER 5 FEET DEEP UNLESS YOU ARE SURE OF THE FOLLOWING:

A) A PERMIT HAS BEEN ISSUED.
B) PROPER SHORING IS IN PLACE OR BANK IS PROPERLY SLOPED.
C) THERE IS A LADDER WITHIN 25 FEET OF WHERE YOU ARE WORKING.
D) SPOIL PILES SHALL BE AT LEAST 2 FEET FROM EDGE OF TRENCH.
E) THERE IS NO EQUIPMENT PARKED OR WORKING NEAR EDGE OF TRENCH.
F) NEVER DUMP MATERIALS INTO A TRENCH OR DRIVE EQUIPMENT TO SIDE OF TRENCH BEFORE CHECKING TO MAKE SURE WORKMEN ARE CLEAR. USE AN OBSERVER.
G) ALWAYS WEAR YOUR HARD HAT WHILE WORKING AROUND A TRENCHER OPERATION.
H) THIS COMPANY OFTEN USES AN ENGINEERED SHORING SYSTEM TO PROTECT OUR WORKERS AGAINST THE HAZARD OF MOVING GROUND. THE PLANS AND CALCULATIONS FOR THESE SYSTEMS ARE IN THE PROJECT OFFICE OR WITH THE FOREMAN RUNNING JOB.

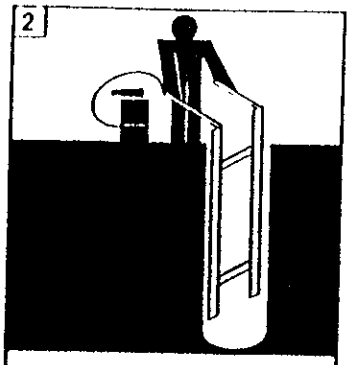
INSTALLATION

SAFE-T-SHORE®

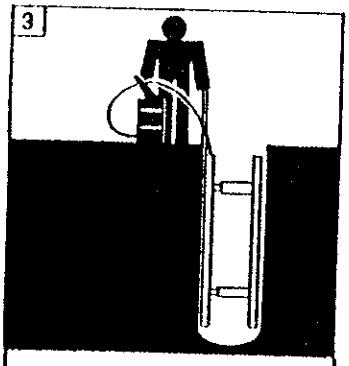
Strong Shoring, Strong Service.



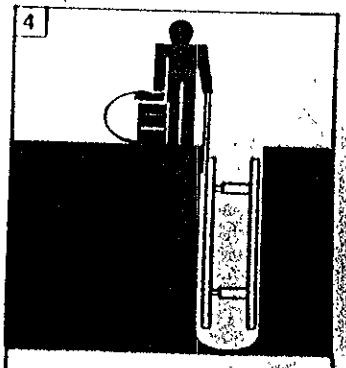
Position SAFE-T-SHORE across the trench at point of entry (as pictured) with handles facing away from trench and male hydraulic fitting on the lower rail side. Once positioned, remove female hydraulic coupling from top of pump can and place on male hydraulic fitting on the SAFE-T-SHORE, (make sure ¼ turn valve on pump is in open position). Place release tool hook through handle on lower rail.



While holding lower rail with hook, pull top rail back until shore is in folded position. Lower shore into trench with hook to desired position. Release top rail into trench until shore is completely unfolded and cylinders are horizontal to trench bottom. SAFE-T-SHORE is now suspended in trench on the hook of release tool.

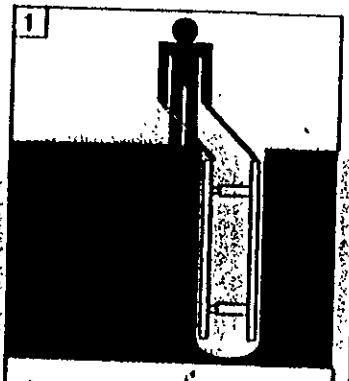


With free hand, turn ¼ turn valve on pump to closed position. Pump shore to a minimum pressure of 750 pounds per square inch (psi) as shown on pump gauge. Higher pressures can be used when needed. Remove hook from handle.

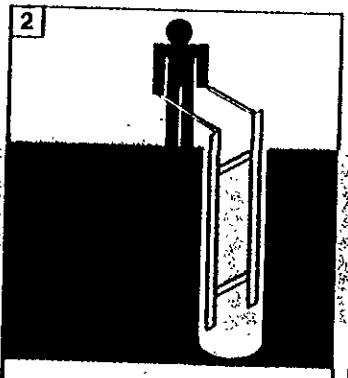


Lower release tool (with hook in contact with rail) until pressure plate is engaged behind collar of female hydraulic coupling from pump hose. With one hand, pull tool towards yourself while holding pump hose with other hand. When disconnected, turn ¼ turn valve back to open position, and place female coupling back on pump until installation of your next SAFE-T-SHORE.

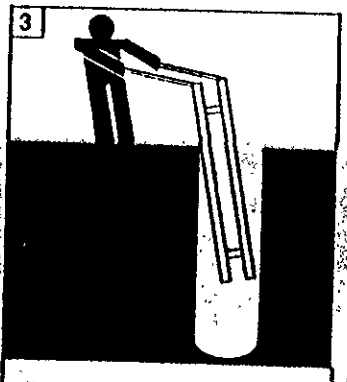
REMOVAL



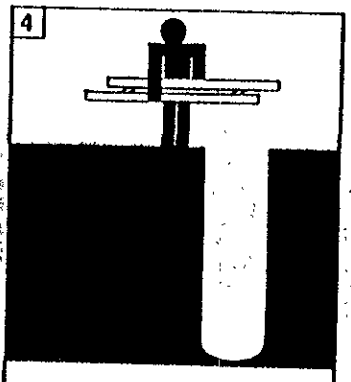
Lower release tool between handle and rail with hook facing toward the opposing trench wall. Place tool such that spray deflector is above male hydraulic fitting, and push on handle so the pressure plate depresses check valve on male hydraulic fitting. This will release the SAFE-T-SHORE shoring fluid from the cylinders.



The rail nearest you will drop engaging the handle with the hook on release tool. Pull removal tool until shore is in folded position.



By pulling both the release tool and removal tool, remove SAFE-T-SHORE from trench.



Remove tools from shore and fold SAFE-T-SHORE flat to be carried to next installation point.

MODEL	COLOR	SHORABLE TRENCH	DAILY	WEEKLY	MONTHLY
SR7 24		14 to 18	$ 8	$ 24	$ 60
SR7-27	ORANGE	18 to 25	8	24	60
SR7-36	RED	23 to 34	8	24	60
SR7-36/6		29 to 40	9	27	70
SR7-46	GREEN	30 to 44	9	27	70
SR7-36/11		34 to 45	9	27	70
SR7-55	BLUE	35 to 53	10	30	80
SR7-36/22		45 to 56	10	30	80
SR7-55/11		46 to 64	11	33	99
SR7-88	BLACK	54 to 86	11	33	99
SR7-88/24		78 to 110	13	39	117
SR7-88/42		96 to 128	15	45	135
SR7-88/72		126 to 158	17	51	153
SR7-88/102		156 to 188	CALL FOR QUOTE		

STANDARD SAFE-T-SHORE WITH PLYWOOD

SR7-24		16 to 20	$ 20	$ 40	$ 110
SR7-27	ORANGE	20 to 27	20	40	110
SR7-36	RED	25 to 36	20	40	110
SR7-36/6		31 to 42	22	44	122
SR7-46	GREEN	32 to 46	22	44	122
SR7-36/11		36 to 47	22	44	122
SR7-55	BLUE	37 to 55	24	48	134
SR7-36/22		47 to 58	24	48	134
SR7-55/11		48 to 66	28	56	158
SR7-88	BLACK	56 to 88	28	56	158
SR7-88/24		80 to 112	30	60	170
SR7-88/42		98 to 130	32	64	182
SR7-88/72		128 to 160	34	77	198
SR7-88/102		158 to 190	34	77	198

SINGLE CYLINDER SAFE-T-SHORE (2 FT. RAIL)

SR2-24		14 to 18	$ 3	$ 9	$ 27
SR2-27	ORANGE	18 to 25	3	9	27
SR2-36	RED	23 to 34	3	9	27
SR2-36/6		29 to 40	4	12	36
SR2-46	GREEN	30 to 44	4	12	36
SR2-36/11		34 to 45	4	12	36
SR2-55	BLUE	35 to 53	5	15	45
SR2-36/22		45 to 56	5	15	45
SR2-55/11		46 to 64	6	18	54
SR2-88	BLACK	54 to 86	6	18	54
SR2-88/24		78 to 110	7	21	63
SR2-88/42		96 to 128	8	24	72
SR2-88/72		126 to 158	10	30	90
SR2-88/102		156 to 188	10	30	90

SHP-1000	PUMP	$ 6	$ 18	$ 54
SRT-	TOOL	2	6	18
SSB	SPREADER BAR	10	20	54

ACCESSORIES

MODEL	DESCRIPTION	DAILY	WEEKLY	MONTHLY
SHP-1000	HYDRAULIC PUMP	$ 6	$ 18	$ 54
SEP-2000*	ELECTRIC PUMP	60	75	225
SRT-30/48/96	RELEASE TOOL	2	6	18
SSB	SPREADER BAR	10	20	54
4'x8'x1 1/8"	PLYWOOD	4	12	36
	TIMBER	8	10	30
SBH	BRIDLE HOSE	2	6	18
SEH	EXTENSION HOSE	2	6	18
SSF-0	SHORING FLUID-QUARTS	$ 4.00 EACH		
SSF-12	SHORING FLUID-QUARTS	$ 42.00 CASE		

HEAVY DUTY SAFE-T-SHORE 8' RAIL NO PLYWOOD

MODEL	SHORABLE TRENCH	DAILY	WEEKLY	MONTHLY
SVH8-24	14 to 18	$ 10	$ 30	$ 90
SVH8-27	18 to 25	10	30	90
SVH8-36	23 to 34	10	30	90
SVH8-46	30 to 44	11	33	99
SVH8-55	35 to 53	12	36	108
SVH8-88	54 to 86	14	42	126
SVH8-88/24	78 to 110	16	48	144
SVH8-88/42	96 to 128	18	54	162

HEAVY DUTY SAFE-T-SHORE 8' RAIL WITH PLYWOOD

MODEL	SHORABLE TRENCH	DAILY	WEEKLY	MONTHLY
SVH8-24	16 to 20	$ 30	$ 40	$ 120
SVH8-27	20 to 27	30	40	120
SVH8-36	25 to 36	30	40	120
SVH8-46	32 to 46	34	45	135
SVH8-55	37 to 55	36	48	144
SVH8-88	56 to 88	41	55	165
SVH8-88/24	80 to 112	45	60	180
SVH8-88/42	98 to 130	49	65	195

MULTI SAFE-T SHORE HEAVY DUTY 12' RAIL

MODEL	SHORABLE TRENCH	DAILY	WEEKLY	MONTHLY
SVHI2-24	11 to 18	$ 14	$ 42	$ 126
SVHI2-27	18 to 25	14	42	126
SVHI2-36	23 to 34	14	42	126
SVHI2-46	30 to 44	15	45	135
SVHI2-55	35 to 53	16	48	144
SVHI2-88	54 to 86	18	54	162
SVHI2-88/24	78 to 110	20	60	180
SVHI2-88/42	96 to 128	25	75	225

MULTI SAFE-T-SHORE HEAVY DUTY 12' RAIL WITH PLYWOOD

MODEL	SHORABLE TRENCH	DAILY	WEEKLY	MONTHLY
SVHI2-24	16 to 20	$ 56	$ 75	$ 225
SVHI2-27	20 to 27	56	75	225
SVHI2-36	25 to 36	56	75	225
SVHI2-46	32 to 46	60	80	240
SVHI2-55	37 to 55	64	85	255
SVHI2-88	56 to 88	75	100	300
SVHI2-88/24	80 to 112	83	110	330
SVHI2-88/42	98 to 130	90	120	360
SVHI2-88/102	158 to 190	135	180	420

MULTI SAFE-T-SHORE HEAVY DUTY 16' RAIL WITH PLYWOOD

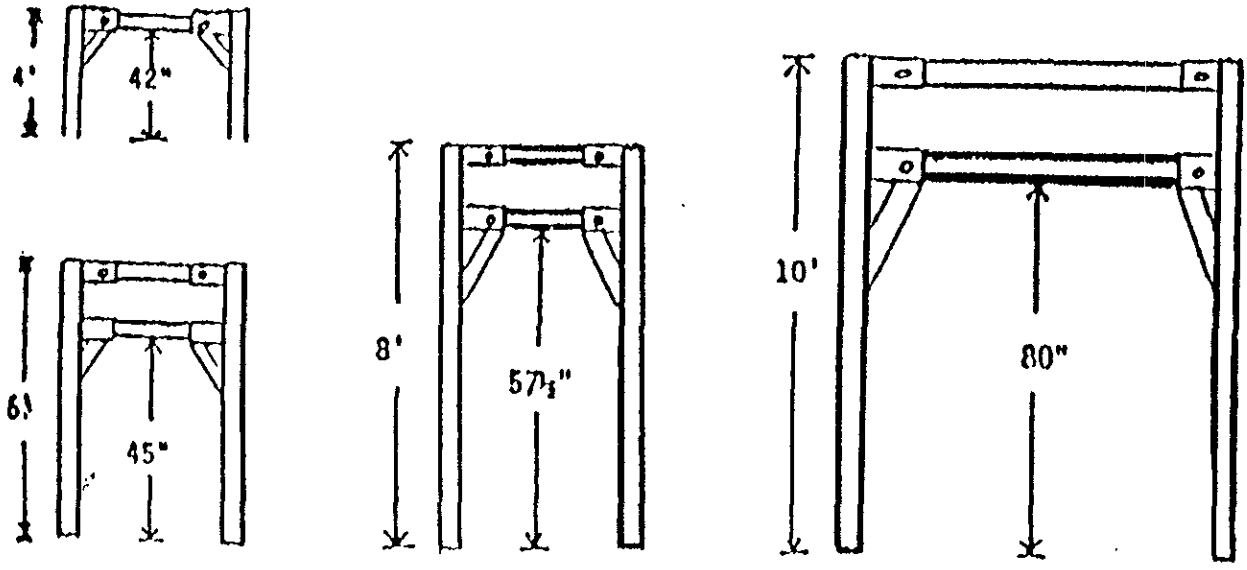
MODEL	SHORABLE TRENCH	DAILY	WEEKLY	MONTHLY
SVHI6-24	16 to 20	$ 68	$ 90	$ 270
SVHI6-27	20 to 27	68	90	270
SVHI6-36	25 to 36	68	90	270
SVHI6-46	32 to 46	71	95	285
SVHI6-55	37 to 55	75	100	300
SVHI6-88	56 to 88	90	120	360
SVHI6-88/24	80 to 112	98	130	390
SVHI6-88/42	98 to 130	105	140	420

STEEL TRENCH SHIELD

MODEL	HEIGHT/LONG/WALL	WEIGHT	24"ID to 60"ID WEEK	24"ID to 60"ID MONTH	63"ID to 120"ID WEEK	63"ID to 120"ID MONTH
STB 412	4'×12'×3"	2700	$ 275	$ 825	$ 385	$ 1155
STB 612	6'×12'×3"	3800	330	990	440	1320
STB 812	8'×12'×3"	4700	385	1155	495	1450
STB 46	4'×16'×4"	4500	$ 325	$ 975	$ 425	$ 1275
STB 66	6'×16'×4"	7500	375	1125	475	1425
STB-86	8'×16'×4"	8000	425	1275	525	1575
STB-106	10'×16'×6"	11000	880	2640	990	2970
STB-4-2	4'×20'×4"	5200	$ 375	$1125	$ 475	$ 1425
STB-6-2	6'×20'×4"	7700	475	1425	525	1575
STB-8-2	8'×20'×4"	9500	525	1575	625	1875
STB-4-24	4'×24'×6"		$ 475	$1425	$ 525	$1575
STB-8-24	8'×24'×6"		625	1875	725	2175

PULLING AND LIFTING CABLES ARE FURNISHED AT NO CHARGE.

CALIFORNIA REGISTERED ENGINEER DESIGN TO MEET OR EXCEED CAL/OSHA DETERMINE DEPTH**********35KV GROUND.



WELD HOLES 24" to 128"

MODEL	WEEK	MONTH
8'	$ 137.50	$ 330.00
12'	176.00	440.00
16'	220.00	550.00

HYDRAULIC MANHOLE BOX

MODEL	WEEK	MONTH
SMH-4	$ 150	$ 450
SMH-8	225	675

PRODUCT #	COLOR	SIZE	WEIGHT	ROLLS/ PALLET	PRICE/ROLL
CONWED SAFETY FENCE - DIAMOND PATTERN					
L-XT60004850	GREEN	4'X50'	20	16	$ 36.00*
XD60004850	ORANGE	4'X50'	20	16	$ 55.00
L-XD60006050	ORANGE	X50'	25	16	$ 65.00
HIGH VISABILITY SAFETY FENCE (LIGHTWEIGHT)					
L-XL5968	ORANGE	4'X150'	47	16	$ 120.00
	ORANGE	5'X164'	62	16	$ 250.00
	ORANGE	6'X100'	46	16	$ 180.00
MULTI USE FENCE (2 1/4"X2 3/4" MESH)					
	BLACK	4'X330'	21	16	$ 115.00
	BLACK	5'X330'	27	16	$ 145.00
	BLACK	6'X330'	32	16	$ 175.00
	BLACK	7'X330'	41	16	$ 205.00

AMERICAN TRENCH & TRAFFIC SUPPLIES

STEEL PLATE RENTAL RATES

PLATE SIZE	WEEKLY	MONTHLY
6' x 10' x 7/8"	30.00	90.00
8' x 12' x 1"	40.00	120.00

LIFTING RING PROVIDED AT NO EXTRA CHARGE

CUSTOMER RESPONSIBLE FOR LOADING & UNLOADING
DELIVERY & PICK UP AT $40.00 PER HOUR PORTAL TO PORTAL
ONE HOUR MINIMUM ON ALL PICK UP AND DELIVERIES

OUTSIDE TRUCKING WILL BE BILLED AT COST

PRICES SUBJECT TO CHANGE WITHOUT NOTICE

439 DOGHERTY LANE
CAMPBELL, CA 95008
(408) 879-9578

POWER
ENGINEERING CONTRACTORS
1275 N. SAN ANTONIO ROAD
PALO ALTO, CA 94303-1312
415/969-9696
LICENSE A/B 480215

JOB SPECIFIC SAFETY PLAN

Department of Environmental Health
Hazardous Material Division
80 Swan Way Room 200
Oakland, Calif 94621

RE: SAN ANTONIO PUMP STATION
SAN FRANCISCO WATER DEPT

JOB SITE INFORMATION FOR REMOVAL OF (3) OIL TANKS

SITE ADDRESS

5555 Calaveras Rd.
Sunol Calif

EPA ID #

CAC 000608736

GENERAL CONTRACTOR

Power Engineering contractors
1275 North San Antonio Rd.
Palo Alto , Calif 94303
(415) 969-9696

HAZARDOUS WASTE TRANSPORTER

H & H Environmental Services
220 China Basin
San Francisco, Calif 94107
(415) 543-4835

CAD # 004-771168
HAUL REG # 0034

TANK HAULED TO

220 China Basin
San Francisco , Calif 94107

TANKS HISTORY

TANKS INSTALLED	Year of 1967
USAGE OF TANKS	(2 each) 9680 gal Diesel
	(1 each) 550 gal Lube oil

ACTIVITY REMOVAL OF EXSISTING DIESEL TANKS

a) THE USE OF ROPES, SLINGS AND CHAINS SHALL BE IN ACCORDANCE WITH THE SAFE RECOMMENDATIONS OF MANUFACTURER. RIGGING EQUIPMENT SHALL NOT BE LOADED IN EXCESS OF IT'S RECOMMENDED SAFE WORKING LOAD AS PRESCRIBED IN LATEST EDITION OF ANSI B 30.9 APPENDIX C.

b) HOOKS AND OTHER FITTINGS THAT SHOW SIGNS OF EXCESSIVE WEAR SHALL BE REMOVED.

c) RUNNING LINES LOCATED WITHIN 6 FEET 6 INCHES OF THE GROUND OR WORKING LEVEL SHALL BE BOXED OFF.

d) RIGGING EQUIPMENT SHALL BE INSPECTED PRIOR TO USE ON EACH SHIFT AND AS NECESSARY TO INSURE THAT IT IS SAFE.

e) RIGGING EQUIPMENT WHEN NOT IN USE SHALL BE REMOVED FROM THE IMMEDIATE WORK AREA AND PROPERLY STORED.

f) DEFECTIVE SLINGS SHALL BE REMOVED FROM SERVICE.

g) PROTECTION SHALL BE PROVIDED BETWEEN THE SLING AND SHARP UNYIELDING SURFACES OF THE LOAD TO BE LIFTED. THE USE OF SLINGS WILL BE SUCH THAT THE ENTIRE LOAD IS POSITIVELY SECURED.

h) ALL HOISTING EQUIPMENT MUST BE CAPABLE OF SATISFACTORILY COMPLETING A PERFORMANCE (OPERATING) TEST BEFORE BEING PLACED IN SERVICE ON A PROJECT. THIS TEST SHALL CONSIST OF MANEUVERING A SPECIFIED TEST LOAD THROUGH A MAXIMUM LIFT HEIGHT, LIFT RADIUS, AND BOOM QUADRANT. EXCEPT FOR THE TEST LOAD, THE ANTICIPATED LOAD IS THE MAXIMUM LOAD THAT CAN BE LIFTED BY THE HOISTING EQUIPMENT. TEST SHALL BE REPEATED PRIOR TO UNUSUAL OR CRITICAL LIFTS, AND AFTER ALTERATION OR ASSEMBLY.TEST RECORDS SHALL BE MADE PART OF THE OFFICIAL PROJECT FILE.

i) LOAD CAPACITIES, DETERMINED BY THE PERFORMANCE TEST, RECOMMENDED OPERATING SPEEDS, AND SPECIAL HAZARD WARNINGS OR INSTRUCTIONS SHALL BE POSTED WHERE CLEARLY VISIBLE TO THE OPERATORS OF CRANES AND POSTED ON THE HOIST.

j) AT NO TIME SHALL A CRANE BE LOADED IN EXCESS OF THE MANUFACTURER'S RATING EXCEPT DURING PERFORMANCE TESTS. TEST LOADS SHALL NOT EXCEED THAT SPECIFIED BY THE ANSI B30 SERIES REQUIREMENTS FOR A PARTICULAR CRANE TYPE.

k) NO MODIFICATIONS OR ADDITIONS WHICH AFFECT THE CAPACITY OR SAFE OPERATION OF THE EQUIPMENT SHALL BE MADE WITHOUT THE MANUFACTURER'S APPROVAL. IF SUCH MODIFICATIONS OR CHANGES ARE MADE, THE CAPACITY, OPERATION, AND MAINTENANCE INSTRUCTION PLATES OR TAGS SHALL BE CHANGED ACCORDINGLY. IN NO CASE SHALL THE ORIGINAL SAFETY FACTOR BE REDUCED.

m) BRAKING EQUIPMENT CAPABLE OF STOPPING, LOWERING, AND HOLDING A LOAD OF AT LEAST THE FULL TEST LOAD SHALL BE PROVIDED

n) THERE SHALL BE AT LEAST TWO FULL WRAPS OF CABLE ON THE DRUMS OF HOISTING EQUIPMENT AT ALL TIMES.

o) RIDING ON LOADS, HOOKS, ETC IS PROHIBITED.

p) WHILE HOISTING EQUIPMENT IS IN OPERATION, THE OPERATOR SHALL NOT PERFORM ANY OTHER WORK AND SHALL NOT LEAVE HIS POSITION AT THE CONTROLS UNTIL THE LOAD HAS BEEN SAFELY LANDED OR RETURNED TO GROUND LEVEL.

q) A STANDARD SIGNAL SYSTEM SHALL BE USED ON ALL HOISTING EQUIPMENT.

r) WHENEVER A SLACK LINE CONDITION OCCURS, PRIOR TO FURTHER OPERATIONS, THE PROPER SEATING OF THE ROPE IN THE SHEAVES AND ON THE DRUM SHALL BE CHECKED.

s) ATTACHMENTS USED WITH CRANES SHALL NOT EXCEED THE CAPACITY, RATING, OR SCOPE RECOMMENDED BY THE MANUFACTURER.

t) HOISTING ROPES SHALL NOT BE WRAPPED AROUND THE LOAD

u) HOISTING ROPES SHALL BE INSTALLED IN ACCORDANCE WITH THE MANUFACTURER'S RECOMMENDATION.

v) ADEQUATE CLEARANCE SHALL BE MAINTAINED BETWEEN MOVING AND ROTATING STRUCTURES OF THE CRANE AND FIXED OBJECTS TO ALLOW PASSAGE OF EMPLOYEES WITHOUT HARM.

w) PERFORMANCE TEST OF CRAWLER, TRUCK, AND WHEEL MOUNTED CRANES SHALL DEMONSTRATE THE STRENGTH, STABILITY, CAPACITY, AND ADEQUACY OF POWER, BRAKES CLUTCHES, AND CONTROLS TO SAFELY MANEUVER 125% OF THE ANTICIPATED LOAD.

y) ALL CRAWLER, TRUCK, OR LOCOMOTIVE CRANES IN USE SHALL MEET THE REQUIREMENTS FOR DESIGN, INSPECTION, CONSTRUCTION, TESTING, MAINTENANCE, AND OPERATION IN ANSI B30.5, SAFETY STANDARD FOR MOBILE HYDRAULIC CRANES.

ae) ALL PERSONS REQUIRED TO HANDLE OR USE FLAMMABLE LIQUIDS, GASES, OR TOXIC MATERIALS SHALL BE INSTRUCTED IN THE SAFE HANDLING, STORAGE, DISPOSAL, AND USE OF THESE MATERIALS AND SPECIFIC REQUIREMENTS FOR PROTECTION.

af) COMPATIBLE FIRE EXTINGUISHING EQUIPMENT SHALL BE PROVIDED IN THE IMMEDIATE VICINITY OF THE TANK REMOVAL OPERATION.

bw) THE CONSTRUCTION INSTALLATION AND USE OF LADDERS SHALL CONFORM TO THE LATEST EDITION OF THE SAFETY CODE FOR WOOD, METAL FIXED AND JOB MADE LADDERS

bx) SPLICES TO LADDERS SHALL DEVELOP THE FULL STRENGTH OF A LADDER OF THE SAME OVERALL LENGTH.

by) PORTABLE LADDERS SHALL BE USED AT SUCH A PITCH THAT THE HORIZONTAL DISTANCE FROM THE TOP SUPPORT TO THE FOOT OF THE LADDER WILL NOT BE GREATER THAN ONE-FORTH THE VERTICAL DISTANCE BETWEEN POINTS.

bz) THE SUPPORTS ON WHICH A LADDER RESTS BOTH TOP AND BOTTOM SHALL BE RIGID CAPABLE OF SUPPORTING THE LOADS TO BE IMPOSED AND SUCH THAT LATERAL DISPLACEMENT CANNOT OCCUR.

ca) ALL PORTABLE LADDERS SHALL BE OF SUFFICIENT LENGTH AND SHALL BE PLACED SO THAT WORKERS WILL NOT STRETCH OR ASSUME A HAZARDOUS POSITION.

cb) PORTABLE LADDERS USED AS TEMPORARY ACCESS SHALL EXTEND AT LEAST 3 FEET PAST THE LANDING.

cc) PORTABLE METAL LADDERS SHALL NOT BE USED FOR ELECTRICAL WORK OR WHERE THEY MAY CONTACT ELECTRICAL CONDUCTORS.

cd) BROKEN OR DAMAGED LADDERS SHALL BE REMOVED FROM SERVICE IMMEDIATELY AND DESTROYED.

ce) THE STEPS AND RUNGS OF ALL LADDERS SHALL BE SET TO PROVIDE AT LEAST 7 INCHES TOE SPACE FROM THE INSIDE EDGE OF THE RUNG TO THE NEAREST INTERFACE.

cf) THE LENGTH OF PORTABLE STEP LADDERS SHALL NOT BE GREATER THAN 20 FEET.

ACTIVITY DEMOLITION

a) DEMOLITION WORK SHALL NOT PROCEED UNTIL A DEMOLITION PLAN HAS BEEN MADE AND APPROVED

b) ALL ELECTRIC, GAS, WATER, AND OTHER SERVICE LINES SHALL BE SHUT OFF CAPPED OR OTHER WISE CONTROLLED OUTSIDE THE BUILDING LINE BEFORE DEMOLITION IS STARTED. IN EACH CASE ANY UTILITY COMPANY WHICH IS INVOLVED SHALL BE NOTIFIED IN ADVANCE.

c) IF IT IS NECESSARY TO MAINTAIN ANY POWER WATER OR OTHER UTILITIES DURING DEMOLITION SUCH LINES SHALL BE TEMPORARILY RELOCATED.

d) WHERE HAZARDS EXISTS TO EMPLOYEES FALLING THROUGH OPENINGS THE OPENING SHALL BE PROTECTED TO A HEIGHT OF APPROXIMATELY 42 INCHES.

f) ALL STAIRWAYS, PASSAGEWAYS, GANGWAYS AND ACCESSWAYS SHALL BE KEPT FREE OF MATERIALS, SUPPLIES AND OBSTRUCTIONS AT ALL TIMES.

g) CONTAMINATION OR POLLUTION OF PUBLIC WATER IS PROHIBITED. COMPLIANCE WITH ALL FEDERAL, STATE OR LOCAL LAWS CONCERNING POLLUTION OF WATER RESOURCES IS REQUIRED.

h) DUST FROM EQUIPMENT, SAWING, OR GRINDING AND OTHER DUST-PRODUCING ACTIVITIES SHALL BE CONTROLLED TO ASSURE VISIBILITY AND SAFE OPERATIONS AND TO MINIMIZE NUISANCE DUST IN THE IMMEDIATE AND ADJACENT AREAS.

i) DUST FROM ROAD TRAFFIC STORAGE AREAS OR BULK STOCKPILES SHALL BE CONTROLLED TO ASSURE ADEQUATE VISIBILITY.

ACTIVITY THROUGHOUT CONSTRUCTION

a) THE EMLOYER SHALL PROVIDE TRAINING IN HANDLING EMERGENCY SITUATIONS THAT MAY ARISE IN THE USE OF ANY EQUIPMENT ON THE PROJECT.

b) PROTECTION AGAINST THE EFFECTS OF NOISE EXPOSURE SHALL BE PROVIDED FOR ALL PERSONNEL WHENEVER THE SOUND LEVEL EXCEEDS 85 dB CONTINUOUS OR 140 dB IMPULSE, REGARDLESS OF EXPOSURE.

c) WHEN PERSONNEL ARE SUBJECTED TO SOUND LEVELS EXCEEDING THE LIMITS SPECIFIED IN THIS SECTION, FEASIBLE ENGINEERING OR ADMINISTRATIVE CONTROLS SHALL BE UTILIZED. IF SUCH CONTROLS FAIL TO REDUCE SOUND LEVELS WITHIN THE SPECIFIED LIMIT, PERSONAL PROTECTIVE EQUIPMENT SHALL BE PROVIDED AND USED TO REDUCE SOUND LEVELS TO THE SPECIFIED LIMIT. ONLY THOSE HEARING PROTECTORS WHICH HAVE BEEN TESTED IN ACCORDANCE WITH ANSI Z24.22 SHALL BE ACCEPTABLE. PLAIN COTTON IS NOT AN ACCEPTABLE PROTECTIVE DEVICE.

d) ANY ACTIVITY WHICH INVOLVES POTENTIAL EXPOSURE TO LASERS, MICROWAVES, X-RAYS, AND ELECTROMAGNETIC OR IONIZING RADIATION, WHETHER OR NOT SUBJECT TO LICENSE FROM THE NUCLEAR REGULATORY COMMISSION, SHALL BE PERFORMED BY COMPETENT PERSONS. FOR MATERIALS USED UNDER COMMISSION LICENSE, ONLY PERSONS UNDER DIRECTION OF THE LICENSEE SHALL PERFORM SUCH WORK. ALL PERSONS REQUIRED TO BE IN AREAS OF POTENTIAL EXPOSURE SHALL BE INSTRUCTED IN THE POTENTIAL HAZARDS AND SAFEGUARDS.

e) PERSONAL PROTECTIVE DEVICES SHALL BE USED AS REQUIRED

f) ITEMS OF PERSONAL ISSUE SHALL BE INSPECTED REGULARLY AND MAINTAINED IN SERVICEABLE AND SANITARY CONDITION AND, BEFORE BEING
REISSUED TO TO ANOTHER PERSON OR RETURNED TO STORAGE, SHALL BE CLEANED, DISINFECTED, INSPECTED AND REPAIRED.

g) PROTECTIVE FOOTWEAR SUCH AS RUBBER BOOTS, PROTECTIVE COVERS, SAFETY BOOTS, ETC., SHALL BE WORN BY ALL PERSONS WHO ARE ENGAGED IN WORK WHICH REQUIRES SUCH PROTECTION.

h) PERSONS HANDLING ROUGH SHARP EDGED ABRASIVE MATERIALS OR WHERE THE WORK SUBJECTS THE HANDS TO LACERATIONS, PUNCTURES, BURNS, OR BRUISES SHALL USE HAND PROTECTION.

i) PERSONS EXPOSED TO VEHICULAR, SUCH AS SIGNAL PERSONS, SPOTTERS, INSPECTORS, OR OTHERS SHALL WEAR BELTS OR APPAREL MARKED WITH A REFLECTORIZED OR HIGH VISIBILITY MATERIAL.

j) ALL PERSONS EXPOSED TO OPERATIONS WHICH SUBJECT THE EYES OR FACE TO SUBJECT TO DUST OR FLYING PARTICLES SHALL USE EYEAND/OR FACE PROTECTION.

k) OPERATIONS WHICH REQUIRE THE HANDLING OF HARMFUL MATERIALS WHERE PROTECTION FROM GASES FUMES AND LIQUIDS IS NECESSARY SHALL REQUIRE THE WEARING OF GOGGLES WITH CUPS OF SOFT PLIABLE RUBBER OR SUITABLE FACE MASKS OF HOODS WHICH COVER THE HEAD AND NECK, AND OTHER PROTECTIVE CLOTHING APPROPRIATE TO THE HAZARDS INVOLVED.

l) DEFECTIVE SAFETY BELTS, HARNESSES, ETC., SHALL BE REPLACED.

m) SAFETY BELTS, HARNESSES, ETC., SHALL BE INSPECTED BEFORE USE EACH DAY TO DETERMINE THAT THEY ARE IN SAFE WORKING CONDITION.

n) ALL PROTECTIVE HEADGEAR SHALL MEET THE REQUIREMENTS OF ANSI Z89.1 CLASS A OR ANSI Z89.2 CLASS B.

o) ALL POINTS OF ENTRY TO A HARD HAT AREA SHALL HAVE A HARD HAT CAUTION SIGN POSTED.

p) ALL PERSONS WORKING ON OR VISITING NON-ADMINISTRATIVE ACTIVITIES SHALL BE PROVIDED WITH AND REQUIRED TO WEAR PROTECTIVE HEADGEAR.

q) LOOSE OR FRAYED CLOTHING LOOSE LONG HAIR DANGLING JEWELRY RINGS CHAINS AND WRIST WATCHES SHALL NOT BE WORN WHILE WHILE WORKING WITH ANY POWER TOOL OR MACHINE

r) STRUCTURAL STEEL SHALL BE STORED IN ORDERLY PILES AWAY FROM WALKWAYS AND ROADWAYS.

s) PIPE UNLESS RACKED, SHALL NOT BE STACKED HIGHER THAN 5 FEET.

t) EITHER A PYRAMID OR BATTENED STACK SHALL BE USED.

u) WHERE A BATTENED STACK IS USED, THE OUTSIDE PILE OR POLE SHALL BE CHOKED.

v) BATTENED STACKS SHALL BE TAPERED BACK AT LEAST ONE PILE OR POLE IN EACH TIER.

w) UNLOADING OF ROUND MATERIAL SHALL BE DONE SO THAT NO PERSON IS REQUIRED TO BE ON THE UNLOADING SIDE OF THE CARRIER AFTER THE TIE WIRES HAVE BEEN CUT OR DURING THE UNLOCKING OF THE STAKES.

x) LOOSE OR LIGHT MATERIAL SHALL NOT BE STORED OR LEFT ON ROOFS OR FLOORS THAT ARE NOT CLOSED IN, UNLESS IT IS SAFELY SECURED.

y) TOOLS, MATERIALS, EXTENSION CORDS, HOSES, OR DEBRIS SHALL NOT CAUSE TRIPPING OR OTHER HAZARD.

z) PROTRUDING NAILS IN SCRAP BOARDS, PLANKS, AND TIMBERS SHALL BE REMOVED, HAMMERED IN, OR BENT OVER FLUSH WITH THE WOOD UNLESS PLACED IN CONTAINERS FOR REMOVAL.

aa) WALKWAYS RUNWAYS AND SIDEWALKS SHALL BE KEPT CLEAR OF EXCAVATED MATERIAL OR OTHER OBSTRUCTION AND NO SIDEWALKS SHALL BE UNDERMINED UNLESS SHORED TO CARRY A MINIMUM LIVE LOAD OF ONE HUNDRED AND TWENTY-FIVE POUNDS PER SQUARE FOOT.

ab) CONTAINERS SHALL BE PROVIDED FOR STORING OR CARRYING BOLTS OR RIFT PINS, AND SECURED AGAINST ACCIDENTAL DISPLACEMENT WHEN ALOFT.

ac) FORM AND SCRAP LUMBER AND DEBRIS SHALL BE CLEARED FROM WORK AREAS, PASSAGEWAYS, AND STAIRS IN AND AROUND BUILDING STORAGE YARDS AND OTHER STRUCTURES.

ad) ALL STORAGE AND CONSTRUCTION SITES SHALL BE KEPT FREE FROM THE ACCUMULATION OF COMBUSTIBLE MATERIALS. A REGULAR PROCEDURE SHALL BE ESTABLISHED FOR CLEANUP OF THE AREA AS SPECIFIED BY THE DESIGNATED AUTHORITY.

ae) ACCUMULATION OF FLAMMABLE AND COMBUSTIBLE LIQUIDS ON FLOORS, WALLS, ETC. IS PROHIBITED. ALL SPILLS OF FLAMMABLE AND COMBUSTIBLE MATERIAL SHALL BE CLEANED UP IMMEDIATELY.

af) CONTRACTORS SHALL PROVIDE SUFFICIENT PERSONNEL AND EQUIPMENT TO INSURE COMPLIANCE WITH ALL HOUSEKEEPING REQUIREMENTS.

ag) CONTRACTORS WILL INSPECT THE WORK AREA DAILY FOR ADEQUATE HOUSEKEEPING AND RECORDING UNSATISFACTORY FINDINGS ON THE DAILY INSPECTION REPORT.

ah) SCRAP LUMBER SHALL BE PLACED IN PILES OR CONTAINERS. WASTE MATERIAL AND RUBBISH SHALL BE PLACED IN CONTAINERS.

ai) CONTAINERS SHALL BE PROVIDED FOR THE COLLECTION AND SEPARATION OF WASTE, TRASH, OILY, AND USED RAGS AND OTHER REFUSE. COVERED METAL CONTAINERS SHALL BE PROVIDED FOR GARBAGE AND OTHER OILY, FLAMMABLE, OR HAZARDOUS WASTES SUCH AS CAUSTICS, ACIDS, AND HARMFUL DUSTS. DISPOSAL SHALL BE DAILY.

aj) STRUCTURAL STEEL POLES PIPE BAR STOCK AND OTHER CYLINDRICAL MATERIALS UNLESS RACKED SHALL BE STACKED AND BLOCKED SO AS TO PREVENT SPREADING OR TILTING.

ak) ALL HAND TOOLS SHALL BE IN GOOD REPAIR AND USED ONLY FOR THE PURPOSE FOR WHICH DESIGNED.

al) TOOLS HAVING DEFECTS THAT WILL IMPAIR THEIR STRENGTH OR RENDER THEM UNSAFE SHALL BE REMOVED FROM SERVICE.

am) WHEN WORK IS BEING PERFORMED OVERHEAD, TOOLS NOT IN USE SHALL BE SECURED OR PLACED IN HOLDERS.

an) THROWING TOOLS OR MATERIALS FROM ONE LOCATION TO ANOTHER, FROM ONE PERSON TO ANOTHER, OR DROPPING THEM TO LOWER LEVELS, SHALL NOT BE PERMITTED.

ao) ONLY NONSPARKING TOOLS SHALL BE USED IN LOCATIONS WHERE SOURCES OF IGNITION MAY CAUSE AND EXPLOSION.

ap) POWER TOOLS SHALL BE INSPECTED, TESTED, AND DETERMINED TO BE IN SAFE OPERATING CONDITION PRIOR TO USE. CONTINUED PERIODIC INSPECTIONS SHALL BE MADE TO ASSURE SAFE OPERATING CONDITION AND PROPER MAINTENANCE.

aq) ROTATING OR RECIPROCATING PORTABLE POWER TOOLS SHALL HAVE A CONSTANT PRESSURE SWITCH THAT WILL SHUT OFF THE POWER WHEN THE TOOL IS RELEASED BY THE OPERATOR.

ar) HYDRAULIC FLUID USED IN POWER TOOLS SHALL RETAINED ITS OPERATING CHARACTERISTICS AT THE MOST EXTREME TEMPERATURES TO WHICH IT WILL BE EXPOSED.

as) MANUFACTURERS SAFE OPERATING PRESSURES FOR HYDRAULIC HOSES VALVES, PIPES, FILTERS AND OTHER FITTINGS SHALL NOT BE EXCEEDED.

at) ALL HYDRAULIC OR PNEUMATIC TOOLS WHICH ARE USED ON OR AROUND ENERGIZED LINES OR EQUIPMENT SHALL HAVE NONCONDUCTING HOSES HAVING ADEQUATE STRENGTH FOR THE NORMAL PRESSURES.

au) TOOLS, MATERIALS, AND EQUIPMENT SUBJECT TO DISPLACEMENT OR FALLING SHALL BE ADEQUATELY SECURED.

av) EMPLOYEES USING, OPERATING, REPAIRING, SERVICING, AND AND HANDLING EXPLOSIVE ACTUATED TOOLS SHALL BE CERTIFIED BY THE MANUFACTURER OR AUTHORIZED REPRESENTATIVE IN THE SAFE USE AND SERVICING OF THE TOOL.

ax) SAFETY CLIPS OR RETAINERS SHALL BE INSTALLED AND MAINTAINED ON PNEUMATIC IMPACT TOOLS TO PREVENT DIES AND TOOLS FROM BEING ACCIDENTALLY EXPELLED FROM THE BARREL.

ay) PRESSURE SHALL BE SHUT OFF AND EXHAUSTED FROM THE LINE BEFORE DISCONNECTING THE LINE FROM AN;Y TOOL OR CONNECTION.

az) SAFETY LASHING SHALL BE PROVIDED AT CONNECTION BETWEEN TOOL AND HOSE, AND AT ALL QUICK MAKE-UP TYPE CONNECTIONS.

ba) AIR HOSE, PIPES, VALVES, FILTERS, AND OTHER FITTINGS SHALL BE PRESSURE RATED BY THE MANUFACTURER AND THIS PRESSURE SHALL NOT BE EXCEEDED. DEFECTIVE HOSES SHALL BE REMOVED FROM SERVICE.

bb) HOSES SHALL NOT BE LAID OVER LADDERS, STEPS, SCAFFOLDS, OR WALKWAYS TO CREATE A TRIPPING HAZARD.

bc) THE USE OF COMPRESSED AIR FOR BLOWING DIRT FROM HANDS, FACE, OR CLOTHING IS PROHIBITED.

bd) COMPRESSED AIR SHALL NOT BE USED FOR OTHER CLEANING PURPOSES EXCEPT WHERE REDUCED TO LESS THAN 30 PSI AND THEN ONLY WITH EFFECTIVE CHIP GUARDING AND PERSONNEL PROTECTIVE EQUIPMENT. THE 30 PSI REQUIREMENT DOES NOT APPLY FOR CONCRETE FORMS, MILL SCALE AND SIMILAR CLEANING DEVICES.

be) HOSES SHALL NOT BE USED FOR HOISTING AND LOWERING TOOLS.

bf) ALL AIR LINES EXCEEDING 1/2-INCH INSIDE DIAMETER WHEN USED ON TOOLS AND EQUIPMENT SUCH AS TRACK DRILLS SHALL HAVE A SAFETY DEVICE AT THE SOURCE OF SUPPLY OR BRANCH LINE TO REDUCE PRESSURE IN CASE OF HOSE FAILURE.

bg) IMPACT WRENCHES SHALL BE PROVIDED WITH A LOCKING DEVICE FOR RETAINING THE SOCKET.

bh) HEAVY EQUIPMENT OPERATORS SHALL RECEIVE INSTRUCTIONS AND SHALL DEMONSTRATE PROFICIENCY IN THE OPERATING OF THE EQUIPMENT.

bi) EVERY PERSON REGULARLY OR OCCASIONALLY OPERATING A MOTOR VEHICLE SHALL POSSESS, AT ALL TIMES WHILE OPERATING SUCH A VEHICLE, A PERMIT VALID FOR THE EQUIPMENT BEING OPERATED.

bj) NO VEHICLE SHALL BE PLACED IN SERVICE UNTIL IT HAS BEEN INSPECTED BY A MECHANIC AND FOUND TO BE IN SAFE OPERATING CONDITION.

bk) ALL VEHICLES SHALL BE INSPECTED ON A SCHEDULED MAINTENANCE PROGRAM. VEHICLES IN USE SHALL BE CHECKED AT THE BEGINNING OF EACH SHIFT TO ASSURE THAT THE FOLLOWING PARTS, EQUIPMENT, AND ACCESSORIES ARE IN SAFE OPERATING CONDITION AND FREE FROM OPERATING DAMAGE THAT COULD CAUSE FAILURE WHILE IN USE; SERVICE BRAKES, INCLUDING TRAILER BRAKE CONNECTION; PARKING SYSTEM (HAND BRAKE); EMERGENCY STOPPING SYSTEM (BRAKES); TIRES; HORNS; STEERING MECHANISM; COUPLING DEVICES; SEAT BELTS; OPERATING CONTROLS; AND SAFETY DEVICES. THESE REQUIREMENTS ALSO APPLY TO EQUIPMENT SUCH AS LIGHTS, REFLECTORS,WINDSHIELD WIPERS, DEFROSTERS, AND FIRE EXTINGUISHERS WHERE SUCH EQUIPMENT IS NECESSARY.

bl) VEHICLES NOT MEETING SAFE OPERATING CONDITIONS SHALL BE REMOVED FROM SERVICE, REPAIRED OR REPLACED, AND REINSPECTED BEFORE BEING PLACED IN SERVICE AGAIN.

bm) ALL VEHICLES OR COMBINATION OF VEHICLES OPERATED BETWEEN SUNSET AND SUNRISE SHALL HAVE THE FOLLOWING LIGHTS.

1) TWO HEADLIGHTS, ONE ON EACH SIDE.
2) AT LEAST ONE RED TAILLIGHT AND ONE RED OR AMBER STOP LIGHT ON EACH SIDE.
3) DIRECTIONAL SIGNAL LIGHTS BOTH FRONT AND BACK.
4) THREE EMERGENCY FLARES, REFLECTIVE MARKERS, OR EQUIVALENT PORTABLE WARNING DEVICES.

bn) ALL VEHICLES, EXCEPT TRAILERS OR SEMITRAILERS HAVING A GROSS WEIGHT OF 5,000 POUNDS OR LESS, SHALL BE EQUIPPED WITH SERVICE BRAKES AND MANUALLY-OPERATED PARKING BRAKES. SERVICE AND PARKING BRAKES SHALL BE ADEQUATE TO CONTROL THE MOVEMENT OF, TO STOP, AND TO HOLD THE VEHICLE UNDER ALL CONDITIONS OF SERVICE. SERVICE BRAKES ON TRAILERS AND SEMITRAILERS SHALL BE CONTROLLED FROM THE DRIVERS SEAT OF THE PRIME MOVER.

bo) EVERY MOTOR VEHICLE SHALL BE EQUIPPED WITH A SPEEDOMETER, A FUEL GAGE, AND AN AUDIBLE WARNING DEVICEIN OPERATING CONDITION.

bp) EVERY MOTOR VEHICLE SHALL BE EQUIPPED WITH AN ADEQUATE WINDSHIELD WIPER.

bq) EVERY MOTOR VEHICLE SHALL BE EQUIPPED WITH AN OPERABLE DEFROSTING AND DEFOGGING DEVICE.

br) ALL MOTOR VEHICLE SHALL BE EQUIPPED WITH AN ADEQUATE REAR VIEW MIRROR OR MIRRORS.

bs) GLASS IN WINDSHIELDS, WINDOWS, AND DOORS SHALL BE SAFETY GLASS.

bt) CRACKED OR BROKEN GLASS SHALL BE REPLACED.

bu) ALL TOWING DEVICES USED ON ANY COMBINATIONS OF VEHICLES SHALL BE STRUCTURALLY ADEQUATE FOR THE WEIGHT DRAWN AND BE PROPERLY MOUNTED.

bv) NO VEHICLE SHALL BE DRIVEN AT A SPEED GREATER THAN THE POSTED SPEED LIMIT, WITH DUE REGARD TO WEATHER, TRAFFIC, INTERSECTIONS, WIDTH AND CHARACTER OF THE ROADWAY, TYPE OF MOTOR VEHICLE, AND ANY OTHER EXISTING CONDITION. THE OPERATOR MUST AT ALL TIMES HAVE THE VEHICLE UNDER SUCH CONTROL AS TO BE ABLE TO BRING IT TO A COMPLETE STOP WITHIN THE ASSURED CLEAR DISTANCE AHEAD.

bw) HEADLIGHTS SHALL BE SWITCHED TO LOW BEAM WHEN APPROACHING OTHER VEHICLES.

bx) EVERY VEHICLE, UPON APPROACHING A RAILROAD CROSSING OR DRAWBRIDGE, SHALL BE DRIVEN AT SUCH A SPEED AS TO PERMIT STOPPING BEFORE REACHING THE NEAREST TRACK OR THE EDGE OF THE DRAW AND SHALL PROCEED ONLY IF THE COURSE IS CLEAR.

by) NO VEHICLE SHALL BE STOPPED, PARKED OR LEFT STANDING ON ANY ROAD OR ADJACENT THERETO OR IN ANY AREA IN SUCH A MANNER AS TO ENDANGER THE VEHICLE, EQUIPMENT, OR PERSONNEL USING OR PASSING THAT ROAD OR AREA.

bz) NO VEHICLE SHALL BE, STOPPED, PARKED OR LEFT STANDING ON ANY ROAD OR ADJACENT THERETO OR IN SUCH A MANNER AS TO ENDANGER THE VEHICLE, OTHER VEHICLES, EQUIPMENT, OR PERSONNEL USING OR PASSING THAT ROAD AREA.

ca) NO VEHICLE SHALL BE LEFT UNATTENDED UNTIL AFTER THE MOTOR HAS BEEN SHUT OFF, THE KEY REMOVED (UNLESS LOCAL REGULATIONS PROHIBIT) PARKING BRAKES SET, AND GEAR ENGAGED IN LOW, REVERSE, OR PARK. IF STOPPED ON A HILL OR GRADE, FRONT WHEELS SHALL BE TURNED OR HOOKED INTO THE CURB OR THE WHEELS SECURELY CHOCKED.

cb) ALL VEHICLES CARRYING LOADS WHICH PROJECT BEYOND THE SIDES OR MORE THAN 4 FEET BEYOND THE REAR OF THE VEHICLE AT NIGHT OR WHEN ATMOSPHERIC CONDITIONS RESTRICT VISIBILITY SHALL CARRY A RED LIGHT AT OR NEAR THE END OF THE PROJECTION. AT OTHER TIMES, A RED FLAG NOT LESS THAN 12 INCHES SQUARE SHALL BE USED.

cc) NO VEHICLES OR COMBINATION OF VEHICLES HAULING UNUSUALLY HEAVY LOADS OR EQUIPMENT SHALL BE MOVED UNTIL THE DRIVER HAS BEEN PROVIDED WITH REQUIRED PERMITS, THE CORRECT WEIGHTS OF THE VEHICLE AND LOAD, AND A DESIGNATED ROUTE TO BE FOLLOWED.

ACTIVITY HAZARD ANALYSIS

FOR

REMOVAL OF DIESEL FUEL STORAGE TANK

ACTIVITY HAZARD ANALYSIS

SAN ANTONIO PUMP STATION IMPROVEMENTS
SAN FRANCISCO WATER DEPARTMENT CONTRACT WD-2062

ACTIVITY:

1 STORAGE OF MATERIALS
2. REMOVAL OF EXISTING FUEL TANK

POTENTIAL HAZARDS WITH CORRESPONDING PRECAUTIONARY ACTION TAKEN

ACTIVITY 1: STORAGE OF MATERIALS

1 TRIPPING ON MATERIAL
- a) The equipment and material shall be stored in an organized manner away from the direct worksite.
- b) The jobsite shall be kept free of tripping hazards

2 HURT BY A FALLING OBJECT
- a) All stored material shall be supported in a safe manner adhering to good construction practices.

3 AUTOMOTIVE ACCIDENTS
- a) All drivers are required to have a state drivers license

4 FOOT INJURY
- a) Safety shoes shall be warned at all times

5 INJURY WHILE USING HAND TOOLS
- a) All hand tools shall be thoroughly checked prior to use
- b) All employees using hand tools have been previously trained in the proper use of each tool.

6 EQUIPMENT BACKING INTO MEN
- a) Back up alarms will be installed on all equipment

7 CRANE OVERLOAD

a) All hoisting equipment shall have current certifications with the equipment at all times.
b) Each load shall be carefully evaluated to determine the actual weight.
c) The operator shall be experienced in running the equipment needed for each use.
d) Picking radius shall be measured for each pick.

8 EQUIPMENT MALFUNCTION

a) Each piece of equipment shall be inspected daily for any problems.
b) A daily checklist shall be provided for each piece of equipment.

9 LADDER ACCIDENT

a) Ladder shall be of sound construction with no defects.
b) All ladders shall be securely attached

10 INJURIES TO PERSONS NOT INVOLVED IN THE WORK

a) Area within the working radius of the crane and our work area shall be barricaded to keep all outside personnel from the work area.

11 FOOT INJURY

a) Safety shoes shall worn at all times.

ACTIVITY 2 REMOVE EXISTING DIESEL FUEL STORAGE TANKS

1 CRANE OVERLOADED

a) All hoisting equipment shall have current certifications with the equipment at all times.
b) Each load shall be carefully evaluated to determine the actual weight.
c) The operator shall be experienced in running the equipment needed for each use.
d) Picking radius shall be measured for each pick.

2 EQUIPMENT MALFUNCTION

a) Each piece of equipment shall be inspected daily for any problems.
b) A daily checklist shall be provided

3 DIESEL FUEL SPILL

a) An earthen berm shall be constructed around the immediate tank removal area to contain any spills during the tank removal operation.

4 b) Two fire extinguishers and Level C protective clothing shall be available at the site.

5 LADDER ACCIDENT

a) Ladder shall be of sound construction with no defects

b) All ladders shall be securely attached

6 INJURIES TO PERSONS NOT INVOLVED IN THE WORK

a) Area within the working radius of the crane and our work area shall be barricaded to keep all outside personnel from the work area.

7 FOOT INJURY

a) Safety shoes shall worn at all times.

8 HEAD INJURY

a) Hard hats are required at all times

9 CATASTROPHIC FAILURE CAUSE BY RIGGING BEING SHEARED BY SHARP EDGES ON THE MATERIAL TO BE MOVED

a) Any rigging that has to be wrapped around material which could possibly shear the rigging have a rubber tire or other material attached to protect the rigging

10 CUTS AND LACERATIONS TO HANDS

a) Work gloves required while handling equipment or performing any other work which could cause cuts

11 INJURY WHILE USING HAND TOOLS

a) All hand tools shall be thoroughly checked prior to use

b) All employees using hand tools have been previously trained in the proper use of each tool.

12 INJURY DUE TO EXPLOSIVE FUMES.

a) An explosimeter (gas sniffer) will be available at the site of the tank removal operation.

b) The operator of the explosimeter (gas sniffer) shall be qualified in its use