12.0 MISCELLANEOUS

12.1 SECTION CONTENTS

This section provides various guidelines which are useful for general plant safety and gives basic information for establishing uniform identification of plant hazards.

12.2 Safety Signs and Safety Color Codes 2
12.3 Identification and Labeling of Pipelines and Equipment 5
12.4 Lighting 8
12.5 Noise Levels 10
12.6 Shoring and Bracing of Excavations 11
12.7 Notes and References 15

NOTE: An asterisk (*) after a section of text indicates that the information in that section is new or revised as of September 1996.

Fed-OSHA 1910.145

12.2 SAFETY SIGNS AND SAFETY COLOR CODES

A. SAFETY SIGNS

Note: Safety signs and symbols used to indicate, and so far as possible, to define special hazards of a nature such that failure to designate them may lead to accidental injury to workers or the public, or both, or property damage shall meet the specifications of 1910.145.

1. Danger signs should be used only where an immediate hazard exists. There shall be no variation in the type of design of signs posted to warn of specific dangers and radiation hazards.
2. Caution signs shall be used only to warn against potential hazards or to caution against unsafe practices. All employees shall be instructed that caution signs indicate a possible hazard against which proper precaution should be taken.
3. Safety instruction signs shall be used where there is a need for general instructions and suggestions relative to safety measures.
4. All signs shall be furnished with rounded or blunt corners and shall be free from sharp edges, burrs, splinters, or other sharp projections. The ends or heads of bolts or other fastening devices shall be located in such a way that they do not constitute a hazard.
5. Slow-moving vehicle emblem (see fig. J-7, 1910.145) consists of a fluorescent yellow-orange triangle with a dark red reflective border. The emblem is intended as a unique identification for, and it shall be used only on, vehicles which by design move slowly (25 m.p.h. or less) on the public roads. The material, location, mounting, etc., of the emblem shall be in accordance with the American Society of Agricultural Engineers Emblem for Identifying Slow-Moving Vehicles, ASAE R276-1967, or ASAE S276.2 (ANSI B114.1-1971).
6. The wording of any safety sign should be easily read and concise. The sign should contain sufficient information to be easily understood. The wording should make a positive, rather than negative suggestion and should be accurate in fact.
7. The biological hazard sign shall be used to signify the actual or potential presence of a biohazard and to identify equipment, containers, rooms, materials, experimental animals, or combinations thereof, which contain, or are contaminated with, viable hazardous agents. For the purpose of this subparagraph the term "biological hazard," or "biohazard," shall include only those infectious agents presenting a risk or potential risk to the well-being of humans.

(continued next page)

Chevron Guidelines

1. Safety signs are used to:
- warn of particular hazards
- indicate required precautions
- provide instructions
- convey information

2. Uniformity of safety signs within and between plants and locations is required to promote ease of recognition and to avoid confusion especially during times of emergency.

3. There shall be no variation in the type of design of signs posted to warn of specific dangers.

4. Required color shades and chromaticities are specified in Combined Standard Safety Color Code (CSSCC) colors (see ANSI Z53.1-1979).

5. Dimensions, materials, finish, lettering, and guidelines for specific signs are provided in CRTC Standard Form EF-528 (6-79). See *Figure 12.1* for typical safety signs.

Fed-OSHA 1910.335

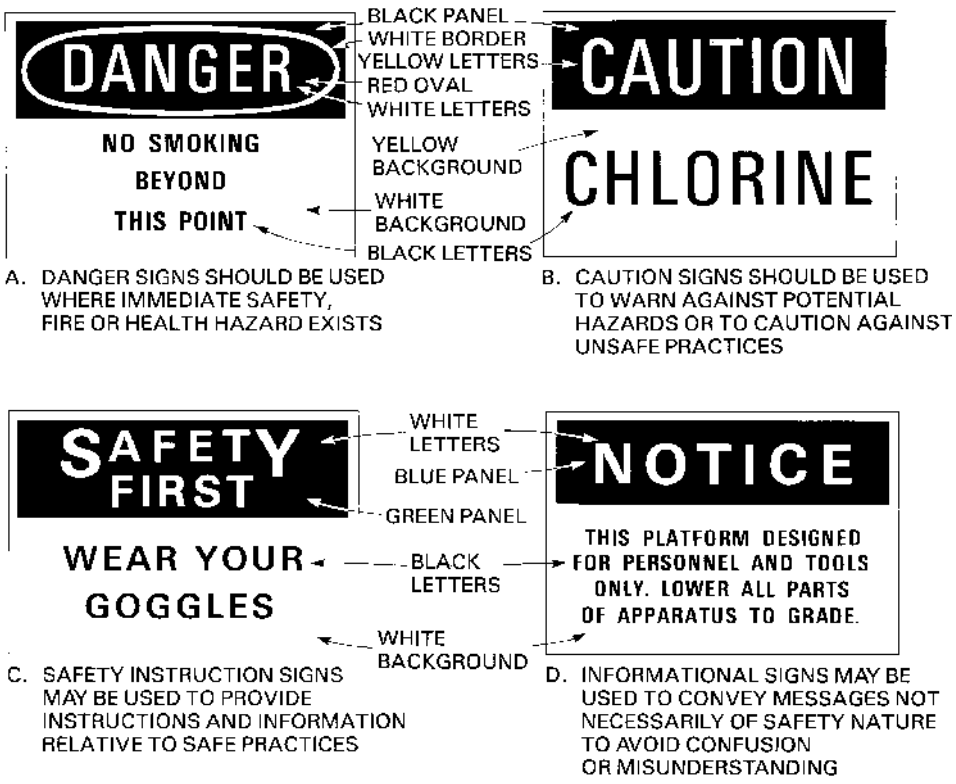


Figure 12.1 Typical Safety Signs

1. Safety signs, symbols, or accident prevention tags shall be used where necessary to warn employees about electrical hazards which may endanger them.

Cal-OSHA 6003

Note: Requirements for classification of signs according to use, sign design and sign wording is contained in Section 6003.

B. SAFETY COLOR CODE

Fed-OSHA 1910.145

Chevron Guidelines

1. Color coding provides a uniform system for identification of emergency safety equipment, hazardous equipment or conditions and toxic or corrosive chemicals.

2. *Figure 12.2* contains a list of color meanings adapted from codes and standards and in common use within the Company.

1. Danger signs:

   The colors red, black, and white shall be those of opaque glossy samples as specified in Table I of Fundamental Specification of Safety Colors for CIE Standard Source "C", American National Standard Z53.1-1967.

2. Caution signs:

   Standard color of the background shall be yellow; the panel shall be black with yellow letters. Any letters used against the yellow background shall be black. The colors shall be those of opaque

(continued next page)

Fed-OSHA 1910.145

glossy samples as specified in Table I of American National Standard Z53.1-1 967.

3. Safety instruction signs:

   Standard color of the background shall be white; the panel shall be green with white letters. Any letters used against the white background shall be black. The colors shall be those of opaque glossy samples as specified in Table I of American National Standard, Z53.1-1967.

COLOR	USES
Red	• Fire Protection Apparatus and Equipment • Fire Protection Lines • Emergency Stops and Switches • Designation of Danger
Purple and Yellow	• Radiation Hazards (may also be black and yellow)
Orange	• Mechanical and Electrical Hazards (dangerous energized equipment) • Noise Hazard (Hearing Protection Required)
Yellow	• Chemical Hazards (Chemical Goggles Area) • Piping with Toxic or Corrosive Material • Designation of Caution
Yellow and Black	• Physical Hazards (obstructed access clearances, stumbling and tripping hazards). Yellow and black may be checkered, stripes, or other distinctive combination.
Green	• Locations of Emergency Safety Equipment (First-Aid Equipment, Safety Showers, Eye-Wash Units) • Containers for Emergency Equipment (Special Breathing Apparatus) • Piping for Potable Water and Respirable Air • Designation of Safety Instruction
Blue	• Special Meaning in Railroad Area for warning against starting, use of, or movement of equipment • Lines Used for Vacuum • Designation of Safety Information
White	• Delineation of Aisles, Traffic Passageways, Housekeeping or Cleaning Equipment
Aluminum or White	• Piping for Liquified Petroleum Gas (or for other products which should have a reflective piping surface for minimizing heat absorption)

Figure 12.2 Color Codes and Standards (continues)

ADDITIONAL COLOR CODES FOR LABORATORIES

Light Brown	• Lines Used for Venting
Black	• Lines Used for Low Pressure Gas
Orange	• Steam
Gray	• Telephone Wires in Conduits
Orchid	• Air

Figure 12.2 Color Codes and Standards

12.3 IDENTIFICATION AND LABELING OF PIPELINES AND EQUIPMENT

A. PIPE LINES

Chevron Guidelines

1. Lines containing liquids or gases other than corrosive or toxic materials should be identified by the use of aluminum bands with black lettering on black lines or by the use of black bands with aluminum lettering on aluminum colored lines.
2. Lines containing corrosive or toxic materials should be identified by the use of yellow bands with black lettering.
3. Lines may be color coded by complete painting of all visible parts of piping or by 8 - 10 inch wide color bands at boundaries, valves, and connections. See *Figures 12.3* and *12.4* for details.

Cal-OSHA 3321

1. Where, in any one establishment, one or more hazardous substances are transported through pipelines, all above ground piping systems used to transport gases, vapors, liquids, semi-liquids, or plastics shall be identified at points where confusion would introduce hazards to employees.
2. Where identification is required for piping systems, one or more of the following methods shall be employed:
   - Complete color painting of all visible parts of the pipe
   - Color bands, preferably 8 to 10 inches wide, at various intervals and at each outlet valve or connection
3. Where identification is provided by complete color painting or by color bands, a color code shall be posted at those locations where confusion would introduce hazards to employees.
   - The names of or abbreviations of the names of the materials transported shall be lettered or stenciled on the pipe near the valves or outlets.
   - Tags of metal or other suitable material naming the material transported shall be fastened securely to the system on or near the valve. Tag legibility shall be maintained.

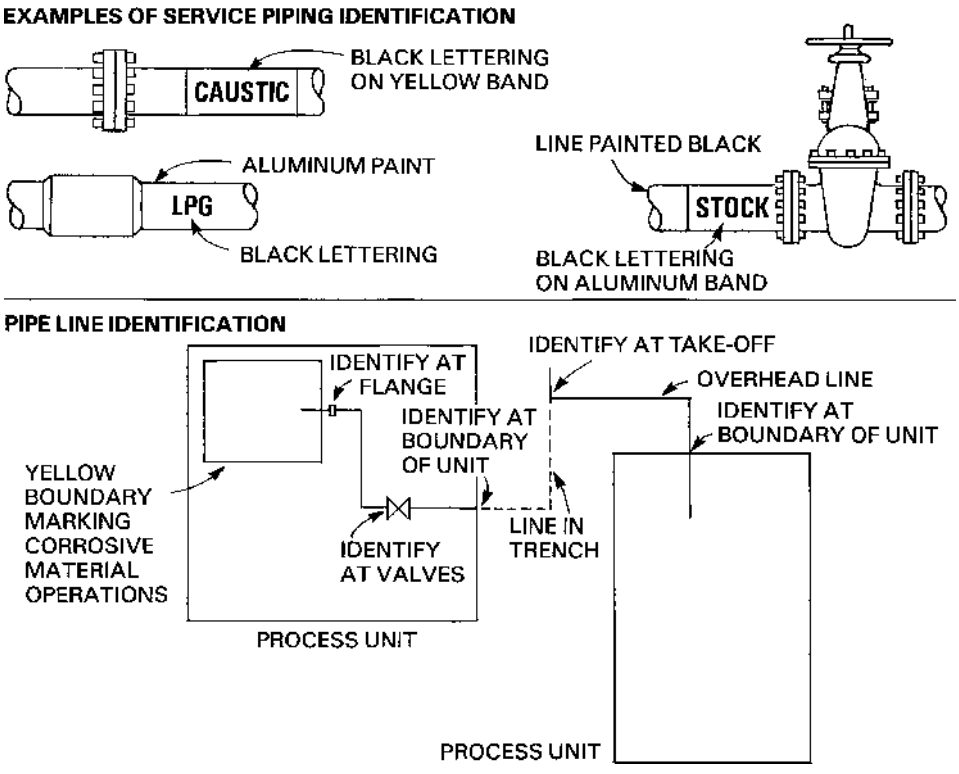
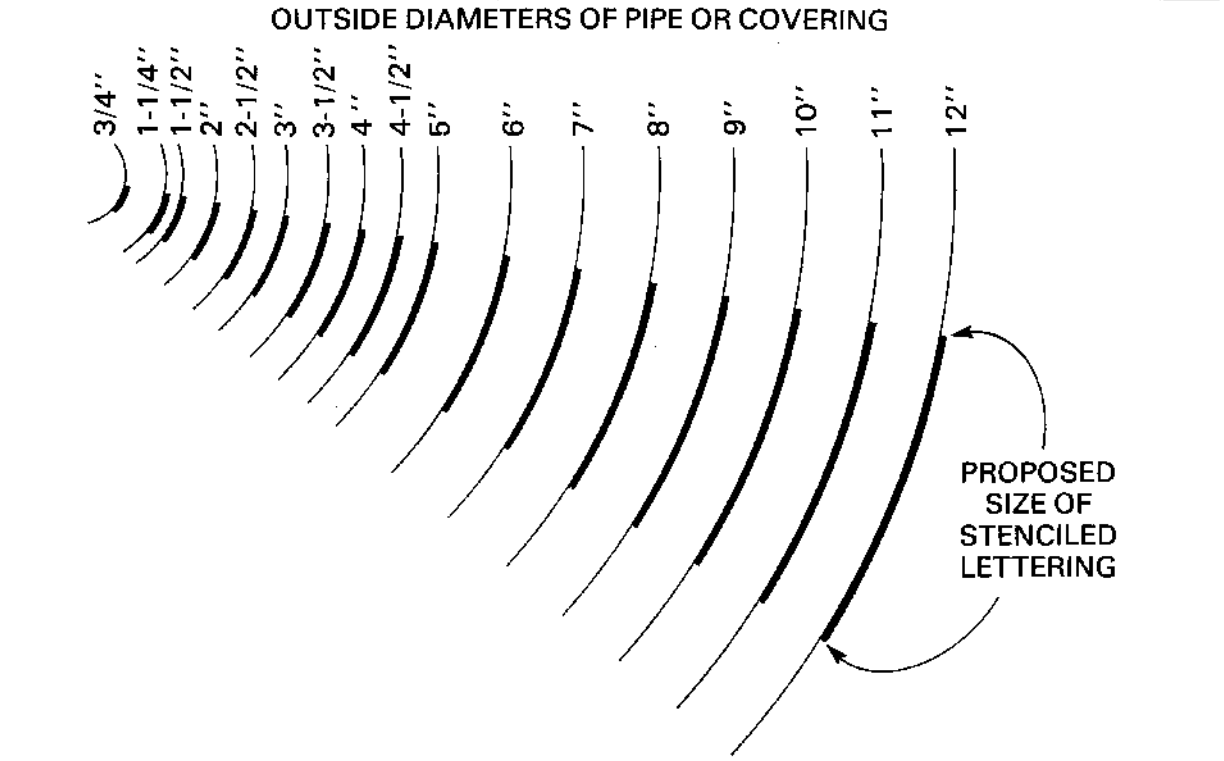


Figure 12.3 Typical Pipe Line Identification

SIZES OF STENCIL LETTERS



OUTSIDE DIAMETER OF PIPE OR COVERING IN INCHES	SIZE OF STENCIL LETTERING IN INCHES
3/4 TO 1-1/4	1/2
1-1/2 TO 2	3/4
2-1/2 TO 3	7/8
3 1/2 TO 4	1-1/4
4 1/2 TO 5	1-1/2
6	1-3/4
7	2
8 TO 9	2-1/2
10 TO 11	3
12 AND OVER	3-1/2

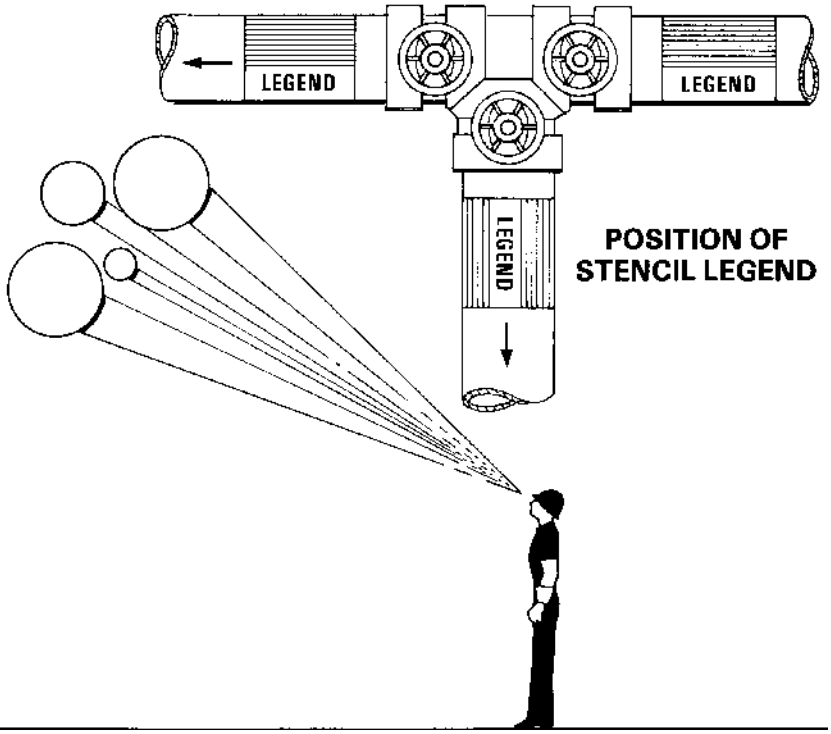


Figure 12.4 Size of Lettering for Pipelines

B. VALVES

CAL-OSHA 6846

1. Quarter turn valves shall be provided with a means to indicate whether the valve is in the open or closed position.
2. Manually operated valves required for the emergency shutdown of units shall plainly indicate whether they are open or closed.

Chevron Guidelines

1. Manually operated valves required for the emergency shutdown of units shall plainly indicate whether they are open or closed.*

12.4 LIGHTING

Chevron Guidelines

1. Recommended light levels are the amount of illumination that should be maintained at the point where a task is performed. See *Figure 12.5.*

2. Higher light output from the light sources is typically required to maintain the recommended light levels.

3. Some causes of light level losses are due to lamp output losses, dirt accumulation on lamps or on reflected surfaces, the operating environment and lack of maintenance.

4. Periodic readings of illumination level should be taken to ensure recommended light levels are maintained.

5. Avoid placing lights where persons climbing stairs or ladders look directly at the light.

Location and Type of Facility	Recommended Light Level (ft. candles)	Measurement Point
OFFICE AREAS		
Prolonged Difficult Tasks (drafting or other close work)	100 ± 20	Top of Table
Difficult Tasks (bookkeeping, typing, etc.)	75 ± 15	Top of Table
Ordinary Tasks (desk work, reading, etc.)	50 ± 10	Top of Table
General Office Areas	30 ± 5	3-4 Feet Above Floor
Hallways, Stairways, Lobby	10 ± 5	Floor Level
CONTROL ROOMS		
Instrument Board	50 ± 10	Active Panel Area
Operator's Desk	50 ± 10	Top of Desk
Chart Table	30 ± 5	Top of Table
General Area	30 ± 5	3-4 Feet Above Floor
Back of Board	10 ± 2	Floor Level
WAREHOUSE		
Bulk Storage	10 ± 2	Floor Level
Bin Storage	20 ± 4	Floor Level
Counters	50 ± 10	On Counter
PROCESS PLANT		
Pump Pads and Manifolds	5	On Pumps or Valves
Operating Aisles	5	Center of Aisle
Ladders and Platforms	5	Platform Level
Elevated Walkways	2	On Walkway
Instruments and Gauges	5	On Instruments
General Area	1	Ground Level
TANK FIELDS		
Stairways and Platforms	2	On Stairs and Platforms
Pipe Manifolds and General Area	1	Ground Level
Pump Pads	5	On Pumps or Valves
LOADING AREAS		
Tank Car Racks	10	On Stairs, Platforms, and Top of Tank
Tank Truck Racks	10	On Stairs, Platforms, and Top of Tank
Record Tables	15	Top of Desk

Figure 12.5 Table of Recommended Light Levels

12.5 NOISE LEVELS

Chevron Guidelines

1. A safety engineer or other qualified personnel familiar with codes and regulations as well as trained in the use and interpretation of noise monitoring equipment should be consulted for noise exposure studies and surveys.

2. The following guidelines are simplified, basic requirements and are provided to show typical plant noise exposure limits:

- Federal OSHA regulations limit worker noise exposures to 90 dBA averaged over an 8-hour period. Exposures to higher noise levels are permitted for shorter periods of time, provided that the 90 dBA average full-shift exposure limit is not exceeded. (See 1910.95).
- Feasible engineering or administrative controls shall be utilized to maintain worker exposures within the 90 dBA 8-hour averaged limit. If such controls fail to reduce noise exposures to within allowable levels, personal protective equipment (hearing protectors) shall be used to limit exposures.
- Federal OSHA requires a Hearing Conservation Program for all workers exposed to 8-hour averaged noise levels of 85 dBA or higher.

3. Individual equipment should be designed with a maximum noise level of 85 dBA at 3-feet during operation at full load. For additional guidance on appropriate design specifications and engineered control of noise exposures, consult the CRTC *Noise Control in Designs Manual.*

Fed-OSHA 1926.650-652

12.6 SHORING AND BRACING OF EXCAVATIONS

Note: See 1926.250-252 for requirements for excavations.

A. GENERAL REQUIREMENTS FOR SHORING AND BRACING

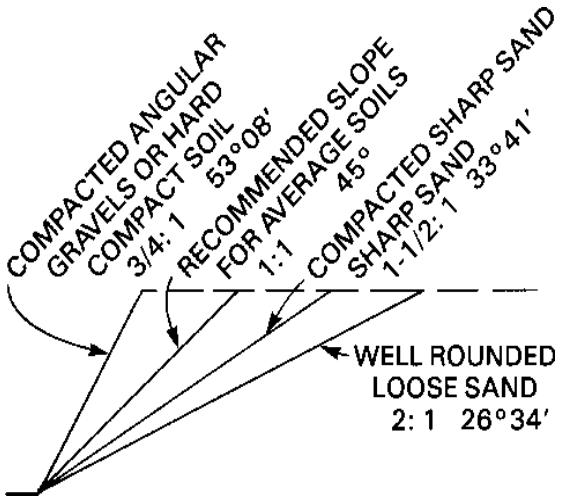
Chevron Guidelines

1. Personnel who enter excavations 5 feet or more in depth shall be protected by a support system of shoring or bracing. Protection of personnel in excavations less than 5 feet shall also be provided where hazardous ground movement may be expected.
2. The excavation support system shall be designed and constructed by personnel knowledgeable of code requirements and familiar with the hazards involved. Excavations in excess of a 20 foot depth may require a permit and / or detailed plans by a civil engineer registered within the appropriate jurisdiction.
3. The excavation shoring or bracing system shall be inspected daily and after a rainstorm, earthquake, or other hazard-increasing occurrence. All work in the excavation shall cease until necessary precautions have been taken to safeguard personnel. See *Figures 12.6* through *12.9* for details.

B. SHORING AND BRACING ALTERNATIVES

Chevron Guidelines

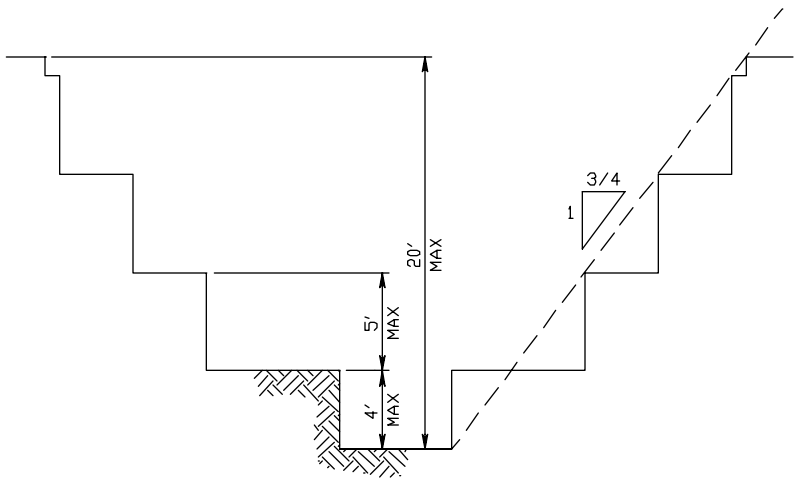
1. In lieu of a shoring system, the sides or walls of an excavation or trench may be sloped or benched to the angle of repose, provided protection is equivalent.



NOTE: THE SIDES OF EXCAVATIONS CAN BE SLOPED TO THEIR ANGLE OF REPOSE IN LIEU OF SHORING IF THIS GUIDE IS FOLLOWED

Figure 12.6 Approximate Angle of Repose for Sloping of Excavated Sides

Slope shall not exceed 3/4 horizontal to 1 vertical.



NOTE: CLAYS, SILTS, LOAMS OR NON-HOMOGENEOUS SOILS REQUIRE SHORING AND BRACING. THE PRESENCE OF GROUND WATER REQUIRES SPECIAL TREATMENT

Figure 12.7 Benching hard, dry compact soil

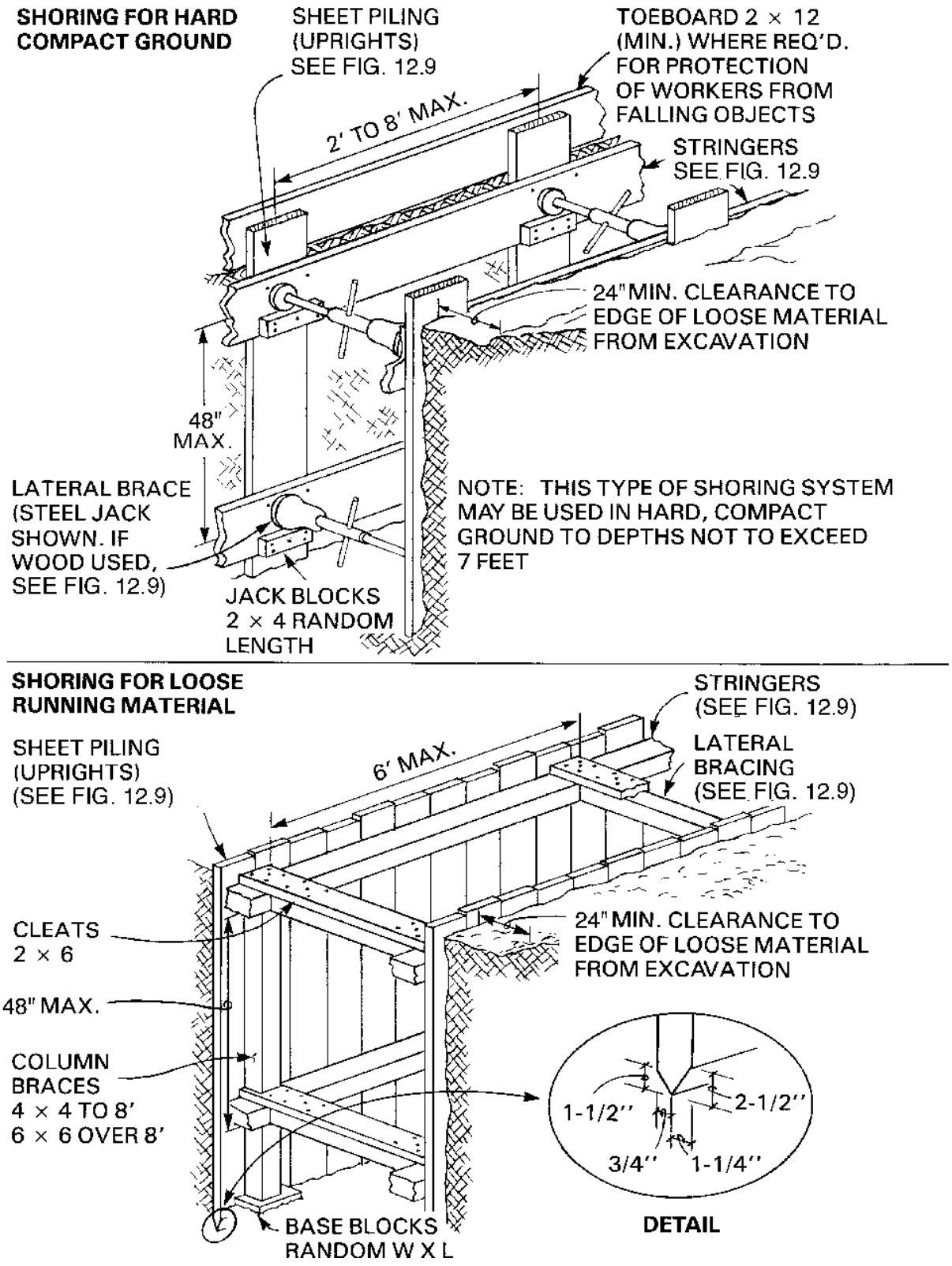


Figure 12.8 Typical Shoring and Bracing Systems for Excavations

Hydraulic shoring systems, portable trench boxes, or sliding trench shields may also be used if design, construction, and use provide protection equal to or greater than shoring system diagrammed.

DEPTH OF TRENCH	KIND OR CONDITION OF EARTH	SIZE & SPACING OF MEMBERS										
		UPRIGHTS		STRINGERS		LATERAL BRACES						
						WIDTH OF TRENCH					MAX. SPACING	
		MIN. DIM.	MAX. SPACING	MIN. DIM.	MAX. SPACING	0'-3'	3'-6'	6'-8'	8'-10'	10'-12'	VERT.	HORIZ.
FT.		IN.	FT.	IN.	FT.	IN.	IN.	IN.	IN.	IN.	FT.	FT.
4' TO 10'	Hard, compact	3 x 10 3 x 8	4 2	6 x 8	4	4 x 4	4 x 6	6 x 6	6 x 8	8 x 8	4	6
	Likely to crack	3 x 10 3 x 8	4 2	6 x 8	4	4 x 4	4 x 6	6 x 6	6 x 8	8 x 8	4	6
	Soft, sandy or filled	3 x 8 3 x 8	Close sheeting	10x10	4	6 x 6	6 x 6	6 x 6	6 x 8	8 x 8	4	6
	Hydrostatic pressure	3 x 8	Close sheeting	10x10	4	6 x 6	6 x 6	6 x 6	6 x 8	8 x 8	4	6
10' TO 15'	Hard, compact	4 x 10 6 x 8	4 8	8 x 10	4	4 x 4	4 x 6	6 x 6	6 x 8	8 x 8	4	6
	Likely to crack	3 x 8	Close sheeting	8 x 10	4	4 x 4	4 x 6	6 x 6	6 x 8	8 x 8	4	6
	Soft, sandy or filled	3 x 8	Close sheeting	10 x 12	4	8 x 8	8 x 8	8 x 8	8 x 8	8 x 8	4	6
	Hydrostatic pressure	3 x 8	Close sheeting	10 x 12	4	8 x 8	8 x 8	8 x 8	8 x 8	8 x 8	4	6
15' TO 20'	All kinds of conditions	4 x 8	Close sheeting	12 x 12	4	8 x 8	8 x 8	8 x 8	8 x 8	8 x 10	4	6
OVER 20'	All kinds of conditions	4 x 8	Close sheeting	12 x 12	4	8 x 8	8 x 8	8 x 10	8 x 10	10 x 10	4	6

Figure 12.9 Table of Size and Spacing of Trench Shoring Members

12.7 NOTES AND REFERENCES

OTHER GUIDES

EXCAVATIONS

29 CFR 1926.650-.651 OSHA Standard
"Excavations, Trenching, and Shoring"

8 Cal. Code of Regs. 1540-41 General Industry Safety Orders
"Excavations, Trenches, Earthwork"

SAFETY SIGNS

29 CFR 1910.145 OSHA Standard
"Specifications for Accident Prevention Signs and Tags"

8 Cal. Code of Regs. 6003 General Industry Safety Orders
"Accident Prevention Signs and Tags"

ANSI/SAE J115-JAN87
"Safety Signs"

COLOR CODES

29 CFR 1910.144 OSHA Standard
"Safety Color Code for Marking Physical Hazards"

ANSI Z535.1-1991
"Safety Color Code"

PIPING

8 Cal. Code of Regs. 3321 General Industry Safety Orders
"Identification of Piping"

ANSI A13.1-1981
"Scheme for the Identification of Piping Systems"

LIGHT LEVELS

8 Cal. Code of Regs. 3317 General Industry Safety Orders
"Illumination"

ANSI/IES RP1-1992
"Practice for Office Lighting"

ANSI/IES RP7-1990
"Practice for Industrial Lighting"

NOISE LEVELS

29 CFR 1910.95 OSHA Standard
"Occupational Noise Exposure"

8 Cal. Code of Regs. Article 105 General Industry Safety Orders
"Control of Noise Exposure"

ADDITIONAL REFERENCES

SAFETY SIGNS

CRTC Standard Form EF-528
"Safety Signs for . ."

LIGHT LEVELS

CRTC *Electrical Manual*
"Engineering Guideline ELC, Section 1200"

NOISE LEVELS

CRTC *Noise Control in Designs Manual*