

Construction Industry Digest

OSHA 2202
2002 (Revised)



**Occupational
Safety and Health
Administration**

U.S. Department of Labor

This informational booklet is intended to provide a generic, non-exhaustive overview of particular standards-related topics. This publication does not itself alter or determine compliance responsibilities, which are set forth in OSHA standards themselves and the *Occupational Safety and Health Act*. Moreover, because interpretations and enforcement policy may change over time, for additional guidance on OSHA compliance requirements, the reader should consult current administrative interpretations and decisions by the Occupational Safety and Health Review Commission and the courts.

Employers and employees in the 25 states and territories that operate their own OSHA-approved workplace safety and health plans should check with their state agency. Their state may be enforcing standards and other procedures that, while “at least as effective as” federal standards, are not always identical to the federal requirements. See “States with Approved Plans” at the end of this booklet.

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To the Reader

If you have recommendations about the usefulness of this digest as a reference tool or about other informational topics that would be helpful to you in operating your business or performing your job, please complete the enclosed reader response card.

Construction Industry Digest



U.S. Department of Labor
Elaine L. Chao, Secretary

Occupational Safety and Health Administration
John L. Henshaw, Assistant Secretary

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OSHA advises and encourages employers and contractors to institute and maintain in their establishments a program that provides adequate systematic policies, procedures, and practices to protect their employees from, and allow them to recognize, job-related safety and health hazards.

An effective program includes provisions for the systematic identification, evaluation, and prevention or control of general workplace hazards, specific job hazards, and potential hazards that may arise from foreseeable conditions.

Contractors and employers who do construction work also must comply with standards in 29 *CFR* 1926. Subpart C, *General Safety and Health Provisions*, as well as other specific sections of these standards include the responsibilities for each contractor/employer to initiate and maintain safety and health programs, provide for a competent person to conduct frequent and regular inspections, and instruct each employee to recognize and avoid unsafe conditions and know what regulations are applicable to the work environment.



OSHA uses Special Emphasis Programs (SEPs), Local Emphasis Programs (LEPs), and National Emphasis Programs (NEPs) to find ways to help control accidents, injuries, and illnesses in occupations where employee exposure to unusually physical or health risks exist.

Employers may use these programs to assess the actual extent of suspected or potential hazards, determine the feasibility of new or experimental compliance procedures, or evaluate other legitimate reasons.

In addition, the programs are limited in scope and time, are usually established before a program is implemented, and include employer awareness training.

One OSHA SEP was developed to prevent workers' overexposure to crystalline silica in the construction industry. OSHA implemented this program to teach the public about silicosis and increase the number of inspections to ensure that employers use appropriate engineering controls, personal protective equipment, respirators, and work practices to protect employees exposed to crystalline silica-containing dust.

OSHA also developed a National Emphasis Program to examine injuries and deaths associated with trenching and excavation. This program requires compliance officers to be on the lookout for excavations and make inspections if they identify hazards.

Other hazards in the construction industry where a standard may not exist include exposure to asphalt fumes during paving operations. To help prevent exposure, manufacturers, through partnership with OSHA, have agreed to install engineering controls on their paving machines voluntarily.

Another initiative involves OSHA's construction Focused Inspection Initiative. This initiative recognizes contractors who have established and fully implemented a corporate safety and health program and site-specific plans. Contractors who qualify for a focused inspection receive an abbreviated inspection focusing on safety and health program implementation and the four leading hazards—falls, struck by, caught in or between, and electrical—that cause 90 percent of deaths and injuries in construction. If you have questions about OSHA's Focused Inspection Program or other construction issues, contact your nearest OSHA area or regional office listed at the end of this booklet, or visit OSHA's website at www.osha.gov.

What is an occupational safety and health management system?

An effective safety and health management system includes the following four main elements: management commitment and employee involvement, worksite analysis, hazard prevention and control, and safety and health training. A commitment to workplace safety and health adds value to your business, your job, and your life.

OSHA's recommended guidelines for the effective management and protection of worker safety and health are summarized in the following paragraphs.

1. *Management Commitment and Employee Involvement*

The elements of management commitment and employee involvement are complementary and form the core of any occupational safety and health program. Management's commitment provides the motivating force and the resources for organizing and controlling activities within an organization. In an effective program, management regards worker safety and health as a fundamental value of the organization and applies its commitment to safety and health protection with as much vigor as to other organizational goals.

Employee involvement provides the means by which workers develop and express their own commitment to safety and health protection for themselves and for their fellow workers.

¹ The complete original text of the nonmandatory guidelines is found in the *Federal Register* 54(18):3094-3916, January 26, 1989.

In implementing a safety and health management system, there are various ways to provide commitment and support by management and employees. Some recommended actions are described briefly as follows:

- State clearly a worksite policy on safe and healthful work and working conditions, so that everyone with responsibility at the site (and those at other locations with responsibility for the site) fully understand the priority and importance of safety and health protection in the organization.
- Establish and communicate a clear goal for the safety and health program and define objectives for meeting that goal so all members of the organization understand the results desired and measures planned for achieving them.
- Provide visible top management involvement in implementing the program so all employees understand that management's commitment is serious.
- Arrange for and encourage employee involvement in the structure and operation of the program and in decisions that affect their safety and health so they will commit their insight and energy to achieving the safety and health program's goal and objectives.
- Assign and communicate responsibility for all aspects of the program so that managers, supervisors, and employees in all parts of the organization know what performance is expected of them.

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- Provide adequate authority and resources to responsible parties so assigned responsibilities can be met.
 - Hold managers, supervisors, and employees accountable for meeting their responsibilities so essential tasks will be performed.
 - Review program operations at least annually to evaluate their success in meeting the goals and objectives to identify deficiencies and revise the program and/or objectives if they do not meet the goal of effective safety and health protection.

2. *Worksite Analysis*

A practical analysis of the work environment involves a variety of worksite examinations to identify existing hazards and conditions and operations in which changes might occur to create new hazards. Lack of awareness of a hazard stemming from failure to examine the worksite is a sign that safety and health policies and/or practices are ineffective. Effective management actively analyzes the work and worksite to anticipate and prevent harmful occurrences. OSHA recommends the following measures to identify all existing and potential hazards:

- Conduct a comprehensive baseline worksite survey for safety and health and periodic comprehensive update surveys and involve employees in this effort.
- Analyze planned and new facilities, processes, materials, and equipment.

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- Perform routine job hazard analyses.
 - Assess risk factors of ergonomics applications to workers' tasks.
 - Conduct regular site safety and health inspections to identify new or previously missed hazards and failures in hazard controls.
 - Provide a reliable system for employees to notify management personnel about conditions that appear hazardous and to receive timely and appropriate responses and encourage employees to use the system without fear of reprisal. This system uses employee insight and experience in safety and health protection and allows employers to address employee concerns.
 - Investigate accidents and "near miss" incidents to identify their causes and means of prevention.
 - Analyze injury and illness trends over time to identify and prevent patterns with common causes.
 - Visit the OSHA website at www.osha.gov for information about standards and safety and health issues.

3. Hazard Prevention and Control

Workplace hazards often can be eliminated by redesigning the jobsite or job. Where it is not feasible to eliminate such hazards, employers must control them to prevent unsafe and unhealthful exposure. Employers must eliminate or control the hazard in a timely manner once it becomes apparent. Specifically, as part of the program, employers should establish procedures to correct or control present or potential hazards in a timely manner. These procedures should include measures such as the following:

- Use engineering techniques where feasible and appropriate.
- Establish, at the earliest time, safe work practices and procedures that all affected parties can understand and follow. Understanding and compliance are a result of training, positive reinforcement, correction of unsafe performance, and if necessary, enforcement through a clearly communicated disciplinary system.
- Provide personal protective equipment when engineering controls are infeasible.
- Use administrative controls such as reducing the duration of exposure.
- Maintain the facility and equipment to prevent equipment breakdowns.

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- Plan and prepare for emergencies, and conduct training and emergency drills, as needed, to ensure that proper responses to emergencies will be “second nature” for everyone involved.
 - Establish a medical program that includes first aid onsite as well as nearby physician and emergency medical care to reduce the risk of any injury or illness that occurs.

4. Safety and Health Training

Training is an essential component of an effective safety and health program. Training helps identify the safety and health responsibilities of both management and employees at the site. Training often is most effective when incorporated into other education or performance requirements and job practices. The type of training depends on the size and complexity of the worksite as well as the characteristics of the hazards and potential hazards at the site.

Employee Training. Design employee training programs to ensure all employees understand and are aware of the hazards to which they may be exposed and the proper methods for avoiding them.

Supervisory Training. Train supervisors to understand the key role they play in jobsite safety and to enable them to carry out their safety and health responsibilities effectively.

Training programs for supervisors should include the following topics:

- Analyze the work under their supervision to anticipate and identify potential hazards.
- Maintain physical protection in their work areas.
- Reinforce employee training on the nature of potential hazards in their work and on needed protective measures through continual performance feedback and, if necessary, through enforcement of safe work practices.
- Understand their safety and health responsibilities.

(NOTE: See also standard requirements, 1926.21, for safety training and education.)

Access to Medical and Exposure Records

Each employer shall permit employees, their designated representatives, and OSHA direct access to employer-maintained exposure and medical records. The standard limits access only to those employees who are, have been (including former employees), or will be exposed to toxic substances or harmful physical agents.

1926.33(a) and .33(b)(3) made applicable to construction by 1910.1020

Each employer must preserve and maintain accurate medical and exposure records for each employee. Exposure records and data analyses based on them are to be kept for 30 years. Medical records are to be kept for at least the duration of employment plus 30 years. Background data for exposure records such as laboratory reports and work sheets need to be kept for only 1 year.

Records of employees who have worked for less than 1 year need not be retained after employment, but the employer must provide these records to the employee upon termination of employment. First-aid records of one-time treatment need not be retained for any specified period. **1926.33(d)(1). Text can be found in 1910.1020(d).**

Aerial Lifts

Aerial lifts, powered or manual, include, but are not limited to, the following types of vehicle-mounted aerial devices used to elevate personnel to jobsites above ground: extensible boom platforms, articulating boom platforms, and vertical towers.

1926.453(a)(2)

When operating aerial lifts, employers must ensure employees are

- Trained,
- Authorized,
- Setting brakes and using outriggers,
- Not exceeding boom and basket load limits,
- Using personal fall protection when required, and
- Not using devices such as ladders, stilts, or step stools to raise the employee above the basket.

In addition, manufacturers or the equivalent must certify, in writing, all modifications to aerial lifts. **1926.453(b) and 1926.454**

Air Tools

Pneumatic power tools shall be secured to the hose in a positive manner to prevent accidental disconnection. **1926.302(b)(1)**

Safety clips or retainers shall be securely installed and maintained on pneumatic impact tools to prevent attachments from being accidentally expelled. **1926.302(b)(2)**

The manufacturer's safe operating pressure for all fittings shall not be exceeded. **1926.302(b)(5)**

All hoses exceeding 1/2-inch (1.3-centimeters) inside diameter shall have a safety device at the source of supply or branch line to reduce pressure in case of hose failure. **1926.302(b)(7)**

Asbestos

Each employer who has a workplace or work operation where exposure monitoring is required must perform monitoring to determine accurately the airborne concentrations of asbestos to which employees may be exposed. **1926.1101(f)(1)(i)**

Employers also must ensure that no employee is exposed to an airborne concentration of asbestos in excess of 0.1 f/cc as an 8-hour time-weighted average (TWA). **1926.1101(c)(1)**

In addition, employers must ensure that no employee is exposed to an airborne concentration of asbestos in excess of 1 f/cc as averaged over a sampling period of 30 minutes. **1926.1101(c)(2)**

Respirators must be used during (1) all Class I asbestos jobs; (2) all Class II work where an asbestos-containing material is not removed substantially intact; (3) all Class II and III work not using wet methods, except on sloped roofs; (4) all Class II and III work without a negative exposure assessment; (5) all Class III jobs where thermal system insulation or surfacing asbestos-containing or presumed asbestos-containing material is cut, abraded, or broken; (6) all Class IV work within a regulated area where respirators are required; (7) all work where employees are exposed above the PEL or STEL; and (8) in emergencies. **1926.1101(h)(1)(i) through (viii)**

The employer must provide and require the use of protective clothing—such as coveralls or similar whole-body clothing, head coverings, gloves, and foot coverings—for

- Any employee exposed to airborne asbestos exceeding the PEL or STEL,
- Work without a negative exposure assessment, or

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- Any employee performing Class I work involving the removal of over 25 linear or 10 square feet (10 square meters) of thermal system insulation or surfacing asbestos-containing or presumed asbestos-containing materials. **1926.1101(i)(1)**

The employer must provide a medical surveillance program for all employees who—for a combined total of 30 or more days per year—engage in Class I, II, or III work or are exposed at or above the PEL or STEL; or who wear negative-pressure respirators. **1926.1101(m)(1)(i)**

Belt Sanding Machines

Belt sanding machines shall be provided with guards at each nip point where the sanding belt runs onto a pulley. **1926.304(f), incorporated from ANSI 01.1-1961, Section 4.9.4**

The unused run of the sanding belt shall be guarded against accidental contact. **1926.304(f), incorporated from ANSI 01.1-1961, Section 4.9.4**

Chains (See Wire Ropes, Chains, and Hooks)

Compressed Air, Use of

Compressed air used for cleaning purposes shall be reduced to less than 30 pounds per square inch (psi) (207 KPa) and then only with effective chip guarding and personal protective equipment. **1926.302(b)(4)**

This requirement does not apply to concrete form, mill scale, and similar cleaning operations. **1926.302(b)(4)**

Compressed Gas Cylinders

Valve protection caps shall be in place and secured when compressed gas cylinders are transported, moved, or stored. **1926.350(a)(1)**

Cylinder valves shall be closed when work is finished and when cylinders are empty or are moved. **1926.350(a)(8)**

Compressed gas cylinders shall be secured in an upright position at all times, except if necessary for short periods of time when cylinders are actually being hoisted or carried. **1926.350(a)(9)**

Cylinders shall be kept far enough away from the actual welding or cutting operations so that sparks, hot slag, or flame will not reach them. When this is impractical, fire-resistant shields shall be provided. Cylinders shall be placed where they cannot become part of an electrical circuit. **1926.350(b)(1) through (2)**

Oxygen and fuel gas pressure regulators shall be in proper working order while in use. **1926.350(h)**

Concrete and Masonry Construction

No construction loads shall be placed on a concrete structure or portion of a concrete structure unless the employer determines, based on information received from a person who is qualified in structural design, that the structure or

portion of the structure is capable of supporting the loads. **1926.701(a)**

No employee shall be permitted to work under concrete buckets while buckets are being elevated or lowered into position. **1926.701(e)(1)**

To the extent practical, elevated concrete buckets shall be routed so that no employee or the fewest number of employees is exposed to the hazards associated with falling concrete buckets. **1926.701(e)(2)**

Formwork shall be designed, fabricated, erected, supported, braced, and maintained so that it is capable of supporting—without failure—all vertical and lateral loads that may reasonably be anticipated to be applied to the formwork. **1926.703(a)(1)**

Forms and shores (except those used for slabs on grade and slip forms) shall not be removed until the employer determines that the concrete has gained sufficient strength to support its weight and superimposed loads. Such determination shall be based on compliance with one of the following:

- The plans and specifications stipulate conditions for removal of forms and shores, and such conditions have been followed, or
- The concrete has been properly tested with an appropriate American Society for Testing Materials (ASTM) standard test method designed to indicate the concrete compressive strength, and the test results indicate that the concrete has gained sufficient strength to support its weight and superimposed loads. (ASTM, 100 Barr Harbor Drive, West Conshohocken, PA 19428;

(610) 832-9585). **1926.703(e)(1)(i) through (ii)**

A limited access zone shall be established whenever a masonry wall is being constructed. The limited access zone shall conform to the following:

- The limited access zone shall be established prior to the start of construction of the wall.
- The limited access zone shall be equal to the height of the wall to be constructed plus 4 feet (1.2 meters), and shall run the entire length of the wall.
- The limited access zone shall be established on the side of the wall that will be unscaffold.
- The limited access zone shall be restricted to entry by employees actively engaged in constructing the wall. No other employees shall be permitted to enter the zone.
- The limited access zone shall remain in place until the wall is adequately supported to prevent overturning and to prevent collapse; where the height of a wall is more than 8 feet (2.4 meters), the limited access zone shall remain in place until the requirements of paragraph (b) of this section have been met. **1926.706(a)(1) through (5)**

All masonry walls more than 8 feet (2.4384 meters) in height shall be adequately braced to prevent overturning and to prevent collapse unless the wall is adequately supported so that it will not overturn or collapse. The bracing shall remain in place until permanent supporting elements of the structure are in place.

1926.706(b)

Confined Spaces

All employees required to enter into confined or enclosed spaces must be instructed as to the nature of the hazards involved, the necessary precautions to be taken, and in the use of required protective and emergency equipment. The employer shall comply with any specific regulations that apply to work in dangerous or potentially dangerous areas. Confined or enclosed spaces include, but are not limited to, storage tanks, process vessels, bins, boilers, ventilation or exhaust ducts, sewers, underground utility vaults, tunnels, pipelines, and open top spaces more than 4 feet deep (1.2 meters) such as pits, tubs, vaults, and vessels. **1926.21(b)(6)(i) through (ii)**

Cranes and Derricks

The employer shall comply with the manufacturer's specifications and limitations. **1926.550(a)(1)**

Rated load capacities, recommended operating speeds, and special hazard warnings or instructions shall be conspicuously posted on all equipment. Instructions or warnings shall be visible from the operator's station. **1926.550(a)(2)**

Equipment shall be inspected by a competent person before each use and during use, and all deficiencies corrected before further use. **1926.550(a)(5)**

Accessible areas within the swing radius of the rear of the rotating superstructure shall be properly barricaded to prevent employees from being struck or crushed by the crane. **1926.550(a)(9)**

Except where electrical distribution and transmission lines have been deenergized and visibly grounded at point of work, or where insulating barriers not a part of or an attachment to the equipment or machinery have been erected to prevent physical contact with the lines, no part of a crane or its load shall be operated within 10 feet (3 meters) of a line rated 50 kilovolts (kV) or below; 10 feet (3 meters) plus 0.4 inches (10.2 centimeters) for each kV over 50 kV for lines rated over 50 kV, or twice the length of the line insulator, but never less than 10 feet (3 meters). **1926.550(a)(15)(i) through (iii)**

An annual inspection of the hoisting machinery shall be made by a competent person. Records shall be kept of the dates and results of each inspection. **1926.550(a)(6)**

All crawler, truck, or locomotive cranes in use shall meet the requirements as prescribed in the ANSI B30.5-1968, *Safety Code for Crawler, Locomotive and Truck Cranes*. (212) 642-4900. **1926.550(b)(2)**

The use of a crane or derrick to hoist employees on a personnel platform is prohibited, except when the erection, use, and dismantling of conventional means of reaching the worksite—such as a personnel hoist, ladder, stairway, aerial lift, elevating work platform or scaffold—would be more hazardous or is not possible because of structural design or worksite conditions. Where a decision is reached that this is the case, then 29 *CFR* 1926.550(g) shall be reviewed and complied with. **1926.550(g)(2)**

Disposal Chutes

Whenever materials are dropped more than 20 feet (6 meters) to any exterior point of a building, an enclosed chute shall be used. **1926.252(a)**

When debris is dropped through holes in the floor without the use of chutes, the area where the material is dropped shall be enclosed with barricades not less than 42 inches high (106.7 centimeters) and not less than 6 feet (1.8 meters) back from the projected edges of the opening above. Warning signs of the hazard of falling material shall be posted at each level. **1926.252(b)**

Diving

The employer shall develop and maintain a safe practice manual, and make it available at the dive location for each dive team member. **1910.420(a) made applicable to construction by 1926.1080**

The employer shall keep a record of each dive. The record shall contain the diver's name, his or her supervisor's name, date, time, location, type of dive (scuba, mixed gas, surface supply), underwater and surface conditions, and maximum depth and bottom time. **1910.423(d) made applicable to construction by 1926.1084**

Each dive team member shall have the experience or training necessary to perform assigned tasks safely. **1910.423(d) made applicable to construction by 1926.1076**

Each dive team member shall be briefed on the tasks, safety procedures, unusual hazards or environmental conditions, and modifications made to the operating procedures. **1910.421(f) made applicable to construction by 1926.1081**

The dive shall be terminated when a diver requests it, the diver fails to respond correctly, communication is lost, or when the diver begins to use the reserve breathing gas. **1910.422(i)(1) through (4) made applicable to construction by 1926.1082.**

Drinking Water

An adequate supply of potable water shall be provided in all places of employment.

1926.51(a)(1)

Portable drinking water containers shall be capable of being tightly closed and equipped with a tap. **1926.51(a)(2)**

Using a common drinking cup is prohibited. **1926.51(a)(4)**

Where single service cups (to be used but once) are supplied, both a sanitary container for unused cups and a receptacle for used cups shall be provided. **1926.51(a)(5)**

Electrical Installations

Employers must provide either ground-fault circuit interrupters (GFCIs) or an assured equipment grounding conductor program to protect employees from ground-fault hazards at construction sites. The two options are detailed below.

- (1) All 120-volt, single-phase, 15- and 20-ampere receptacles that are not part of the permanent wiring must be protected by GFCIs. Receptacles on smaller generators are exempt under certain conditions.

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- (2) An assured equipment grounding conductor program covering extension cords, receptacles, and cord- and plug-connected equipment must be implemented. The program must include the following:
- A written description of the program.
 - At least one competent person to implement the program.
 - Daily visual inspections of extension cords and cord- and plug-connected equipment for defects. Equipment found damaged or defective shall not be used until repaired.
 - Continuity tests of the equipment grounding conductors or receptacles, extension cords, and cord- and plug-connected equipment. These tests must generally be made every 3 months.
 - Paragraphs (f)(1) through (f)(11) of this standard contain grounding requirements for systems, circuits, and equipment.
- 1926.404(b)(1)(i) through (iii)(e)**

Light bulbs for general illumination must be protected from breakage, and metal shell sockets must be grounded. **1926.405(a)(2)(ii)(e)**

Temporary lights must not be suspended by their cords, unless they are so designed.

1926.405(a)(2)(ii)(f)

Portable lighting used in wet or conductive locations, such as tanks or boilers, must be operated at no more than 12 volts or must be protected by GFCIs. **1926.405(a)(2)(ii)(g)**

Extension cords must be of the three-wire type. Extension cords and flexible cords used with

temporary and portable lights must be designed for hard or extra hard usage (for example, types S, ST, and SO). **1926.405(a)(2)(ii)(j)**

Worn or frayed electric cords or cables shall not be used. **1926.416(e)(1)**

Extension cords shall not be fastened with staples, hung from nails, or suspended by wire. **1926.416(e)(2)**

Work spaces, walkways, and similar locations shall be kept clear of cords. **1926.416(b)(2)**

Listed, labeled, or certified equipment shall be installed and used in accordance with instructions included in the listing, labeling, or certification. **1926.403(b)(2)**

Electrical Work Practices

Employers must not allow employees to work near live parts of electrical circuits, unless the employees are protected by one of the following means:

- Deenergizing and grounding the parts.
- Guarding the part by insulation.
- Any other effective means. **1926.416(a)(1)**

In work areas where the exact location of underground electrical power lines is unknown, employees using jack hammers, bars, or other hand tools that may contact the lines must be protected by insulating gloves, aprons, or other protective clothing that will provide equivalent electrical protection. **1926.416(a)(2) and .95(a)**

Barriers or other means of guarding must be used to ensure that workspace for electrical

equipment will not be used as a passageway during periods when energized parts of equipment are exposed. **1926.416(b)(1)**

Flexible cords must be connected to devices and fittings so that strain relief is provided which will prevent pull from being directly transmitted to joints or terminal screws. **1926.405(g)(2)(iv)**

Equipment or circuits that are deenergized must be rendered inoperative and must have tags attached at all points where the equipment or circuits could be energized. **1926.417(b)**

Excavating and Trenching

The estimated location of utility installations—such as sewer, telephone, fuel, electric, water lines, or any other underground installations that reasonably may be expected to be encountered during excavation work—shall be determined prior to opening an excavation. **1926.651(b)(1)**

Utility companies or owners shall be contacted within established or customary local response times, advised of the proposed work, and asked to establish the location of the utility underground installations prior to the start of actual excavation. When utility companies or owners cannot respond to a request to locate underground utility installations within 24 hours (unless a longer period is required by state or local law), or cannot establish the exact location of these installations, the employer may proceed, provided the employer does so with caution, and provided detection equipment or other acceptable means to locate utility installations are used.

1926.651(b)(2)

When excavation operations approach the estimated location of underground installations, the exact location of the installations shall be determined by safe and acceptable means. While the excavation is open, underground installations shall be protected, supported, or removed, as necessary, to safeguard employees.

1926.651(b)(3) through (4)

Each employee in an excavation shall be protected from cave-ins by an adequate protective system except when:

- Excavations are made entirely in stable rock, or excavations are less than 5 feet (1.5 meters) in depth and examination of the ground by a competent person provides no indication of a potential cave-in.

1926.652(a)(1)(i) through (ii)

- Protective systems shall have the capacity to resist, without failure, all loads that are intended or could reasonably be expected to be applied or transmitted to the system.

1926.652(a)(2)

Employees shall be protected from excavated or other materials or equipment that could pose a hazard by falling or rolling into excavations. Protection shall be provided by placing and keeping such materials or equipment at least 2 feet (0.6 meters) from the edge of excavations, or by the use of retaining devices that are sufficient to prevent materials or equipment from falling or rolling into excavations, or by a combination of both if necessary. **1926.651(j)(2)**

Daily inspections of excavations, the adjacent areas, and protective systems shall be made by a *competent person* for evidence of a situation that

could result in possible cave-ins, indications of failure of protective systems, hazardous atmospheres, or other hazardous conditions. An inspection shall be conducted by the competent person prior to the start of work and as needed throughout the shift. Inspections shall also be made after every rainstorm or other hazard increasing occurrence. These inspections are only required when employee exposure can be reasonably anticipated. **1926.651(k)(1)**

Where a *competent person* finds evidence of a situation that could result in a possible cave-in, indications of failure of protective systems, hazardous atmospheres, or other hazardous conditions, exposed employees shall be removed from the hazardous area until the necessary precautions have been taken to ensure their safety. **1926.651(k)(2)**

A stairway, ladder, ramp, or other safe means of egress shall be located in trench excavations that are 4 feet (1.2 meters) or more in depth so as to require no more than 25 feet (7.6 meters) of lateral travel for employees. **1926.651(c)(2)**

Exits

Exits must be free of all obstructions so they can be used immediately in case of fire or emergency. **1926.34(c)**

Explosives and Blasting

Only authorized and qualified persons shall be permitted to handle and use explosives. **1926.900(a)**

Explosives and related materials shall be stored in approved facilities required under the applicable provisions of the Bureau of Alcohol, Tobacco and Firearms regulations contained in 27 *CFR* Part 55, Commerce in Explosives. (See Subpart K.) **1926.904(a)**

Smoking and open flames shall not be permitted within 50 feet (15.2 meters) of explosives and detonator storage magazines. **1926.904(c)**

Procedures that permit safe and efficient loading shall be established before loading is started. **1926.905(a)**

Eye and Face Protection

Eye and face protection shall be provided when machines or operations present potential eye or face injury. **1926.102(a)(1)**

Eye and face protective equipment shall meet the requirements of ANSI Z87.1-1968, *Practice for Occupational and Educational Eye and Face Protection*. **1926.102(a)(2)**

Employees involved in welding operations shall be furnished with filter lenses or plates of at least the proper shade number as indicated in Table E-2. **1926.102(b)(1)**

Table E-2
Eye and Face Protection
Filter Lens Shade Numbers for Protection
Against Radiant Energy
1926.102(b)(1)

Welding operation	Shade Number
Shielded metal-arc welding 1/16-, 3/32-, 1/8-, 5/32-inch diameter electrodes	10
Gas-shielded arc welding (nonferrous) 1/16-, 3/32-, 1/8-, 5/32-inch diameter electrodes	11
Gas-shielded arc welding (ferrous) 1/16-, 3/32-, 1/8-, 5/32-inch diameter electrodes	12
Shielded metal-arc welding 3/16-, 7/32-, 1/4-inch diameter electrodes	12
5/16-, 3/8-inch diameter electrodes	14
Atomic hydrogen welding	10-14
Carbon-arc welding	14
Soldering	2
Torch brazing	3 or 4
Light cutting, up to 1 inch	3 or 4
Medium cutting, 1 inch to 6 inches	4 or 5
Heavy cutting, over 6 inches	5 or 6
Gas welding (light), up to 1/8-inch	4 or 5
Gas welding (medium), 1/8- to 1/2-inch	5 or 6
Gas welding (heavy), over 1/2-inch	6 or 8

Employees exposed to laser beams shall be furnished suitable laser safety goggles that will protect for the specific wave length of the laser and the optical density adequate for the energy involved. **1926.102(b)(2)**

Fall Protection

Employers are required to assess the workplace to determine if the walking/working surface on which employees are to work have the strength and structural integrity to safely support workers. Employees are not permitted to work on those surfaces until it has been determined that the surfaces have the requisite strength and structural integrity to support the workers. **1926.501(a)(2)**

Where employees are exposed to falling 6 feet (1.8 meters) or more from an unprotected side or edge, the employer must select either a guardrail system, safety net system, or personal fall arrest system to protect the worker. **1926.501(b)(1)**

A personal fall arrest system consists of an anchorage, connectors, body harness and may include a lanyard, deceleration device, lifeline, or a suitable combination of these. Effective January 1, 1998, body belts used for fall arrests are prohibited. **1926.500(b) and 1926.502(d)**

Each employee in a hoist area shall be protected from falling 6 feet (1.8 meters) or more by guardrail systems or personal fall arrest systems. If guardrail systems (or chain gate or guardrail) or portions thereof must be removed to facilitate hoisting operations, as during the landing of materials, and a worker must lean through the access opening or out over the edge of the access

opening to receive or guide equipment and materials, that employee must be protected by a personal fall arrest system.

1926.501(b)(3)

Personal fall arrest systems, covers, or guardrail systems must be erected around holes (including skylights) that are more than 6 feet (1.8 meters) above lower levels. **1926.501(b)(4)**

Each employee at the edge of an excavation 6 feet deep (1.8 meters) or more shall be protected from falling by guardrail systems, fences, barricades, or covers. Where walkways are provided to permit employees to cross over excavations, guardrails are required on the walkway if it is 6 feet (1.8 meters) or more above the excavation.

1926.501(b)(7)

Each employee using ramps, runways, and other walkways shall be protected from falling 6 feet (1.2 meters) or more by guardrail systems.

1926.501(b)(6)

Each employee performing overhand bricklaying and related work 6 feet (1.8 meters) or more above lower levels shall be protected by guardrail systems, safety net systems, or personal fall arrest systems, or shall work in a controlled access zone. All employees reaching more than 10 inches (25.4 centimeters) below the level of a walking/working surface on which they are working shall be protected by a guardrail system, safety net system, or personal fall arrest. **1926.501(b)(9)**

Each employee engaged in roofing activities on low-slope roofs with unprotected sides and edges 6 feet (1.8 meters) or more above lower levels shall be protected from falling by guardrail, safety net, or personal fall arrest systems or a combination of a

-
- Warning line system and guardrail system,
 - Warning line system and safety net system,
 - Warning line system and personal fall arrest system, or
 - Warning line system and safety monitoring system. **1926.501(b)(10)**

On low-slope roofs 50 feet (15.2 meters) or less in width, the use of a safety monitoring system without a warning line system is permitted. **1926.501(b)(10)**

Each employee on a steep roof with unprotected sides and edges 6 feet (1.8 meters) or more above lower levels shall be protected by guardrail systems with toeboards, safety net systems, or personal fall arrest systems. **1926.501(b)(11)**

Fire Protection

A firefighting program is to be followed throughout all phases of the construction and demolition work involved. It shall provide for effective firefighting equipment to be available without delay, and designed to effectively meet all fire hazards as they occur. **1926.150(a)(1)**

Firefighting equipment shall be conspicuously located and readily accessible at all times, be periodically inspected, and be maintained in operating conditions. **1926.150(a)(2) to (4)**

A fire extinguisher, rated not less than 2A (acceptable substitutes are a 1/2-inch diameter garden-type hose not to exceed 100 feet capable of discharging a minimum of 5 gallons per minute or a 55-gallon drum of water with two fire pails), shall be provided for each 3,000 square

feet (270 square meters) of the protected building area, or major fraction thereof. Travel distance from any point of the protected area to the nearest fire extinguisher shall not exceed 100 feet (30.5 meters). **1926.150(c)(1)(i) to (iii)**

The employer shall establish an alarm system at the worksite so that employees and the local fire department can be alerted for an emergency. **1926.150(e)(1)**

Flaggers

Flaggers, signaling by flaggers, and the garments worn shall follow the OSHA rules that incorporated by reference the Department of Transportation's *Manual on Uniform Traffic Control Devices*, Part 6.

Flammable and Combustible Liquids

Only approved containers and portable tanks shall be used for storing and handling flammable and combustible liquids. **1926.152(a)(1)**

No more than 25 gallons (94.7 liters) of flammable or combustible liquids shall be stored in a room outside of an approved storage cabinet. No more than three storage cabinets may be located in a single storage area. **1926.152(b)(1) through (3)**

Inside storage rooms for flammable and combustible liquids shall be of fire-resistant construction, have self-closing fire doors at all openings, 4-inch (10 centimeter) sills or depressed floors, a ventilation system that provides at least six air changes within the room per hour, and electrical

wiring and equipment approved for Class 1, Division 1 locations. **1926.152(b)(4)**

Storage in containers outside buildings shall not exceed 1,100 gallons (4,169 liters) in any one pile or area. The storage area shall be graded to divert possible spills away from buildings or other exposures, or shall be surrounded by a curb or dike. Storage areas shall be located at least 20 feet (6 meters) from any building and shall be free from weeds, debris, and other combustible materials not necessary to the storage. **1926.152(c)(1),(3),(4) through (5)**

Flammable liquids shall be kept in closed containers when not actually in use. **1926.152(f)(1)**

Conspicuous and legible signs prohibiting smoking shall be posted in service and refueling areas. **1926.152(g)(9)**

Gases, Vapors, Fumes, Dusts, and Mists

Exposure to toxic gases, vapors, fumes, dusts, and mists at a concentration above those specified in the *Threshold Limit Values of Airborne Contaminants* for 1970 of the American Conference of Governmental Industrial Hygienists (ACGIH), shall be avoided. (ACGIH, 1330 Kemper Meadow Drive, Cincinnati, OH 45240-1634; (513) 742-2020.) **1926.55(a)**

Administrative or engineering controls must be implemented whenever feasible to comply with Threshold Limit Values. **1926.55(b)**

When engineering and administrative controls are not feasible to achieve full compliance,

protective equipment or other protective measures shall be used to keep the exposure of employees to air contaminants within the limits prescribed. Any equipment and technical measures used for this purpose must first be approved for each particular use by a competent industrial hygienist or other technically qualified person. Whenever respirators are used, their use shall comply with 1926.103. **1910.134 made applicable to construction by 1926.55(b)**

General Duty Clause

Hazardous conditions or practices not covered in an OSHA standard may be covered under Section 5(a)(1) of the *Occupational Safety and Health Act of 1970*, which states: "Each employer shall furnish to each of his employees employment and a place of employment which are free from recognized hazards that are causing or are likely to cause death or serious physical harm to his employees."

Grinding

All abrasive wheel bench and stand grinders shall be provided with safety guards that cover the spindle ends, nut and flange projections, and are strong enough to withstand the effects of a bursting wheel. **1926.303(b)(1) and (c)(1)**

An adjustable work rest of rigid construction shall be used on floor and bench-mounted grinders, with the work rest kept adjusted to a clearance not to exceed 1/8-inch (0.3 centimeter) between the work rest and the surface of the wheel. **1926.303(c)(2)**

All abrasive wheels shall be closely inspected and ring-tested before mounting to ensure that they are free from cracks or other defects.

1926.303(c)(7)

Portable abrasive wheel tools shall be provided with safety guards, except when the wheels are 2 inches (5 centimeters) or less, or the wheel is entirely inside the work. **1926.303(c)(3) and (4)**

Hand Tools

Employers shall not issue or permit the use of unsafe hand tools, including tools that may be furnished by employees or employers. All hand tools must be properly maintained. **1926.300(a) and 1926.301(a)**

Wrenches shall not be used when jaws are sprung to the point that slippage occurs. Impact tools shall be kept free of mushroomed heads. The wooden handles of tools shall be kept free of splinters or cracks and shall be kept tight in the tool.

1926.301(b) through (d)

Electric power operated tools shall either be approved double-insulated, or be properly grounded in accordance with subpart K of the standard.

1926.302(a)(1)

Hazard Communication

Employers shall develop, implement, and maintain at the workplace a written hazard communication program for their workplaces. Employers must inform their employees of the availability of the program, including the required list(s) of hazardous chemicals, and material safety data sheets required.

1910.1200(e)(1) and (e)(4) made applicable to construction by 1926.59

The employer shall ensure that each container of hazardous chemicals in the workplace is labeled, tagged, or marked with the identity of the hazardous chemical(s) contained therein; and must show hazard warnings appropriate for employee protection. **1910.1200(e)(2) and (f)(1) made applicable to construction by 1926.59**

Chemical manufacturers and importers shall obtain or develop a material safety data sheet for each hazardous chemical they produce or import. Employers shall have a material safety data sheet for each hazardous chemical they use. **1910.1200 (g)(1) and (f)(1) made applicable to construction by 1926.59**

Employers shall provide employees with information and training on hazardous chemicals in their work area at the time of their initial assignment, and whenever a new hazard is introduced into their work area. Employers shall also provide employees with information on any operations in their work area where hazardous chemicals are present, and the location and availability of the written hazard communication program, including the required list(s) of hazardous chemicals, and material safety data sheets required by the standard. **1910.1200 (h)(1) and (2)(i) through (iii) made applicable to construction by 1926.59**

Employers who produce, use, or store hazardous chemicals at multiemployer workplaces shall additionally ensure that their hazard communication program includes the methods the employer will use to provide other employer(s) with a copy of the material safety data sheet for hazardous chemicals

other employer(s) employees may be exposed to while working; the methods the employer will use to inform other employer(s) of any precautionary measures for the protection of employees; and the methods the employer will use to inform the other employer(s) of the labeling system used in the workplace. **1910.1200 (e)(2) made applicable to construction by 1926.59**

Hazardous Waste Operations

Employers must develop a written safety and health program for employees involved in hazardous waste operations. At a minimum, the program shall include a comprehensive workplan, standard operating procedures, a site specific safety and health plan (which need not repeat the standard operating procedures), the training program, and the medical surveillance program. **1926.65(b)(1)**

A site control program also shall be developed and shall include, at a minimum, a map, work zones, buddy systems, site communications—including alerting means for emergencies—standard operating procedures or safe work practices, and identification of the nearest medical assistance. **1926.65(d)(3)**

Training must be provided for all site employees, their supervisors, and management who are exposed to health or safety hazards. **1926.65(e)**

Head Protection

Head protective equipment (helmets) shall be worn in areas where there is a possible danger of

head injuries from impact, flying or falling objects, or electrical shock and burns. **1926.100(a)**

Helmets for protection against impact and penetration of falling and flying objects shall meet the requirements of ANSI Z89.1-1969. **1926.100(b)**

Helmets for protection against electrical shock and burns shall meet the requirements of ANSI Z89.2-1971. **1926.100(c)**

Hearing Protection

Feasible engineering or administrative controls shall be utilized to protect employees against sound levels in excess of those shown in Table D-2. **1926.52(b)**

When engineering or administrative controls fail to reduce sound levels within the limits of Table D-2, ear protective devices shall be provided and used. **1926.52(b) and .101(a)**

In all cases where the sound levels exceed the values shown in Table D-2, a continuing, effective hearing conservation program shall be administered. **1926.52(d)(1)**

A hearing conservation program in construction should include the following elements:

- Monitoring employee noise exposures,
- Using engineering, work practice and administrative controls, and personal protective equipment,
- Fitting each overexposed employee with appropriate hearing protectors,
- Training employees in the effects of noise and protection measures,

- Explaining procedures for preventing further hearing loss, and
- Recordkeeping.

1926.21(b)(2), 1926.52, and 1926.101

Table D-2 — Permissible Noise Exposures

Duration per day, hours:	Sound Level/ dBA slow response
8	90
6	92
4	95
3	97
2	100
1-1/2	102
1	105
1/2	110
1/4 or less	115

1926.52(d)(1)

Exposure to impulsive or impact noise should not exceed 140 dB peak sound pressure level.

1926.52(e)

Plain cotton is not an acceptable protective device. **1926.101(c)**

Heating Devices, Temporary

When heating devices are used, fresh air shall be supplied in sufficient quantities to maintain the health and safety of workers. **1926.154(a)(1)**

Solid fuel salamanders are prohibited in buildings and on scaffolds. **1926.154(d)**

Hoists, Material, and Personnel

The employer shall comply with the manufacturer's specifications and limitations.

1926.552(a)(1)

Rated load capacities, recommended operating speeds, and special hazard warnings or instructions shall be posted on cars and platforms.

1926.552(a)(2)

Hoistway entrances of material hoists shall be protected by substantial full width gates or bars that are painted with diagonal contrasting colors such as black and yellow stripes. **1926.552(b)(2)**

Hoistway doors or gates of personnel hoist shall be not less than 6 feet 6 inches (198.1 meters) high and shall be protected with mechanical locks that cannot be operated from the landing side and that are accessible only to persons on the car. **1926.552(c)(4)**

Overhead protective coverings shall be provided on the top of the hoist cage or platform. **1926.552(b)(3) and (c)(7)**

All material hoists shall conform to the requirements of ANSI A10.5-1969, *Safety Requirements for Material Hoists*. **1926.552(b)(8)**

Hooks (See Wire Ropes, Chains, and Hooks)

Housekeeping

Form and scrap lumber with protruding nails and all other debris shall be kept clear from all work areas. **1926.25(a)**

Combustible scrap and debris shall be removed at regular intervals. **1926.25(b)**

Containers shall be provided for collection and separation of all refuse. Covers shall be provided on containers used for flammable or harmful substances. **1926.25(c)**

Wastes shall be disposed of at frequent intervals. **1926.25(c)**

Illumination

Construction areas, ramps, runways, corridors, offices, shops, and storage areas shall be lighted to not less than the minimum illumination intensities listed in Table D-3 while any work is in progress.

Table D-3 — Minimum Illumination Intensities in Footcandles

Footcandles: Area of Operation

5.....General construction area lighting

3.....General construction areas, concrete placement, excavation, waste areas, accessways, active storage areas, loading platforms, refueling, and field maintenance areas

5.....Indoor warehouses, corridors, hallways, and exitways

5.....Tunnels, shafts, and general underground work areas
(**Exception:** minimum of 10 footcandles is required at tunnel and shaft heading during drilling, mucking, and scaling. Bureau of Mines approved cap lights shall be acceptable for use in the tunnel heading)

10.....General construction plant and shops (e.g., batch plants, screening plants, mechanical and electrical equipment rooms, carpenters shops, rigging lofts and active store rooms, barracks or living quarters, locker or dressing rooms, mess halls, indoor toilets, and workrooms)

30.....First-aid stations, infirmaries, and offices

1926.56(a)

Jointers

A jointer guard shall automatically adjust itself to cover the unused portion of the head and the section of the head on the working side and the back side of the fence or cage. The jointer guard shall remain in contact with the material at all times. **1926.304(f) incorporated by reference to ANSI 01.1–1961, section 4.3.2**

Ladders

Portable and fixed ladders with structural defects—such as broken or missing rungs, cleats or steps, broken or split rails, or corroded components—shall be withdrawn from service by immediately tagging “DO NOT USE” or marking in a manner that identifies them as defective, or shall be blocked, such as with a plywood attachment that spans several rungs. Repairs must restore ladder to its original design criteria. **1926.1053(b)(16), (17)(i) through (iii) and (18)**

Portable non-self-supporting ladders shall be placed on a substantial base, have clear access at top and bottom, and be placed at an angle so the horizontal distance from the top support to the foot of the ladder is approximately one-quarter the working length of the ladder. Portable ladders used for access to an upper landing surface must extend a minimum of 3 feet (0.9 meters) above the landing surface, or where not practical, be provided with grab rails and be secured against movement while in use. **1926.1053(b)(1) and (b)(5)(i)**

Ladders must have nonconductive siderails if they are used where the worker or the ladder could contact energized electrical conductors or equipment. **1926.1053(b)(12)**

Job-made ladders shall be constructed for their intended use. Cleats shall be uniformly spaced not less than 10 inches (25.4 centimeters) apart, nor more than 14 inches (35.5 centimeters) apart.

1926.1053(a)(3)(i)

A ladder (or stairway) must be provided at all work points of access where there is a break in elevation of 19 inches (48.2 centimeters) or more except if a suitable ramp, runway, embankment, or personnel hoist is provided to give safe access to all elevations. **1926.1051(a)**

Wood job-made ladders with spliced side rails must be used at an angle where the horizontal distance is one-eighth the working length of the ladder.

- Fixed ladders must be used at a pitch no greater than 90 degrees from the horizontal, measured from the back side of the ladder.
- Ladders must be used only on stable and level surfaces unless secured to prevent accidental movement.
- Ladders must not be used on slippery surfaces unless secured or provided with slip-resistant feet to prevent accidental movement. Slip-resistant feet must not be used as a substitute for the care in placing, lashing, or holding a ladder upon a slippery surface.

1926.1053(b)(5)(ii) through (b)(7)

Employers must provide a training program for each employee using ladders and stairways. The program must enable each employee to recognize hazards related to ladders and stairways and to use proper procedures to minimize these hazards. For example, employers must ensure that each

employee is trained by a competent person in the following areas, as applicable:

- The nature of fall hazards in the work area;
- The correct procedures for erecting, maintaining, and disassembling the fall protection systems to be used;
- The proper construction, use, placement, and care in handling of all stairways and ladders; and
- The maximum intended load-carrying capacities of ladders used.

In addition, retraining must be provided for each employee, as necessary, so that the employee maintains the understanding and knowledge acquired through compliance with the standard.

1926.1060(a) and (b)

Lasers

Only qualified and trained employees shall be assigned to install, adjust, and operate laser equipment. **1926.54(a)**

Employees shall wear proper (antilaser) eye protection when working in areas where there is a potential exposure to direct or reflected laser light greater than 0.005 watts (5 milliwatts). **1926.54(c)**

Beam shutters or caps shall be utilized, or the laser turned off, when laser transmission is not actually required. When the laser is left unattended for a substantial period of time—such as during lunch hour, overnight, or at change of shifts—the laser shall be turned off. **1926.54(e)**

Employees shall not be exposed to light intensities in excess of the following: direct staring—1 microwatt per square centimeter,

incidental observing—1 milliwatt per square centimeter diffused reflected light—2-1/2 watts per square centimeter. **1926.54(j)(1) through (3)**

Employees shall not be exposed to microwave power densities in excess of 10 milliwatts per square centimeter. **1926.54(1)**

Lead

Each employer who has a workplace or operation covered by this standard shall initially determine if any employee may be exposed to lead at or above the action level of 30 micrograms per cubic meter ($30 \mu\text{g}/\text{m}^3$) of air calculated as an 8-hour time-weighted average. **1926.62(d)(1)**

The employer shall assure that no employee is exposed to lead at concentrations greater than 50 micrograms per cubic meter ($50 \mu\text{g}/\text{m}^3$) of air averaged over an 8-hour period (the permissible exposure limit PEL). **1926.62(c)(1)**

Whenever there has been a change of equipment, process, control, personnel, or a new task has been initiated that may result in exposure above the PEL, the employer shall conduct additional monitoring. **1926.62(d)(7)**

Training shall be provided in accordance with the Hazard Communication Standard and additional training shall be provided for employees exposed at or above the action level. **1926.62(1)**

Prior to the start of the job, each employer shall establish and implement a written compliance program. **1926.62(e)(2)**

Where airborne concentrations of lead equal or exceed the action level at any time, an initial

medical examination consisting of blood sampling and analysis shall be made available for each employee prior to initial assignment to the area. **1926.62 Appendix B, viii, paragraph (j)**

Lift Slab

Lift-slab operations shall be designed and planned by a registered professional engineer who has experience in lift-slab construction. Such plans and designs shall be implemented by the employer and shall include detailed instructions and sketches indicating the prescribed method of erection. **1926.705(a)**

Jacking equipment shall be cable of supporting at least two and one-half times the load being lifted during jacking operations. Also, do not overload the jacking equipment. **1926.705(d)**

During erection, no employee, except those essential to the jacking operation, shall be permitted in the building or structure while jacking operations are taking place unless the building or structure has been reinforced sufficiently to ensure its integrity. **1926.705(k)(1)**

Equipment shall be designed and installed to prevent slippage; otherwise, the employer shall institute other measures, such as locking or blocking devices, which will provide positive connection between the lifting rods and attachments and will prevent components from disengaging during lifting operations. **1926.705(p)**

Liquefied Petroleum Gas

Each system shall have containers, valves, connectors, manifold valve assemblies, and regulators of an approved type. **1926.153(a)(1)**

Every container and vaporizer shall be provided with one or more approved safety relief valves or devices. **1926.153(d)(1)**

Containers shall be placed upright on firm foundations or otherwise firmly secured. **1926.153(g) and (h)(11)**

Portable heaters shall be equipped with an approved automatic device to shut off the flow of gas in the event of flame failure. **1926.153(h)(8)**

All cylinders shall be equipped with an excess flow valve to minimize the flow of gas in the event the fuel line becomes ruptured. **1926.153(i)(2)**

Storage of liquefied petroleum gas within buildings is prohibited. **1926.153(i)**

Storage locations shall have at least one approved portable fire extinguisher rated not less than 20-B:C. **1926.153(l)**

Medical Services and First Aid

The employer shall ensure the availability of medical personnel for advice and consultation on matters of occupational health. **1926.50(a)**

When a medical facility is not reasonably accessible for the treatment of injured employees, a person qualified to render first aid shall be available at the worksite. **1926.50(c)**

First-aid supplies when required should be readily available. **1926.50(d)(1)**

In areas where 911 is not available, the telephone numbers of the physicians, hospitals, or ambulances shall be conspicuously posted.

1926.50(f)

Motor Vehicles and Mechanized Equipment

All vehicles in use shall be checked at the beginning of each shift to ensure that all parts, equipment, and accessories that affect safe operation are in proper operating condition and free from defects. All defects shall be corrected before the vehicle is placed in service.

1926.601(b)(14)

No employer shall use any motor vehicle, earthmoving, or compacting equipment having an obstructed view to the rear unless:

- The vehicle has a reverse signal alarm distinguishable from the surrounding noise level, or
- The vehicle is backed up only when an observer signals that it is safe to do so.

**1926.601(b)(4)(i) through (ii) and
602(a)(9)(i) through (ii)**

Heavy machinery, equipment, or parts thereof that are suspended or held aloft shall be substantially blocked to prevent falling or shifting before employees are permitted to work under or between them. **1926.600(a)(3)(i)**

Noise (See Hearing Protection)

Personal Protective Equipment

The employer is responsible for requiring the wearing of appropriate personal protective equipment in all operations where there is an exposure to hazardous conditions or where the need is indicated for using such equipment to reduce the hazard to the employees. **1926.28(a) and 1926.95(a) through (c)**

Employees working over or near water, where the danger of drowning exists, shall be provided with U.S. Coast Guard-approved life jackets or buoyant work vests. **1926.106(a)**

Powder-Actuated Tools

Only trained employees shall be allowed to operate powder-actuated tools. **1926.302(e)(1)**

All powder-actuated tools shall be tested daily before use and all defects discovered before or during use shall be corrected. **1926.302(e)(2) through (3)**

Tools shall not be loaded until immediately before use. Loaded tools shall not be left unattended. **1926.302(e)(5) through (6)**

Power Transmission and Distribution

Existing conditions shall be determined before starting work, by an inspection or a test. Such conditions shall include, but not be limited to, energized lines and equipment, condition of

poles, and the location of circuits and equipment including power and communications, cable television, and fire-alarm circuits.

1926.950(b)(1)

Electric equipment and lines shall be considered energized until determined otherwise by testing or until grounding. **1926.950(b)(2) and .954(a)**

Operating voltage of equipment and lines shall be determined before working on or near energized parts. **1926.950(b)(3)**

Rubber protective equipment shall comply with the provisions of the ANSI J6 series, and shall be visually inspected before use.

1926.951(a)(1)(i) through (ii)

Protective equipment of material other than rubber shall provide equal or better electrical and mechanical protection. **1926.951(a)(iv)**

Powered Industrial Trucks (Forklifts)

Each powered industrial truck operator must be competent to operate a powered industrial truck safely, as demonstrated by the successful completion of the training and evaluation.

1910.178(l)(1)(i) and (l)(2)(iii) and (l)(6) made applicable to construction by 1926.602(d)

Training shall consist of a combination of formal instruction (e.g., lecture, discussion, interactive computer learning, video tape, written material), practical training (demonstrations performed by the trainer and practical exercises performed by the trainee), and evaluation of the operator's performance in the workplace.

1910.178(l)(2)(ii) made applicable to construction by 1926.602(d)

Power Transmission, Mechanical

Belts, gears, shafts, pulleys, sprockets, spindles, drums, flywheels, chains, or other reciprocating, rotating, or moving parts of equipment shall be guarded if such parts are exposed to contact by employees or otherwise constitute a hazard. **1926.307(a) through (f), (h) through (i), and (k)**

Guarding shall meet the requirement of ANSI B15.1-1953 (R 1958), *Safety Code for Mechanical Power Transmission Apparatus*. **1926.300(b)(2)**

Process Safety Management of Highly Hazardous Chemicals

Employers shall develop a written plan of action regarding employee participation and consult with employees and their representatives on the conduct and development of process hazards analyses and on the development of the other elements of process safety management. **1926.64(c)(1) through (2)**

The employer, when selecting a contractor, shall obtain and evaluate information regarding the contract employer's safety performance and programs. **1926.64(h)(2)(i)**

The contract employer shall assure that each contract employee is trained in the work practices necessary to safely perform his/her job. **1926.64(h)(3)(i)**

The employer shall perform a pre-startup safety review for new facilities and for modified facilities when the modification is significant enough to require a change in the process safety information. **1926.64(i)(1)**

The employer shall establish and implement written procedures to maintain the on going integrity of process equipment. **1926.64(j)(2)**

Program Safety and Health Requirements

The employer shall initiate and maintain such programs as may be necessary to provide for frequent and regular inspections of the job site, materials, and equipment by designated competent persons. **1926.20(b)(1) through (2)**

The employer should avail himself of the safety and health training programs the Secretary provides. **1926.21(b)(1)**

The employer shall instruct each employee in the recognition and avoidance of unsafe conditions and in the regulations applicable to his work environment to control or eliminate any hazards or other exposure to illness or injury.

1926.21(b)(2)

The use of any machinery, tool, material, or equipment that is not in compliance with any applicable requirement of Part 1926 is prohibited. **1926.20(b)(3)**

The employer shall permit only those employees qualified by training or experience to operate equipment and machinery. **1926.20(b)(4)**

Radiation, Ionizing

Pertinent provisions of the Nuclear Regulatory Commission (NRC) (10 CFR Part 20) relating to protection against occupational radiation exposure shall apply. **1926.53(a)**

Any activity that involves the use of radioactive materials or X-rays, whether or not under license from the Atomic Energy Commission, shall be performed by competent persons specially trained in the proper and safe operation of such equipment. **1926.53(b)**

Railings

Top edge height of top rails or equivalent guardrail system members shall have a vertical height of approximately 42 inches (106.6 centimeters), plus or minus 3 inches (7.6 centimeters) above the walking/working level. **1926.502(b)(1)**

Guardrail systems shall be surfaced so as to prevent injury to an employee, with a strength to withstand at least 200 pounds (90 kilograms), the minimum requirement applied in any outward or downward direction, at any point along the top edge. **1926.502(b)(3) and (6)**

A stair railing shall be of construction similar to a standard railing with a vertical height of 36 inches (91.4 centimeters) from the upper surface of top rail to the surface of tread in line with face of riser at forward edge of tread. **1926.1052(c)(3)(i)**

Recordkeeping: Recording and Reporting Requirements

Within 8 hours after the death or report of the inpatient hospitalization of three or more employees, as the result of a work-related incident, you must report this to the closest OSHA office, or call (800) 321-6742. **1904.39(a) and (b)(7)**

If your company had 10 or more employees during the last calendar year, you must keep the OSHA injury and illness records using the OSHA Forms 300, 300-A, and 301 or the equivalent form. **1904.1(a)(2) and 1904.29(a) and (b)(4)**

If your company had 10 or fewer employees during the last calendar year, you do not need to keep OSHA injury and illness records unless OSHA or the Bureau of Labor Statistics informs you in writing that you must keep these records. **1904.1(a)(1)**

Each recordable injury or illness must be entered on the OSHA Forms 300 and 301 within 7 days of receiving the information. **1904.29(b)(3)**

OSHA injury and illness records must be kept for all projects. If the project is 1 year or longer a separate OSHA 300 log must be kept. If the projects are less than 1 year, these projects may be placed on one OSHA 300 log that covers all short-term projects. These records may be kept at a central location as long as the information is transferred within 7 days. **1904.30(a), (b)(1) and (2)**

The OSHA 300 log must be verified, certified by a company executive, and posted at the end of each calendar year. The log must be posted no

later than February 1 of the following year and remain posted until April 30. **1904.32 (a) and (b)**

The OSHA 300 and 301 logs must be kept for 5 years following the year to which they relate. **1904.33(a) and 1904.44**

Reinforced Steel

All protruding reinforced steel onto and into which employees could fall shall be guarded to eliminate the hazard of impalement. **1926.701(b)**

Respiratory Protection

In emergencies, or when feasible engineering or administrative controls are not effective in controlling toxic substances, appropriate respiratory protective equipment shall be provided by the employer and shall be used. **1910.134 made applicable to construction by 1926.103(a)(1)**

Respiratory protective devices shall be approved by the National Institute for Occupational Safety and Health or acceptable to the U.S. Department of Labor for the specific contaminant to which the employee is exposed. **1910.134(d)(ii) made applicable to construction by 1926.103**

Respiratory protective devices shall be appropriate for the hazardous material involved and the extent and nature of the work requirements and conditions. **1910.134(d)(i) made applicable to construction by 1926.103**

Employees required to use respiratory protective devices shall be thoroughly trained in their use. **1910.134(k) made applicable to construction by 1926.103**

Respiratory protective equipment shall be inspected regularly and maintained in good condition. **1910.134(h) made applicable to construction by 1926.103**

Rollover Protective Structures (ROPS)

Rollover protective structures (ROPS) apply to the following types of materials handling equipment: all rubber-tired, self-propelled scrapers, rubber-tired frontend loaders, rubber-tired dozers, wheel-type agricultural and industrial tractors, crawler tractors, crawler-type loaders, and motor graders, with or without attachments, that are used in construction work. This requirement does not apply to sideboom pipelaying tractors. **1926.1000(a)(1)**

Safety Nets

Safety nets must be installed as close as practicable under the walking/working surface on which employees are working, but in no case more than 30 feet (91.4 meters) below such level. When nets are used on bridges, the potential fall area from the walking/working surface to the net shall be unobstructed. **1926.502(c)(1)**

Safety nets and their installations must be capable of absorbing an impact force equal to that produced by the drop test. **1926.502(c)(4)**

Saws

Band Saws

All portions of band saw blades shall be enclosed or guarded, except for the working portion of the blade between the bottom of the guide rolls and the table. **1926.304(f) incorporated by reference from ANSI 01.1-1961, *Safety Code for Woodworking Machinery***

Band saw wheels shall be fully encased. **1926.304(f) incorporated by reference from ANSI 01.1-1961, *Safety Code for Woodworking Machinery***

Portable Circular Saws

Portable, power-driven circular saws shall be equipped with guards above and below the base plate or shoe. The lower guard shall cover the saw to the depth of the teeth, except for the minimum arc required to allow proper retraction and contact with the work, and shall automatically return to the covering position when the blade is removed from the work. **1926.304(d)**

Circular saws shall have a constant pressure switch that will shut off the power when the pressure is released. **1926.300(d)(3)**

Radial Saws

Radial saws shall have an upper guard that completely encloses the upper half of the saw blade. The sides of the lower exposed portion of the blade shall be guarded by a device that will automatically adjust to the thickness of and remain in contact with the material being cut. **1926.304(g)(1)**

Radial saws used for ripping shall have nonkickback fingers or dogs. **1926.304(f) incorporated by reference from ANSI 01.1-1961, *Safety Code for Woodworking Machinery***

Radial saws shall be installed so that the cutting head will return to the starting position when released by the operator. **1926.304(f) incorporated by reference from ANSI 01.1-1961, *Safety Code for Woodworking Machinery***

Swing or Sliding Cut-Off Saws

All swing or sliding cut-off saws shall be provided with a hood that will completely enclose the upper half of the saw. **1926.304(f) incorporated by reference from ANSI 01.1-1961, *Safety Code for Woodworking Machinery***

Limit stops shall be provided to prevent swing or sliding type cut-off saws from extending beyond the front or back edges of the table. **1926.304(f) incorporated by reference from ANSI 01.1-1961, *Safety Code for Woodworking Machinery***

Each swing or sliding cut-off saw shall be provided with an effective device to return the saw automatically to the back of the table when released at any point of its travel. **1926.304(f) incorporated by reference from ANSI 01.1-1961, *Safety Code for Woodworking Machinery***

Inverted sawing of sliding cut-off saws shall be provided with a hood that will cover the part of the saw that protrudes above the top of the table or material being cut. **1926.304(f) incorporated by reference from ANSI 01.1-1961, *Safety Code for Woodworking Machinery***

Table Saws

Circular table saws shall have a hood over the portion of the saw above the table, so mounted that the hood will automatically adjust itself to the thickness of and remain in contact with the material being cut. **1926.304(h)(1)**

Circular table saws shall have a spreader aligned with the blade, spaced no more than 1/2-inch (1.27-centimeters) behind the largest blade mounted in the saw. This provision does not apply when grooving, dadoing, or rabbeting. **1926.304(f) incorporated by reference from ANSI 01.1-1961, *Safety Code for Woodworking Machinery***

Circular table saws used for ripping shall have nonkickback fingers or dogs. **1926.304(f) incorporated by reference from ANSI 01.1-1961, *Safety Code for Woodworking Machinery***

Feeder attachments shall have the feed rolls or other moving parts covered or guarded so as to protect the operator from hazardous points. **1926.304(c)**

Scaffolds, General Requirements

Scaffolds are any temporary elevated platform (supported or suspended) and its supporting structure (including points of anchorage), used for supporting employees or materials or both. **1926.450(b)**

Each employee who performs work on a scaffold shall be trained by a person qualified to recognize the hazards associated with the type of scaffold used and to understand the procedures to control or minimize those hazards. The training

shall include such topics as the nature of any electrical hazards, fall hazards, falling object hazards, the maintenance and disassembly of the fall protection systems, the use of the scaffold, handling of materials, the capacity and the maximum intended load. **1926.454(a)**

Fall protection (guardrail systems and personal fall arrest systems) must be provided for each employee on a scaffold more than 10 feet (3.1 meters) above a lower level. **1926.451(g)(1)**

Each scaffold and scaffold component shall support without failure its own weight and at least 4 times the maximum intended load applied or transmitted to it. Suspension ropes and connecting hardware must support 6 times the intended load. Scaffolds and scaffold components shall not be loaded in excess of their maximum intended loads or rated capacities, whichever is less. **1926.451(a)(1), (a)(4), (f)(1)**

The scaffold platform shall be planked or decked as fully as possible. **1926.451(b)(1)**

The platform shall not deflect more than 1/60 of the span when loaded. **1926.451(f)(16)**

The work area for each scaffold platform and walkway shall be at least 18 inches (46 centimeters) wide. When the work area must be less than 18 inches (46 centimeters) wide, guardrails and/or personal fall arrest systems shall still be used. **1926.451(b)(2)**

Access must be provided when the scaffold platforms are more than 2 feet (0.6 m) above or below a point of access. Direct access is acceptable when the scaffold is not more than 14 inches (36 centimeters) horizontally and not more than

24 inches (61 centimeters) vertically from the other surfaces. Crossbraces shall not be used as a means of access. **1926.451(e)(1) and (e)(8)**

A competent person shall inspect the scaffold, scaffold components, and ropes on suspended scaffolds before each work shift and after any occurrence which could affect the structural integrity and authorize prompt corrective action. **1926.450 (b), 451(f)(3), and (f)(10)**

Scaffold, Bricklaying

Employees doing overhand bricklaying from a supported scaffold shall be protected by a guard-rail or personal fall arrest system on all sides except the side where the work is being done. **1926.451(g)(1)(vi)**

Scaffold Erectors and Dismantlers

A competent person shall determine the feasibility for safe access and fall protection for employees erecting and dismantling supported scaffolds. **1926.451(e) and (g)(2)**

Scaffold, Fall Arrest Systems

Personal fall arrest systems include harnesses, components of the harness/belt such as Dee-rings and snaphooks, lifelines, and anchorage points of 5,000 pounds (22.2 kN.) **1926.451(g)(3) and 1926.502(d)(15)**

Vertical or horizontal lifelines may be used.
1926.451(g)(3)(ii) through (iv)

Lifelines shall be independent of support lines and suspension ropes and not attached to the same anchorage point as the support or suspension ropes. **1926.451(g)(3)(iii) and (iv)**

When working from an aerial lift, the fall arrest system lanyard shall be attached to the boom or basket. **1926.453(b)(2)(v)**

Scaffold, Guardrails

Guardrails shall be installed along all open sides and ends and before the scaffold is released for use by employees other than the erection and dismantling crews. Guardrails are not required on the front edge of a platform if the front edge of the platform is less than 14 inches (36 centimeters) from the face of the work. When plastering and lathing is being done the distance is 18 inches (46 centimeters) or less from the front edge. When outrigger scaffolds are attached to supported scaffolds the distance is 3 inches (8 centimeters) or less from the front edge of the outrigger. **1926.451(b)(3) and (g)(4)**

The toprail for scaffolds must be 38 inches (0.97 meters) to 45 inches (1.2 meters) from the platform. Midrails are to be installed approximately halfway between the toprail and the platform surface. Toeboards are to be used to protect employees working below.
1926.451(g)(4)(ii) and (iii), 1926.451(j)(1)

When screens and mesh are used for guardrails, they shall extend from the top edge of the

guardrail system to the scaffold platform, and along the entire opening between the supports. **1926.451(g)(4)(v)**

Crossbracing is not acceptable as an entire guardrail system but is acceptable for a toprail when the crossing point of the two braces is between 38 inches (0.9 meters) and 48 inches (1.3 meters) above the work platform and for midrails when between 20 inches (0.5 meters) and 30 inches (0.8 meters) above the work platform. The end points of the crossbracing shall be no more than 48 inches (1.3 meters) apart vertically. **1926.451(g)(4)(xv)**

Scaffolds, Mobile

Support scaffold footings shall be level and capable of supporting the loaded scaffold. The legs, poles, frames, and uprights shall bear on base plates and mud sills. **1926.451(c)(2)**

Supported scaffold platforms shall be fully planked or decked. **1926.451(b)**

Each employee more than 10 feet above a lower level shall be protected from falls or by guardrails or a fall arrest system, except those on single-point and two-point adjustable suspension scaffolds. Each employee on a single-point and two-point adjustable suspended scaffold shall be protected by both a personal fall arrest system and a guardrail. **1926.451(g)(1)**

Scaffold, Planking

Scaffold planking shall be capable of supporting without failure its own weight and at least 4 times the intended load. Solid sawn wood, fabricated planks, and fabricated platforms may be used as scaffold planks, following the recommendations by the manufacturer or a lumber grading association or inspection agency. Tables showing maximum permissible spans, rated load capacity, nominal thickness, etc., are in Appendix A of Subpart L (1)(b) and (c). **1926.451(a)(1)**

Scaffolds, Supported

Supported scaffolds are platforms supported by legs, outrigger beams, brackets, poles, uprights, posts, frames, or similar rigid support. The structural members, poles, legs, posts, frames, and uprights, shall be plumb and braced to prevent swaying and displacement. **1926.451(b) and (c)**

Supported scaffolds poles, legs, posts, frames, and uprights shall bear on base plates and mud sills, or on another adequate firm foundation. **1926.451(c)(2)(i) and (ii)**

Either the manufacturer's recommendation or the following placements shall be used for guys, ties, and braces: install guys, ties, and braces at the closest horizontal member to the 4:1 height and repeat vertically with the top restraint no further than the 4:1 height from the top:

Vertically

- every 20 feet (6.1 meters) or less for scaffolds less than 3 feet (0.9 meters) wide;
- every 26 feet (7.9 meters) or less for scaffolds more than 3 feet (0.9 meters) wide;

Horizontally

- at each end;
- at intervals not to exceed 30 feet (9.1 meters) from one end. **1926.451(c)**

Scaffolds, Suspension

Each employee more than 10 feet (3.1 meters) above a lower level shall be protected from falling by guardrails and a personal fall arrest system when working from single or two-point suspended scaffolds and self-contained adjustable scaffolds that are supported by ropes.

1926.451(g)(ii) and (iv)

Each employee 10 feet (3.1 meters) above a lower level shall be protected from falling by a personal fall arrest system when working from a boatswain's chair, ladder jack, needle beam, float, or catenary scaffolds. **1926.451(g)(i)**

Lifelines shall be independent of support lines and suspension ropes and not attached to the same anchorage point as the support or suspension ropes. **1926.451(g)(3)(iii) and (iv)**

A competent person shall inspect the ropes for defects prior to each workshift and after every occurrence which could affect a rope's integrity, evaluate the direct connections that support the load, and determine if two-point and multi-point scaffolds are secured from swaying.

1926.451(d)(3)(i), (d)(10), (d)(18), (f)(3)

The use of repaired wire rope is prohibited. **1926.451(d)(7)**

Tiebacks shall be secured to a structurally sound anchorage on the building or structure.

Tiebacks shall not be secured to standpipes, vents, other piping systems, or electrical conduit. **1926.451(d)(3)(ix) and (d)(5)**

A single tieback shall be installed perpendicular to the face of the building or structure. Two tie-backs installed at opposing angles are required when a perpendicular tie back cannot be installed. **1926.451(d)(3)(x)**

Only those items specifically designed as counterweights shall be used. Sand, gravel, masonry units, rolls of roofing felt, and other such materials shall not be used as counterweights. **1926.451(d)(3)(ii) and (iii)**

Counterweights used for suspended scaffolds shall be made of materials that can not be easily dislocated. **1926.451(d)(3)(ii)**

Counterweights shall be secured by mechanical means to the outrigger beams. **1926.451(d)(3)(iv)**

Signs, Signals, and Barricades

Construction areas shall be posted with legible traffic signs at points of hazard. **1926.200 (g)(1)**

Barricades for protection of employees shall conform to Part 6 of the *Manual on Uniform Traffic Control Devices*. **1926.202**

Silica

Appropriate engineering controls, personal protective equipment, respirators, and work practices shall be used to protect employees from

crystalline silica. **1926.55 and OSHA Special Emphasis Program for Silicosis 5/2/96**

Stairs

A stairway or ladder must be provided at all worker points of access where there is a break in elevation of 19 inches (48.3 centimeters) or more and no ramp, runway, sloped embankment, or personnel hoist is provided. **1926.1051(a)**

Except during construction of the actual stairway, skeleton metal frame structures and steps must not be used (where treads and/or landings are to be installed at a later date), unless the stairs are fitted with secured temporary treads and landings. **1926.1052(b)(2)**

When there is only one point of access between levels, it must be kept clear to permit free passage by workers. If free passage becomes restricted, a second point of access must be provided and used. **1926.1051(a)(3)**

When there are more than two points of access between levels, at least one point of access must be kept clear. **1926.1051(a)(4)**

All stairway and ladder fall protection systems must be provided and installed as required by the stairway and ladder rules *before* employees begin work that requires them to use stairways or ladders and their respective fall protection systems. **1926.1051(b)**

Stairways that will not be a permanent part of the structure on which construction work is performed must have landings at least 30 inches deep and 22 inches wide (76.2 x 55.9 centimeters) at every 12 feet (3.6 meters) or less of vertical rise. **1926.1052(a)(1)**

Stairways must be installed at least 30 degrees, and no more than 50 degrees, from the horizontal. **1926.1052(a)(2)**

Where doors or gates open directly onto a stairway, a platform must be provided, and the swing of the door shall not reduce the effective width of the platform to less than 20 inches (50.8 centimeters). **1926.1052(a)(4)**

Except during construction of the actual stairway, stairways with metal pan landings and treads must not be used where the treads and/or landings have not been filled in with concrete or other material, unless the pans of the stairs and/or landings are temporarily filled in with wood or other material. All treads and landings must be replaced when worn below the top edge of the pan. **1926.1052(b)(1)**

Stairways having four or more risers, or rising more than 30 inches in height (76.2 centimeters), whichever is less, must have at least one handrail. A stairrail also must be installed along each unprotected side or edge. When the top edge of a stairrail system also serves as a handrail, the height of the top edge must not be more than 37 inches (93.9 centimeters) nor less than 36 inches (91.4 centimeters) from the upper surface of the stairrail to the surface of the tread in line with face of riser at forward edge of tread. **1926.1052(c)(1)(i) through (ii)**

Midrails, screens, mesh, intermediate vertical members, or equivalent intermediate structural members must be provided between the top rail and stairway steps of the stairrail system. **1926.1052(c)(4)**

Midrails, when used, must be located midway between the top of the stairrail system and the stairway steps. **1926.1052(c)(4)(i)**

The height of handrails must not be more than 37 inches (93.9 centimeters) nor less than 30 inches (76.2 centimeters) from the upper surface of the handrail to the surface of the tread in line with face of riser at forward edge of tread.

1926.1052(c)(6)

The height of the top edge of a stairrail system used as a handrail must not be more than 37 inches (93.9 centimeters) nor less than 36 inches (91.4 centimeters) from the upper surface of the stairrail system to the surface of the tread in line with face of riser at forward edge of tread.

1926.1052(c)(7)

Temporary handrails must have a minimum clearance of 3 inches (7.6 centimeters) between the handrail and walls, stairrail systems, and other objects. **1926.1052(c)(11)**

Unprotected sides and edges of stairway landings must be provided with guardrail systems. **1926.1052(c)(12)**

Steel Erection

Each employee engaged in a steel erection activity who is on a walking/working surface with an unprotected side or edge more than 15 feet (4.6 meters) above a lower level shall be protected from fall hazards by guardrail systems, safety net systems, personal fall arrest systems, positioning device systems or fall restraint systems. **1926.760(a)(1)**

Connectors more than two stories or 30 feet (9.1 meters) above a lower level, whichever is less or at heights over 15 feet and up to 30 feet above a lower level shall be protected with a personal fall arrest system, positioning device system or fall restraint, or be provided with other means of protection from fall hazards.

1926.760(b)(1) and (3)

Training shall be provided for all employees exposed to fall hazards. Special training shall be provided to connectors, workers in controlled decking zones, and those rigging for multiple lifts. **1926.761(c)**

Steel erection begins when written notification that the concrete in the footings, piers, and walls or the mortar in the masonry piers and walls has attained the strength to support the loads imposed during steel erection. **1926.752(b)**

Columns shall be anchored by a minimum of four anchor rods (anchor bolts). **1926.755(a)(1)**

Solid web structural members shall be secured with at least two bolts per connection before being released from the hoisting line.

1926.756(a)(1)

Open web joists must be field bolted at each end of the bottom chord before being released from the hoisting line. **1926.757(a)(1)(iii)**

Decking shall be laid tightly and secured. **1926.754(e)(5)**

Controlled decking zones shall be clearly marked and only those employees engaged in leading edge permitted to work in the area.

1926.759(c)

Cranes used in steel erection shall be inspected prior to each shift by a competent person. Routes for suspended load shall be planned to ensure no employee is required to work directly under the load except for connecting or hooking or unhooking. Hooks with self-closing latches shall be used. All loads shall be rigged by a qualified rigger. Multiple lifts shall hoist a maximum of five members. **1926.753(b)(1), (d) and (e)**

Storage

All materials stored in tiers shall be secured to prevent sliding, falling, or collapsing.

1926.250(a)(1)

Aisles and passageways shall be kept clear and in good repair. **1926.250(a)(3)**

Storage of materials shall not obstruct exits.

1926.151(d)(1)

Materials shall be stored with due regard to their fire characteristics. **1926.151(d)(2)**

Tire Cages

A safety tire rack, cage, or equivalent protection shall be provided and used when inflating, mounting, or dismounting tires installed on split rims, or rims equipped with locking rings or similar devices. **1926.600(a)(2)**

Toeboards

Toeboards, when used to protect workers from falling objects, shall be erected along the edge of the overhead walking/working surface.

1926.502(j)(1)

A standard toeboard shall be at least 3-1/2 inches (9 centimeters) in height and may be of any substantial material either solid or open, with openings not to exceed 1 inch (2.54 centimeters) in greatest dimension. **1926.502(j)(3)**

Toilets

Toilets shall be provided according to the following: 20 or fewer persons—one facility; 20 or more persons—one toilet seat and one urinal per 40 persons; 200 or more persons—one toilet seat and one urinal per 50 workers. **1926.51(c)(1)**

This requirement does not apply to mobile crews having transportation readily available to nearby toilet facilities. **1926.51(c)(4)**

Underground Construction

The employer shall provide and maintain safe means of access and egress to all work stations. **1926.800(b)**

The employer shall control access to all openings to prevent unauthorized entry underground. Unused chutes, manways, or other openings shall be tightly covered, bulkheaded, or fenced off, and shall be posted with signs indicating “Keep Out” or similar language. Complete or unused sections of the underground facility shall be barricaded. **1926.800(b)(3)**

Unless underground facilities are sufficiently completed so that the permanent environmental controls are effective and the remaining construction activity will not cause any environmental

hazard or structural failure within the facilities, the employer shall maintain a check-in/check-out procedure that will ensure that aboveground designated personnel can determine an accurate count of the number of persons underground in the event of an emergency. **1926.800(c)**

All employees shall be instructed to recognize and avoid hazards associated with underground construction activities. **1926.800(d)**

Hazardous classifications are for “potentially gassy” and “gassy” operations. **1926.800(h)**

The employer shall assign a competent person to perform all air monitoring to determine proper ventilation and quantitative measurements of potentially hazardous gases. **1926.800(j)(1)(i)(a)**

Fresh air shall be supplied to all underground work areas in sufficient quantities to prevent dangerous or harmful accumulation of dust, fumes, mists, vapors, or gases. **1926.800(k)(1)(i)**

Wall Openings, Underground Construction

Each employee working on, at, above, or near wall openings (including those with chutes attached) where the outside bottom edge of the wall opening is 6 feet (1.8 meters) or more above lower levels and the inside bottom edge of the wall opening is less than 39 inches (1 meter) above the walking/working surface must be protected from falling by the use of a guardrail system, a safety net system, or a personal fall arrest system. **1926.501(b)(14)**

When an employee is exposed to falling objects, the employer must ensure that each

employee wear a hard hat and erect toeboards, screens, or guardrail systems; or erect a canopy structure and keep potential fall objects far enough from the edge of the higher level; or barricade the area to which objects could fall. **1926.501(c)**

Washing Facilities, Underground Construction

The employers shall provide adequate washing facilities for employees engaged in operations involving harmful substances. **1926.51(f)**

Washing facilities shall be near the worksite and shall be so equipped as to enable employees to remove all harmful substances. **1926.51(f)**

Welding, Cutting, and Heating

Employers shall instruct employees in the safe use of welding equipment. **1926.350(d) and 1926.351(d)**

Proper precautions (isolating welding and cutting, removing fire hazards from the vicinity, providing a fire watch) for fire prevention shall be taken in areas where welding or other “hot work” is being done. No welding, cutting, or heating shall be done where the application of flammable paints, or the presence of other flammable compounds or heavy dust concentrations creates a fire hazard. **1926.352(a) through (c) & (f)**

Arc welding and cutting operations shall be shielded by noncombustible or flameproof screens to protect employees and other persons in the vicinity from direct arc rays. **1926.351(e)**

When electrode holders are to be left unattended, the electrodes shall be removed and the holder shall be placed or protected so that they cannot make electrical contact with employees or conducting objects. **1926.351(d)(1)**

All arc welding and cutting cables shall be completely insulated and be capable of handling the maximum current requirements for the job. There shall be no repairs or splices within 10 feet (3 meters) of the electrode holder, except where splices are insulated equal to the insulation of the cable. Defective cable shall be repaired or replaced. **1926.351(b)(1) through (2) and (4)**

Fuel gas and oxygen hose shall be easily distinguishable and shall not be interchangeable. Hoses shall be inspected at the beginning of each shift and shall be repaired or replaced if defective. **1926.350(f)(1) and (3)**

General mechanical ventilation, local exhaust ventilation, air line respirators, and other protection shall be provided, as required, when welding, cutting or heating:

- Zinc, lead, cadmium, chromium, mercury, or materials bearing, based, or coated with beryllium in enclosed spaces;
 - Stainless steel with inert-gas equipment;
 - In confined spaces; and
 - Where an unusual condition can cause an unsafe accumulation of contaminants.
- 1926.353(b)(1), (c)(1)(i) through (iv), (c)(2)(i) through (iv), (d)(1)(iv), and (e)(1)**

Proper eye protective equipment to prevent exposure of personnel shall be provided.

1926.353(e)(2)

Wire Ropes, Chains, and Ropes

Wire ropes, chains, ropes, and other rigging equipment shall be inspected prior to use and as necessary during use to ensure their safety.

Defective gear shall be removed from service.

1926.251(a)(1)

Job or shop hooks and links or makeshift fasteners formed from bolts, rods, or other such attachments shall not be used.

1926.251(b)(3)

When U-bolts are used for eye splices, the U-bolt shall be applied so that the “U” section is in contact with the dead end of the rope.

1926.251(c)(5)(i)

When U-bolt wire rope clips are used to form eyes, the following table shall be used to determine the number and spacing of clips.

1926.251(c)(5)

Woodworking Machinery

All fixed power-driven woodworking tools shall be provided with a disconnect switch that can be either locked or tagged in the off position.

1926.304(a)

All woodworking tools and machinery shall meet applicable requirements of ANSI 01.1-1961, *Safety Code for Woodworking Machinery*.

1926.304(f)

Number and Spacing of U-Bolt Wire Rope Clips

Improved plow steel, rope diameter (inches)	<u>Number of clips</u>		Minimum spacing (inches)
	Drop forged	Other material	
1/2 (1.27 cm)	3	4	3 (7.62cm)
5/8 (.625 cm)	3	4	3-3/4 (8.37 cm)
3/4 (.75 cm)	4	5	4-1/2 (11.43 cm)
7/8 (.875 cm)	4	5	5-1/4 (12.95 cm)
1 (2.54 cm)	5	6	6 (15.24 cm)
1-1/8 (2.665 cm)	6	6	6-3/4 (15.99cm)
1-1/4 (2.79 cm)	6	7	7-1/2 (19.05cm)
1-3/8 (2.915 cm)	7	7	8-1/4 (20.57cm)
1-1/2 (3.81 cm)	7	8	9 (22.86 cm)

1926.251(c)(5)

OSHA can provide extensive help through a variety of programs, including assistance about safety and health programs, state plans, workplace consultations, voluntary protection programs, strategic partnerships, training and education, and more.

State Programs

The *Occupational Safety and Health Act of 1970* (OSH Act) encourages states to develop and operate their own job safety and health plans. OSHA approves and monitors these plans. There are currently 26 state plans: 23 cover both private and public (state and local government) employment; 3 states, Connecticut, New Jersey, and New York, cover the public sector only. States and territories with their own OSHA-approved occupational safety and health plans must adopt and enforce standards identical to, or at least as effective as, the federal standards and provide extensive programs of voluntary compliance and technical assistance, including consultation services.

Consultation Services

Consultation assistance is available on request to employers who want help in establishing and maintaining a safe and healthful workplace. Funded largely by OSHA, the service is provided at no cost to the employer. Primarily developed for smaller employers with more hazardous operations, the consultation service is delivered by state governments employing professional safety and health consultants. Comprehensive assistance includes a hazard survey of the

worksite and appraisal of all aspects of the employer's existing safety and health management system. In addition, the service offers assistance to employers in developing and implementing an effective safety and health management system. No penalties are proposed or citations issued for hazards identified by the consultant. The employer's only obligation is to correct all identified serious hazards within the agreed-upon correction time frame. OSHA provides consultation assistance to the employer with the assurance that his or her name and firm and any information about the workplace will not be routinely reported to OSHA enforcement staff.

Under the consultation program, certain exemplary employers may request participation in OSHA's Safety and Health Achievement Recognition Program (SHARP). Eligibility for participation in SHARP includes, but is not limited to, receiving a full-service, comprehensive consultation visit, correcting all identified hazards, and developing an effective safety and health program management system.

Employers accepted into SHARP may receive an exemption from programmed inspections (not complaint or accident investigation inspections) for a period of 1 year initially, or 2 years upon renewal. For more information concerning consultation assistance, see the list of consultation projects listed at the end of this publication.

Voluntary Protection Programs (VPP)

Voluntary Protection Programs and onsite consultation services, when coupled with an effective enforcement program, expand worker protection to help meet the goals of the *OSH Act*.

The three levels of VPP—Star, Merit, and Demonstration—are designed to recognize outstanding achievements by companies that have developed and implemented effective safety and health management systems. The VPPs motivate others to achieve excellent safety and health results in the same outstanding way as they establish a cooperative relationship between employers, employees, and OSHA. For additional information on VPPs and how to apply, contact the OSHA regional offices listed at the end of this publication.

Strategic Partnership Program

OSHA's Strategic Partnership Program, the newest of OSHA's cooperative programs, helps encourage, assist, and recognize the efforts of partners to eliminate serious workplace hazards and achieve a high level of worker safety and health. Whereas OSHA's Consultation Program and VPP entail one-on-one relationships between OSHA and individual worksites, most strategic partnerships seek to have a broader impact by building cooperative relationships with groups of employers and employees. These partnerships are voluntary, cooperative relationships between OSHA, employers, employee representatives, and others such as trade unions, trade and professional associations, universities, and other government agencies.

For more information on this program, contact your nearest OSHA office, or visit OSHA's website at www.osha.gov.

phone (202) 512-1800. Specify OSHA Regulations, Documents and Technical Information on CD-ROM (ORDT), GPO Order No. S/N 729-013-00000-5.

Emergencies, Complaints, and Further Assistance

To report an emergency, file a complaint, or seek OSHA advice, assistance, or products, call (800) 321-OSHA or contact your nearest OSHA regional, area, state plan, or consultation office listed at the end of this publication. The teletypewriter (TTY) number is (877) 889-5627.

You can also file a complaint online and obtain more information on OSHA federal and state programs by visiting OSHA's website at www.osha.gov.

Region I**(CT,* MA, ME, NH, RI, VT*)**

JFK Federal Building, Room E340

Boston, MA 02203

(617) 565-9860

Region II**(NJ,* NY,* PR,* VI*)**

201 Varick Street, Room 670

New York, NY 10014

(212) 337-2357

Region III**(DE, DC, MD,* PA,* VA,* WV)**

The Curtis Center

170 S. Independence Mall West

Suite 740 West

Philadelphia, PA 19106-3309

(215) 861-4900

Region IV**(AL, FL, GA, KY,* MS, NC,* SC,* TN*)****SNAF**

61 Forsyth Street SW, Room 6T50

Atlanta, GA 30303

(404) 562-2300

Region V**(IL, IN,* MI,* MN,* OH, WI)**

230 South Dearborn Street, Room 3244

Chicago, IL 60604

(312) 353-2220

Region VI**(AR, LA, NM,* OK, TX)**

525 Griffin Street, Room 602

Dallas, TX 75202

(214) 767-4731 or 4736 x224

Region VII**(IA,* KS, MO, NE)**

City Center Square

1100 Main Street, Suite 800

Kansas City, MO 64105

(816) 426-5861

Region VIII**(CO, MT, ND, SD, UT*, WY*)**

1999 Broadway, Suite 1690

Denver, CO 80202-5716

(303) 844-1600

Region IX**(American Samoa, AZ,* CA,* HI, NV,*
Northern Mariana Islands)**

71 Stevenson Street, Room 420

San Francisco, CA 94105

(415) 975-4310

Region X**(AK,* ID, OR,* WA*)**

1111 Third Avenue, Suite 715

Seattle, WA 98101-3212

(206) 553-5930

*These states and territories operate their own OSHA-approved job safety and health programs (Connecticut, New Jersey, and New York plans cover public employees only). States with approved programs must have a standard that is identical to, or at least as effective as, the federal standard.

Birmingham, AL	(205) 731-1534
Mobile, AL	(251) 441-6131
Anchorage, AK	(907) 271-5152
Little Rock, AR	(501) 324-6291(5818)
Phoenix, AZ	(602) 640-2348
San Diego, CA	(619) 557-5909
Sacramento, CA	(916) 566-7471
Denver, CO	(303) 844-5285
Greenwood Village, CO	(303) 843-4500
Bridgeport, CT	(203) 579-5581
Hartford, CT	(860) 240-3152
Wilmington, DE	(302) 573-6518
Fort Lauderdale, FL	(954) 424-0242
Jacksonville, FL	(904) 232-2895
Tampa, FL	(813) 626-1177
Savannah, GA	(912) 652-4393
Smyrna, GA	(770) 984-8700
Tucker, GA	(770) 493-6644/6742/8419
Des Moines, IA	(515) 284-4794
Boise, ID	(208) 321-2960
Calumet City, IL	(708) 891-3800
Des Plaines, IL	(847) 803-4800
Fairview Heights, IL	(618) 632-8612
North Aurora, IL	(630) 896-8700
Peoria, IL	(309) 671-7033
Indianapolis, IN	(317) 226-7290
Wichita, KS	(316) 269-6644
Frankfort, KY	(502) 227-7024
Baton Rouge, LA	(225) 389-0474 (0431)
Braintree, MA	(617) 565-6924
Methuen, MA	(617) 565-8110
Springfield, MA	(413) 785-0123
Linthicum, MD	(410) 865-2055/2056
Bangor, ME	(207) 941-8177
Portland, ME	(207) 780-3178
August, ME	(207) 622-8417
Lansing, MI	(517) 327-0904
Minneapolis, MN	(612) 664- 5460
Kansas City, MO	(816) 483-9531

St. Louis, MO	(314) 425-4249
Jackson, MS	(601) 965-4606
Billings, MT	(406) 247-7494
Raleigh, NC	(919) 856-4770
Omaha, NE	(402) 221-3182
Bismark, ND	(701) 250-4521
Concord, NH.....	(603) 225-1629
Avenel, NJ.....	(732) 750-3270
Hasbrouck Heights, NJ	(201) 288-1700
Marlton, NJ	(856) 757-5181
Parsippany, NJ	(973) 263-1003
Carson City, NV	(775) 885-6963
Albany, NY	(518) 464-4338
Bayside, NY	(718) 279-9060
Bowmansville, NY	(716) 684-3891
New York, NY.....	(212) 337-2636
North Syracuse, NY.....	(315) 451-0808
Tarrytown, NY	(914) 524-7510
Westbury, NY	(516) 334-3344
Cincinnati, OH.....	(513) 841-4132
Cleveland, OH	(216) 522-3818
Columbus, OH	(614) 469-5582
Toledo, OH	(419) 259-7542
Oklahoma City, OK	(405) 278-9560
Portland, OR	(503) 326-2251
Allentown, PA.....	(610) 776-0592
Erie, PA	(814) 833-5758
Harrisburg, PA	(717) 782-3902
Philadelphia, PA	(215) 597-4955
Pittsburgh, PA	(412) 395-4903
Wilkes-Barre, PA	(570) 826-6538
Guaynabo, PR	(787) 277-1560
Providence, RI	(401) 528-4669
Columbia, SC	(803) 765-5904
Nashville, TN.....	(615) 781-5423
Austin, TX	(512) 916-5783 (5788)
Corpus Christi, TX	(361) 888-3420
Dallas, TX.....	(214) 320-2400 (2558)
El Paso, TX	(915) 534-6251

Fort Worth, TX.....	(817) 428-2470 (485-7647)
Houston, TX	(281) 591-2438 (2787)
Houston, TX	(281) 286-0583/0584 (5922)
Lubbock, TX.....	(806) 472-7681 (7685)
Salt Lake City, UT	(801) 530-6901
Norfolk, VA	(757) 441-3820
Bellevue, WA	(206) 553-7520
Appleton, WI	(920) 734-4521
Eau Claire, WI	(715) 832-9019
Madison, WI	(608) 264-5388
Milwaukee, WI	(414) 297-3315
Charleston, WV	(304) 347-5937

Anchorage, AK	(907) 269-4957
Tuscaloosa, AL	(205) 348-3033
Little Rock, AR	(501) 682-4522
Phoenix, AZ	(602) 542-1695
Sacramento, CA	(916) 263-2856
Fort Collins, CO	(970) 491-6151
Wethersfield, CT	(860) 566-4550
Washington, DC	(202) 541-3727
Wilmington, DE	(302) 761-8219
Tampa, FL	(813) 974-9962
Atlanta, GA	(404) 894-2643
Tiyam, GU	9-1-(671) 475-1101
Honolulu, HI	(808) 586-9100
Des Moines, IA	(515) 281-7629
Boise, ID	(208) 426-3283
Chicago, IL	(312) 814-2337
Indianapolis, IN	(317) 232-2688
Topeka, KS	(785) 296-2251
Frankfort, KY	(502) 564-6895
Baton Rouge, LA	(225) 342-9601
West Newton, MA	(617) 727-3982
Laurel, MD	(410) 880-4970
Augusta, ME	(207) 624-6400
Lansing, MI	(517) 322-1809
Saint Paul, MN	(651) 284-5060
Jefferson City, MO	(573) 751-3403
Pearl, MS	(601) 939-2047
Helena, MT	(406) 444-6418
Raleigh, NC	(919) 807-2905
Bismarck, ND	(701) 328-5188
Lincoln, NE	(402) 471-4717
Concord, NH	(603) 271-2024
Trenton, NJ	(609) 292-3923
Santa Fe, NM	(505) 827-4230
Albany, NY	(518) 457-2238
Henderson, NV	(702) 486-9140
Columbus, OH	(614) 644-2631
Oklahoma City, OK	(405) 528-1500
Salem, OR	(503) 378-3272

Indiana, PA	(724)	357-2396
Hato Rey, PR	(787)	754-2171
Providence, RI	(401)	222-2438
Columbia, SC	(803)	734-9614
Brookings, SD	(605)	688-4101
Nashville, TN.....	(615)	741-7036
Austin, TX	(512)	804-4640
Salt Lake City, UT	(801)	530-6901
Montpelier, VT	(802)	828-2765
Richmond, VA	(804)	786-6359
Christiansted St. Croix, VI.....	(809)	772-1315
Olympia, WA	(360)	902-5638
Madison, WI	(608)	266-9383
Waukesha, WI	(262)	523-3044
Charleston, WV	(304)	558-7890
Cheyenne, WY.....	(307)	777-7786

Construction Focused Inspection Guidelines

This guideline is to assist the compliance officer to determine if there is an effective project plan to qualify for a Focused Inspection.

YES/NO

PROJECT SAFETY AND HEALTH COORDINATION: Are there procedures in place by the general contractor, prime contractor, or other such entity to ensure that all employers provide adequate protection for their employees?

Is there a DESIGNATED COMPETENT PERSON responsible for the implementation and monitoring of the project safety and health plan who is capable of identifying existing and predictable hazards and has authority to take prompt corrective measures?

PROJECT SAFETY AND HEALTH PROGRAM/PLAN* that complies with 1926 Subpart C and addresses, based upon the size and complexity of the project, the following:

_____ Project Safety Analysis at initiation and at critical stages that describes the sequence, procedures, and responsible individuals for safe construction.

_____ Identification of work/activities requiring planning, design, inspection, or supervision by an engineer, competent person, or other professional.

_____ Evaluation monitoring of subcontractors to determine conformance with the Project Plan. (The Project Plan may include, or be utilized by subcontractors.)

- _____ Supervisor and employee training according to the Project Plan including recognition, reporting, and avoidance of hazards, and applicable standards.
- _____ Procedures for controlling hazardous operations such as cranes, scaffolding, trenches, confined spaces, hot work, explosives, hazardous materials, leading edges, etc.
- _____ Documentation of training, permits, hazard reports, inspections, uncorrected hazards, incidents, and near misses.
- _____ Employee involvement in the hazard analysis, prevention, avoidance, correction, and reporting.
- _____ Project emergency response plan.

* FOR EXAMPLES, SEE OWNER AND CONTRACTOR ASSOCIATION MODEL PROGRAMS, ANSI A10.33, A10.38, ETC.

The walkaround and interviews confirmed that the Plan has been implemented, including:

- _____ The four leading hazards are addressed: falls, struck by, caught in\between, electrical.
- _____ Hazards are identified and corrected with preventative measures instituted in a timely manner.
- _____ Employees and supervisors are knowledgeable of the project safety and health plan, avoidance of hazards, applicable standards, and their rights and responsibilities.

THE PROJECT QUALIFIED FOR A FOCUSED INSPECTION.



**Occupational Safety
and Health Administration**

U.S. Department of Labor