

Construction Industry Digest



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

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The Construction Industry safety and health standards contained in this booklet are to aid employers, supervisors, and safety and health personnel in their efforts toward achieving compliance with OSHA standards in the workplace.

Although the digest does not contain all OSHA Construction Industry safety and health standards, those presented are (1) standards most frequently overlooked by the employer, and (2) standards covering particularly hazardous situations. The standards are presented alphabetically followed by the reference to the appropriate regulation. With few exceptions, standards in this digest are from *Title 29 of the Code of Federal Regulations (CFR), Part 1926*.

In addition, this booklet contains (1) a brief discussion of the essential elements of a generally applicable safety and health program, (2) a reminder to the employer of the advisability of regular employee training for job safety and health, and (3) a description of OSHA's voluntary programs such as Onsite Consultation Program and Voluntary Protection Programs (VPP) available to the employer.

Remember...this booklet is only a digest of basic applicable standards and should not be considered as a complete substitute for any provisions of the *Occupational Safety and Health Act of 1970*, or for any standards promulgated under the *Act*. The requirements contained herein are summarized and abbreviated. The actual source standards are referenced at the end of each topic discussed; the *CFR* should be consulted for a more complete explanation of the specific standards listed.

Copies of OSHA standards and additional copies of this digest can be ordered from the U.S. Government Printing Office by using the tearout form at the end of this booklet. Information on OSHA programs and activities also is available from OSHA's Web site— <http://www.osha.gov>.



Employers and contractors are advised and encouraged 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 includes 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 in the recognition and avoidance of unsafe conditions and the regulations 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 and or health risk exist.

These programs also may be conducted for assessing the actual extent of suspected or potential hazards, determining the feasibility of new or experimental compliance procedures, or evaluating 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.

The most recent SEP was developed to prevent workers' overexposure to crystalline silica in the construction industry. OSHA implemented this special emphasis program to teach the public about silicosis and to 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, in 1985, the 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 hazards are identified.

Other hazards in the construction industry where a standard may not exist include, but may not be limited to, exposure to asphalt fumes during paving operations. To help prevent exposure, manufactures, through partnership with OSHA, voluntarily agreed to install engineering controls on their paving machines. This initiative became effective January 1, 1997.

Another initiative involves OSHA's construction *Focused Inspection Initiative*, (see *Construction Focused Inspection Guidelines* at end of this publication), 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 web site at <http://www.osha.gov>.

In 1989, OSHA issued recommended guidelines for the effective management and protection of worker safety and health. These guidelines are summarized in the following paragraphs.¹

An effective occupational safety and health program will include the following four main elements: management commitment and employee involvement, worksite analysis, hazard prevention and control, and safety and health training.

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/or 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 program, 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 all personnel with responsibility at the site (and personnel 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 that 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 that 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 that 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 that assigned responsibilities can be met.
 - Hold managers, supervisors, and employees accountable for meeting their responsibilities so that essential tasks will be performed.
 - Review program operations at least annually to evaluate their success in meeting the goals and objectives so that deficiencies can be identified and the program and/or the objectives can be revised when 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. Unawareness 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. The following measures are recommended to identify all existing and potential hazards:

- Conduct 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 so that new or previously missed hazards and failures in hazard controls are identified.
 - 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 utilizes employee insight and experience in safety and health protection and allows employee concerns to be addressed.
 - Investigate accidents and "near miss" incidents so that their causes and means of prevention can be identified.
 - Analyze injury and illness trends over time so that patterns with common causes can be identified and prevented.
 - Use OSHA's Computer-Disk, Read-Only-Memory (CD-ROM)² to review case studies that might be pertinent to worksite analyses and hazard identification.

² OSHA's CD-ROM contains various data on standards, directives, and variances. Order from the U.S. Government Printing Office, Superintendent of Documents, Washington, DC 20402-9325, (202) 512-1800, fax (202) 512-2250. Order No. 729-1300000-5, \$38 per year (quarterly updates), or \$15 per single disk. Standards and other OSHA electronic information are available on OSHA's Web site <http://www.osha.gov>.

3. Hazard Prevention and Control

Where feasible, workplace hazards are prevented by effective design of the job site or job. Where it is not feasible to eliminate such hazards, they must be controlled to prevent unsafe and unhealthful exposure. Elimination or control must be accomplished in a timely manner once a hazard or potential hazards is recognize. 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 are understood and followed by all affected parties. 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 all persons 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 is often most effective when incorporated into other education or performance requirements and job practices. The complexity 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. Employee training programs should be designed to ensure that all employees understand and are aware of the hazards to which they may be exposed and the proper methods for avoiding such hazards.

Supervisory Training. Supervisors should be trained to understand the key role they play in job site safety and to enable them to carry out their safety and health responsibilities effectively. Training programs for supervisors should include the following topics:

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- 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.)

OSHA's area offices offer a variety of information services, such as publications, audiovisual aids, technical advice, and speakers for special engagements. OSHA's Training Institute in Des Plaines, IL, provides basic and advanced courses in safety and health for federal and state compliance officers, state consultants, federal agency personnel, and private sector employers, employees, and their representatives.

The OSHA Training Institute also has established OSHA Training Institute Education Centers to address the increased demand for its courses from the private sector and from other Federal agencies. These centers are nonprofit colleges, universities, and other organizations that have been selected after a competition for participation in the program.

OSHA also provides funds to nonprofit organizations, through grants, to conduct workplace training and education in subjects where OSHA believes there is a lack of workplace training. Grants are awarded annually. Grant recipients are expected to contribute a matching share of at least 20 percent of the total grant cost.

For more information on grants, training and education, contact the OSHA Training Institute, Office of Training and Education, 1555 Times Drive, Des Plaines, IL 60018, telephone (847) 297-4810; (847) 297-4874 (fax); or visit OSHA's Web site at <http://www.osha.gov>.

For further information on any OSHA program, contact your nearest OSHA area or regional office listed at the end of this booklet.

Free onsite safety and health consultation services are available in all states to employers who want help in establishing and maintaining a safe and healthful workplace. Primarily developed for smaller employers with more hazardous operations, the OSHA Consultation Service is largely funded by OSHA and is delivered by state governments employing professional safety consultants and health consultants. The full service assistance that is offered includes an appraisal of all mechanical systems, physical work practices, and occupational safety and health hazards of the workplace, and all aspects of the employer's present job safety and health program. In addition, the service offers assistance to employers in developing and implementing an effective workplace safety and health program that corrects and continuously addresses safety and health concerns.

This program is completely separate from OSHA's inspection efforts. No penalties are proposed or citations issued for any safety or health problems identified by the consultant. The service is confidential. The employer's name, the firm's name, and any information about the workplace, plus any unsafe or unhealthful working conditions that the consultant uncovers, will not be reported routinely to the OSHA inspection staff.

The only obligation is the employer's commitment to correct serious job safety and health hazards in a timely manner. The employer is asked to make this commitment prior to the actual visit.

The onsite consultants perform the following:

- Help recognize hazards in the workplace.
- Suggest general approaches or options for solving a safety or health problem.
- Assist the employer in developing or maintaining an effective safety and health program.
- Identify the kinds of help available for further assistance.
- Offer training and education for the employer and employees at the workplace.
- Provide the employer with a written report summarizing findings.
- Under specified circumstances, recommend the employer's worksite for recognition by OSHA and a 1-year exclusion from general scheduled enforcement inspections.
- Maintain lists of local providers of safety and industrial hygiene services.
- Routinely report possible violations to OSHA enforcement staff unless serious conditions identified by the consultant are not corrected within agreed upon time frames.

The onsite consultants will not:

- Issue citations or propose penalties for violations of OSHA standards.
- Routinely report possible violations to OSHA enforcement staff unless unabated serious conditions exist.
- Guarantee that the workplace will “pass” an OSHA inspection.

For more information on consultation programs and other sources of help, see the listings at the end of this booklet.



OSHA's Voluntary Protection Programs are designed to recognize and promote effective safety and health program management. In the VPP, management, labor and OSHA establish cooperative relationships at workplaces that have implemented strong programs.

Worksites in the construction industry are eligible to apply for participation in the VPP's *Star* or *Merit* programs, or may be interested in participating in the VPP's Construction Safety Excellence Demonstration Program. Sites qualifying for the VPP have met, and must continue to meet, rigorous participation standards. Benefits of VPP participation include improved employee motivation to work safely, leading to better quality and productivity; lost workday case rates that generally are 60 to 80 percent below industry averages; reduced workers' compensation and other injury- and illness-related costs; positive community recognition and interaction; further improvement and revitalization of already good safety and health programs; and partnership with OSHA.

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

For additional information about the VPP, contact the VPP Manager in your OSHA regional or area office listed at the end of this booklet.

Abrasive 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) & (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 (0.3175 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)**

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) & .33(b)(3). Text can be found in 29 CFR 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 29 CFR 1910.1020(d).**

Accident Recordkeeping and Reporting Requirements

Each employer shall maintain in each establishment a log and summary (OSHA Form No. 200 or equivalent) of all recordable injuries and illnesses (resulting in a fatality, hospitalization, lost workdays, medical treatment, job transfer or termination, or loss of consciousness) for that establishment, and enter each recordable event no later than 6 working days after receiving the information. Where the complete log and summary records are maintained at a place other than the establishment, a copy of the log that reflects the injury and illnesses experience of the establishment must be complete and current to date within 45 calendar days and must be available at the original site. **1904.2(a) & (b)(2)**

In addition to the log of occupational injuries and illnesses, each employer shall have available for inspection at each establishment within 6 working days after notification of a recordable case, a supplementary record (OSHA Form No. 101 or equivalent) for each occupational injury or illness for that establishment. **1904.4**

Each employer shall post an annual summary of occupational injuries and illnesses for each establishment, compiled from the collected OSHA Form No. 200, which includes the year's totals, calendar year covered, company name, establishment name and address, certification signature, title, and date. An OSHA Form No. 200 shall be used in presenting the summary. The summary shall be posted by February 1 of each year and shall remain in place until March 1 of the same year. **1904.5(a) & (d)(1)**

The log and summary, the supplementary record, and the annual summary shall be retained in each establishment for 5 years following the end of the year to which they relate. Records shall be made available, as authorized, upon request. **1904.6 & .7(a) thru (b)**

Within 8 hours after its occurrence, an employment accident that is fatal to one or more employees or that results in the over-night hospitalization of three or more employees shall be reported by the employer, either orally or in writing, to the nearest OSHA area director. **1904.8**

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,
wearing personal fall protection and attaching
the lanyard to the boom or basket, 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) & 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 (1.27-centimeter)
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) thru (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
- 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)**

The unused run of the sanding belt shall be guarded against accidental contact. **1926.304(f)**

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) thru (2)**

Oxygen and fuel gas 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) 832-9500). **1926.703(e)(1)(i) thru (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 (1.2192 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 (2.4384 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) thru (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 poten-



tially 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 (1.2192 meters) such as pits, tubs, vaults, and vessels. **1926.21(b)(6)(i) thru (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 (3.048 meters) of a line rated 50 kilovolts (kV) or below; 10 feet (3.048 meters) plus 0.4 inches

(10.16 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 (3.048 meters). **1926.550(a)(15)(i) thru (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*. (ANSI, 11 West 42nd Street, New York, NY 10036; (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 (6.096 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 barri-



acades not less than 42 inches high (106.68 centimeters) and not less than 6 feet (1.8288 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.

1926.1080(a)(1). Text can be found in 29 CFR 1910.420(a)

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. **1926.1084(d). Text can be found in 29 CFR 1910.423(d)**

Each dive team member shall have the experience or training necessary to perform assigned tasks safely. **1926.1076(a)(1). Text can be found in 29 CFR 1910.410(a)(1)**

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

Text can be found in 29 CFR 1910.421(f)

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. **1926.1082(i).**

Text can be found in 29 CFR 1910.422(i)

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.
- (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) thru (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) & .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) thru (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 (1.524 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) thru (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 (0.6096 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 (1.2192 meters) or more in depth so as to require no more than 25 feet (7.62 meters) of lateral travel for employees. **1926.651(c)(2)**

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. **1926.904(a)**

Smoking and open flames shall not be permitted within 50 feet (15.24 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. **1926.102(b)(1)**

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 (1.8288 meters) or more from an unprotected side or edge, the employer must select either a guard-rail 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, a body harness and may include a lanyard, a deceleration device, lifeline or a suitable combination of these. Effective January 1, 1998, body belts used for fall arrests are prohibited. **1926.500(b) & 1926.502(d)**

Each employee in a hoist area shall be protected from falling 6 feet (1.8288 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 (1.8288 meters) above lower levels. **1926.501(b)(4)**

Each employee at the edge of an excavation 6 feet deep (1.8288 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 (1.8288 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 (1.288 meters) or more by guardrail systems. **1926.501(b)(6)**

Each employee performing overhand bricklaying and related work 6 feet (1.8288 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 (25.40 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 (1.8288 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 (15.24 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 (1.8288 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, shall be periodically inspected, and be maintained in operating condition. **1926.150(a)(2) thru (4)**

A fire extinguisher, rated not less than 2A, 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 (30.48 meter). Acceptable substitutes are a 1/2-inch (1.27-centimeters) diameter garden-type hose not to exceed 100 feet (30.48 meters) and capable of discharging a minimum of 5 gallons per minute, or a 55-gallon drum of water with two fire pails. **1926.150(c)(1)(i) thru (iii)**

One or more fire extinguishers, rated not less than 2A, shall be provided on each floor. In multistory buildings, at least one fire extinguisher shall be located adjacent to stairway. **1926.150(c)(1)(iv)**

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)**

Flagmen

When signs, signals, and barricades do not provide necessary protection on or adjacent to a highway or street, flagmen or other appropriate traffic controls shall be provided. **1926.201(a)(1)**

Flagmen shall be provided with and shall wear a red or orange warning garment while flagging. Warning garments worn at night shall be of reflectorized material. **1926.201(a)(4)**

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 (94.75 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) thru (3)**

Inside storage rooms for flammable and combustible liquids shall be of fire-resistive construction, have self-closing fire doors at all openings, 4 inch (10.16 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 (6.096 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) thru (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 TLVs. **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. **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.”

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) & 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) thru (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. **1926.59(e)(1)(i) thru (ii). Text can be found in 29 CFR 1910.1200(e)(1) & (e)(4)**

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. **1926.59(f)(5)(i) thru (ii). Text can be found in 29 CFR 1910.1200(e)(2) & (f)(1)**

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. **1926.59(g)(1). Text can be found in 29 CFR 1910.1200(g)(1)**

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. **1926.59(h)(1)(i) thru (iii). Text can be found in 29 CFR 1910.1200(h)(1) & (2)(i) thru (iii)**

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. **1926.59(e)(2). Text can be found in 29 CFR 1910.1200(e)(2)**

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) & .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,

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- 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, & 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. **1926.552(b)(2)**

Hoistway doors or gates of personnel hoist shall be not less than 6 feet 6 inches (198.12 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) & (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)**

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) thru (iii) & (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 (0.9144 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) & (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 (25.40 centimeters) apart, nor more than 14 inches (35.56 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 (48.26 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) thru (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;

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- 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) & (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) thru (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) & (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 trained to render first aid shall be available at the worksite. **1926.50(c)**

First-aid supplies approved by the consulting physician should be readily available.

1926.50(d)(1)

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) thru (ii) & 602(a)(9)(i) thru (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) & 1926.95(a) thru (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) thru (3)**

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

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) thru (f), (h) thru (i), & (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) thru (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) thru (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 (106.68 centimeters), plus or minus 3 inches (7.62 centimeters) above the walking/working level.

1926.502(b)(1)

Guardrail systems shall be smooth-surfaced, 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) & (6)**

A stair railing shall be of construction similar to a standard railing with a vertical height of 36 inches (91.44 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)

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. **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.

1926.103(a)(2)

Respiratory protective devices shall be appropriate for the hazardous material involved and the extent and nature of the work requirements and conditions. **1926.103(b)(2)**

Employees required to use respiratory protective devices shall be thoroughly trained in their use. **1926.103(c)(1)**

Respiratory protective equipment shall be inspected regularly and maintained in good condition. **1926.103(c)(2)**

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 (91.44 meters) below such level. When nets are used on bridges, the poten-



tial 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

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)**

Band saw wheels shall be fully encased. **1926.304(f)**

Saws, Portable Circular

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)**

Saws, Radial

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)**

Radial saws shall be installed so that the cutting head will return to the starting position when released by the operator. **1926.304(f)**

Saws, Swing or Sliding Cut-Off

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)**

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)**

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)**

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)**

Saws, Table

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 centimeter) behind the largest



blade mounted in the saw. This provision does not apply when grooving, dadoing, or rabbeting. **1926.304(f)**

Circular table saws used for ripping shall have nonkickback fingers or dogs. **1926.304(f)**

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

Scaffold means 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)**

Fall protection—such as guardrail and personal fall arrest systems—must be provided for each employee working on a scaffold more than 10 feet (3.048 meters) above a lower level. **1926.451(g)(1)**

Effective September 2, 1997, the employer shall have a competent person to determine the feasibility and safety of providing fall protection for employees erecting or dismantling supported scaffolds. **1926.451(g)(2)**

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. Scaffolds shall be designed by a qualified person and constructed and loaded in accordance with such design. 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)(6), & (f)(1)**

The scaffold platform shall be planked or decked as fully as possible with the space between the platform and uprights not more than 1 inch (2.54 centimeters) wide. When side brackets or odd shaped structures result in a wider opening between the platform and the uprights, the space shall not exceed 9.5 inches (24.1 centimeters). The platform shall not deflect more than 1/60 of the span when loaded. **1926.451(b)(1) & (f)(16)**

The work area for each scaffold platform and the walkway shall be at least 18 inches (45.72 centimeters) wide. When the work area must be less than 18 inches (45.72 centimeters) wide, guardrails and/or personal fall arrest systems shall be used. **1926.451(b)(2)**

Access must be provided when the scaffold platforms are more than 2 feet (60.96 meters) above or below a point of access. Direct access is acceptable when the scaffold is not more than 14 inches (35.56 centimeters) horizontally and not more than 24 inches (60.96 centimeters) vertically from the other surfaces. Crossbraces shall not be used as a means of access. **1926.451(e)(1) & (e)(8)**

A competent person shall inspect scaffolds, scaffold components, and ropes on suspended scaffolds before each work shift and after any occurrence that could affect the structural integrity. He or she also must ensure that prompt corrective action is taken. **1926.450(b) & 1926.450(f)(3) & (f)(10)**



Stilts may be used on a large area scaffold. (A large area scaffold is a pole, tube and coupler, systems or fabricated frame scaffold erected over substantially the entire work area.) **1926.451(b)**

When a guardrail system is used, the guardrail height shall be equal to the height of the stilts. Any alterations to the stilts shall be approved by the manufacturer. **1926.452(y)**

Bricklaying

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

Erectors and Dismantlers

Effective September 2, 1997, the employer shall provide safe means of access for each employee erecting or dismantling supported scaffolds where the provisions of safe access is feasible and does not create a greater hazard. The determination shall be made by a competent person based on his or her analysis of the site conditions. **1926.451(e)**

Fall Arrest Systems

Personal fall arrest systems include body belts or harnesses, and components of the harness belt, such as Dee-rings, snaphooks, lifelines, and anchorage points. Effective January 1, 1998, body belts are prohibited. **1926.451(g)(3)**

Vertical or horizontal lifelines may be used.

1926.451(g)(3)(ii) thru (iv)

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

When working from an aerial lift, the lanyard shall be attached to the boom or basket.

1926.453(b)(2)(v)

When lanyards are connected to horizontal lifelines or structural members on single or two point adjustable scaffolds, the scaffold shall be equipped with additional independent support lines that are equal in number and strength to the suspension lines and have automatic locking devices. **1926.451(g)(3)(iii)**

Guardrails

Guardrails systems shall be installed along all open sides and ends of platforms. Guardrails systems shall be installed before the scaffold is released for use by employees other than erection/dismantling. Guardrails are not required on the front edge of a platform if the front edge of the platform is less than 14 inches (35.56 centimeters) from the face of the work, when plastering and lathing is being done 18 inches (45.72 centimeters) or less from the front edge, and when outrigger scaffolds are 3 inches (7.62 centimeters) or less from the front edge.

1926.451 (b)(3) & (g)(4)

The top edge height of toprail for scaffolds manufactured and placed in service before January 1, 2000, can be between 36 inches (91.44



centimeters) and 45 inches (114 centimeters). The height of the toprail for scaffolds manufactured and placed in service after January 1, 2000, can be between 38 inches (97 centimeters) and 45 inches (114 centimeters). **1926.451(g)(4)(ii)**

Midrails shall be installed approximately halfway between the toprail and the platform surface. **1926.451(g)(4)(iii)**

When screens and mesh are used, 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 crossbracing is acceptable for a toprail when the crossing point of the two braces is between 38 inches (97 centimeters) and 48 inches (1.3 centimeters) above the work platform. Crossbracing is also acceptable for midrails when between 20 inches (50.80 centimeters) and 30 inches (76.20 centimeters) above the work platform. The end points of the crossbracing shall be no more than 48 inches (1.3 centimeters) apart vertically. **1926.451(g)(4)(xv)**

Planking

Scaffold planking shall be capable of supporting, without failure, its own weight and at least 4 time the intended load. Solid sawn wood, fabricated planks, and fabricated platforms may be used as scaffold planks following the manufacturer, a lumber grading association, or an inspection agency's recommendations. (See Appendix A of Subpart L for tables showing maximum permissible spans, rated load capacity, and nominal thickness.) **1926.451(a)(1)**

Supported Scaffolds

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

Supported scaffold poles, legs, posts, frames, and uprights shall bear on base plates and mud sills, or other adequate firm foundations.

1926.451(c)(2)(i) thru (ii)

Supported scaffolds with a height to base width ratio of more than four to one shall be restrained from tipping by guying, tying, bracing or equivalent means. **1926.451(c)**

Guys, ties, and braces shall be installed according to the scaffold manufacturer's recommendations or at the closest horizontal member to the 4:1 height and be repeated vertically at locations of horizontal members every 20 feet (6.096 meters) or less thereafter for scaffolds 3 feet (0.9144 meters) wide or less, and every 26 feet (7.9248 meters) or less thereafter for scaffolds greater than 3 feet (0.9144 meters) wide. The top guy, tie or brace of completed scaffolds shall be placed no further than the 4:1 height from the top. Such guys, ties and braces shall be installed at each end of the scaffold and at horizontal intervals not to exceed 30 feet (9.144 meters) (measured from one end [not both] towards the other). **1926.451(c)(1)**



Suspension Scaffolds

A suspension scaffold means one or more platforms suspended by ropes or other non-rigid means from an overhead structure. **1926.450(b)**

Each employee on a scaffold more than 10 feet (3.048 meters) above a lower level shall be protected by guardrails, a personal fall arrest system, or both. **1926.451(g)**

Fall arrest and guardrail systems must be used when working on single and two point adjustable suspension scaffolds and on self-contained adjustable scaffolds that are supported by ropes. **1926.451(g)(1)**

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)**

Drum hoists shall contain no less than 4 wraps of the rope at the lowest point. **1926.451(d)(6)**

All support devices shall rest on surfaces capable of supporting at least 4 times the load imposed on them by the scaffold when operating at the rated load of the hoist (or at least 1.5 times the load imposed on them by the scaffold at the stall capacity of the hoist, whichever is greater). The stall load of any scaffold hoist shall not exceed 3 times its rated load. The stall load is the load at which the prime-mover of a power-operated hoist stalls or the power to the

prime-mover is automatically disconnected.

1926.451(a)(5) & (d)(1)

When scaffold platforms are more than 24 inches (60.96 centimeters) above or below a point of access, ladders, ramps, walkways or similar surfaces shall be used. When using direct access, the surface shall not be more than 24 inches (60.96 centimeters) above the surface or 14 inches (35.56 centimeters) horizontally from the surface. **1926.451(e)(1) & (e)(8)**

Counterweights, used to balance adjustable suspension scaffolds, shall be capable of resisting at least 4 times the tipping moment imposed by the scaffold operating at the rated load of the hoist, or 1.5 (minimum) times the tipping moment imposed by the scaffold operating at the stall load of the hoist, whichever is greater.

1926.451(a)(2)

Only those items specifically designed as counterweights shall be used. **1926.451(d)(3)(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)

Vertical lifelines shall not be fastened to counterweights. **1926.451(g)(3)(i)**

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

A single tie back 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)**

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 conduits.

1926.451(d)(3)(ix) & (d)(5)

Training

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 electrical hazards, fall hazards, falling object hazards, the maintenance and disassemble of the fall protection systems; the use of the scaffolds, handing of materials, and the maximum intended load carrying capacity. **1926.454(a)**

Employers who erect, disassemble, move, operate, repair, maintain, or inspect a scaffold shall be trained by a *competent person*. The training shall include such topics as the nature of the hazards, and the correct procedures for erecting, disassembling, moving, operating, repairing, inspecting, and maintaining the type of scaffolds in use. Recommended training includes erection and dismantling planning, personal protective equipment, access, guys and braces, and parts inspection. **1926.454(b) & Appendix D**

Stairs

A stairway or ladder must be provided at all worker points of access where there is a break in elevation of 19 inches (48.26 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 (76.20 x 55.88 centimeters) at every 12 feet (3.6576 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 (50.80 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 (76.20 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 (93.98 centimeters) nor less than 36 inches (91.44 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) thru (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 (93.98 centimeters) nor less than 30 inches (76.20 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 (93.98 centimeters) nor less than 36 inches (91.44 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 (7.62 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

Permanent floors shall be installed so there is not more than eight stories between the erection floor and the uppermost permanent floor, except when structural integrity is maintained by the design. **1926.750(a)(1)**

During skeleton steel erection, a tightly planked temporary floor shall be maintained within two stories or 30 feet (9.144 meters),



whichever is less, below and directly under that portion of each tier of beams on which any work is being performed. **1926.750(b)(2)(i)**

During skeleton steel erection of buildings and structures not adaptable to temporary floors, and where scaffolds are not used, safety nets shall be installed and maintained whenever the potential fall distance exceeds two stories or 25 feet (7.62 meters). **1926.750(b)(1)(ii)**

A safety railing of 1/2-inch (1.27-centimeter) wire rope or equivalent shall be installed around the perimeter of all temporarily floored buildings, approximately 42 inches high (106.68 centimeters), during structural steel assembly.

1926.750(b)(1)(iii)

When placing structural members, the load shall not be released from the hoisting line until the member is secured by at least two bolts, or the equivalent, at each connection, and drawn up wrench tight. **1926.751(a)**

For all types of steel erection, including skeleton steel, towers, tanks, and bridges; safety nets and personal fall arrest systems must be used as fall protection when working more than 25 feet (7.62 meters) above the ground, water, or other surfaces. **1926.104 & 105**

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

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 (1.8288 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. **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

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) & 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) thru (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 (3.048 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) thru (2), & (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) & (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) thru(iv); (c)(2)(i) thru(iv); (d)(1)(iv) & (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)

Number and Spacing of U-Bolt Wire Rope Clips

Improved plow steel, rope diameter (inches)	Number of clips		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)

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)



Single free copies of the following publications can be obtained from the U.S. Department of Labor, OSHA Publications Office, P.O. Box 37535, Washington, DC 20013-7535, (202) 219-4667, (202) 219-9266 (fax), or from the nearest OSHA regional or area office listed at the end of this publication. Send a self-addressed mailing label with your request.

All About OSHA — OSHA 2056

Chemical Hazard Communication —
OSHA 3084

Concrete and Masonry Construction —
OSHA 3106

Consultation Services for the Employer —
OSHA 3047

Employee Workplace Rights — OSHA 3021

*Employer Responsibility and Course of
Action Following an OSHA Inspection* —
OSHA 3000

*4,4'Methylenedianiline (MDA) in the
Construction Industry* — OSHA 3137

*Ground Fault Protection on Construction
Sites* — OSHA 3007

Lead in Construction — OSHA 3142

*Occupational Exposure to Bloodborne
Pathogens* — OSHA 3127

Occupational Safety and Health Poster —
OSHA 2200

The following publications are available from the U.S. Government Printing Office, Superintendent of Documents, Washington, DC 20402, (202) 512-1800, (202) 512-2250 (fax). Include GPO Order No. and make checks payable to Superintendent of Documents.

Hazard Communication-A Compliance Kit — OSHA 3104
Order No. 029-016-00147-6; \$18,
(Foreign \$22.50).

Job Hazard Analysis — OSHA 3071
Order No. 029-016-00142-5; \$1.00.

Job Safety & Health Quarterly —
Order #JSH; \$9.50/year (Foreign \$11.90)

OSHA Handbook for Small Businesses —
OSHA 2209
Order No. 029-016-0017-60; \$6.50.

***Training Requirements in OSHA Standards
and Training Guidelines*** — OSHA 2254
Order No. 029-016- 00160-3; \$6.00.

The Occupational Safety and Health Act of 1970 encourages states to develop and operate their own job safety and health plans. States with plans approved under section 18(b) of the Act must adopt standards and enforce requirements that are at least as effective as federal requirements. There are currently 25 state plan states and territories: 23 covering both private and public (state and local government) employees and two covering public sector employees only.

Plan states must adopt standards comparable (but not necessarily identical) to the federal within 6 months of a federal standard's promulgation. Until a state standard is promulgated, OSHA will provide interim enforcement assistance, as appropriate, in these states.

The following states operate approved plans:

Commissioner

Alaska Department of Labor
1111 West 8th Street
Room 306
Juneau, AK 99801
(907) 465-2700

Director

Industrial Commission of Arizona
800 W. Washington
Phoenix, AZ 85007
(602) 542-5795

Director

California Department of Industrial Relations
45 Fremont Street
San Francisco, CA 94105
(415) 972-8835

Commissioner

Connecticut Department of Labor
200 Folly Brook Boulevard
Wethersfield, CT 06109
(860) 566-5123

Director

Hawaii Department of Labor and Industrial Relations
830 Punchbowl Street
Honolulu, HI 96813
(808) 586-8844

Commissioner

Indiana Department of Labor
State Office Building
402 West Washington Street
Room W195
Indianapolis, IN 46204
(317) 232-2378



Commissioner

Iowa Division of Labor Services
1000 E. Grand Avenue
Des Moines, IA 50319
(515) 281-3447

Secretary

Kentucky Labor Cabinet
1047 U.S. Highway, 127 South, Suite 2
Frankfort, KY 40601
(502) 564-3070

Commissioner

Maryland Division of Labor and Industry
Department of Labor Licensing and Regulation
1100 N. Eutaw Street, Room 613
Baltimore, MD 21202-2206
(410) 767-2215

Director

Michigan Department of Consumer and Industry Services
4th Floor, Law Building
P.O. Box 30004
Lansing, MI 48909
(517) 373-7230

Commissioner

Minnesota Department of Labor and Industry
443 Lafayette Road
St. Paul, MN 55155
(612) 296-2342

Administrator

Nevada Division of Industrial Relations
400 West King Street
Carson City, NV 89710
(702) 687-3032

Secretary

New Mexico Environment Department
1190 St. Francis Drive
P.O. Box 26110
Santa Fe, NM 87502
(505) 827-2850

Commissioner

New York Department of Labor
W. Averell Harriman State Office
Building -12
Room 500
Albany, NY 12240
(518) 457-2741

Commissioner

North Carolina Department of Labor
319 Chapanoke Road
Raleigh, NC 27603
(919) 662-4585

Administrator

Department of Consumer and Business Services
Occupational Safety and Health Division
(OR-OSHA)
350 Winter Street, N.E., Room 430
Salem, OR 97310-0220
(503) 378-3272

Secretary

Puerto Rico Department of Labor
and Human Resources
Prudencio Rivera Martinez Building
505 Munoz Rivera Avenue
Hato Rey, PR 00918
(809) 754-2119



Director

South Carolina Department
of Labor, Licensing, and Regulation
Koger Office Park-Kingstree Building
110 Centerview Drive
Columbia, SC 29210
(803) 896-4300

Commissioner

Tennessee Department of Labor
Attention: Robert Taylor
710 James Robertson Parkway
Nashville, TN 37243-0659
(615) 741-2582

Commissioner

Industrial Commission of Utah
160 East 300 South, 3rd Floor
P.O. Box 146650
Salt Lake City, UT 84114-6650
(801) 530-6898

Commissioner

Vermont Department of Labor and Industry
National Life Building - Drawer 20
120 State Street
Montpelier, VT 05620
(802) 828-2288

Commissioner

Virginia Department of Labor and Industry
Powers-Taylor Building
13 South 13th Street
Richmond, VA 23219
(804) 786-2377

Commissioner

Virgin Islands Department of Labor
2131 Hospital Street Box 890
Christiansted
St. Croix, VI 00820-4666
(809) 773-1994

Director

Washington Department of Labor and Industries
General Administration Building
P.O. Box 44001
Olympia, WA 98504-4001
(360) 902-4200

Administrator

Workers' Safety and Compensation Division (WSC)
Wyoming Department of Employment
Herschler Building
2nd Floor East
122 West 25th Street
Cheyenne, WY 82002
(307) 777-7786

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(H) - Health

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Denver, CO 80202-5716
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San Francisco, CA 94105
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Region X

(AK,* ID, OR,* WA*)
1111 Third Avenue
Suite 715
Seattle, WA 98101-3212
Telephone: (206) 553-5930

*These states and territories operate their own OSHA-approved job safety and health programs (Connecticut 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.

Construction Focused Inspection Guidelines

<p>This guideline is to assist the compliance officer to determine if there is an effective project plan to qualify for a Focused Inspection.</p>	YES/NO
<p>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?</p>	
<p>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?</p>	
<p>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:</p> <ul style="list-style-type: none"> _____ 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, ANSIA10.33, 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.

