



**Cal/OSHA, DOT HAZMAT, EEOC,
EPA, HAZWOPER, HIPAA, IATA,
IMDG, TDG, MSHA, OSHA, and
Canada OHS Regulations and
Safety Online Training**

Since 2008

This document is provided as a training aid
and may not reflect current laws and regulations.

Be sure and consult with the appropriate governing agencies
or publication providers listed in the "Resources" section of our website.

www.ComplianceTrainingOnline.com



[Facebook](#)



[LinkedIn](#)



[Twitter](#)



[Website](#)

This information is provided free of charge by the Department of Industrial Relations from its web site at www.dir.ca.gov. These regulations are for the convenience of the user and no representation or warranty is made that the information is current or accurate. See full disclaimer at http://www.dir.ca.gov/od_pub/disclaimer.html.

Subchapter 4. Construction Safety Orders

Article 6. Excavations

[Return to index](#)
[New query](#)

§ 1541. General Requirements.

(a) Surface encumbrances. All surface encumbrances that are located so as to create a hazard to employees shall be removed or supported, as necessary, to safeguard employees.

(b) Subsurface installations.

(1) The approximate location of subsurface installations, such as sewer, telephone, fuel, electric, water lines, or any other subsurface installations that reasonably may be expected to be encountered during excavation work, shall be determined by the excavator prior to opening an excavation.

(A) Excavation shall not commence until:

1. The excavation area has been marked as specified in Government Code Section 4216.2 by the excavator; and

2. The excavator has received a positive response from all known owner/operators of subsurface installations within the boundaries of the proposed project; those responses confirm that the owner/operators have located their installations, and those responses either advise the excavator of those locations or advise the excavator that the owner/operator does not operate a subsurface installation that would be affected by the proposed excavation.

(B) When the excavation is proposed within 10 feet of a high priority subsurface installation, the excavator shall be notified by the facility owner/operator of the existence of the high priority subsurface installation before the legal excavation start date and time in accordance with Government Code Section 4216.2(a), and an onsite meeting involving the excavator and the subsurface installation owner/operator's representative shall be scheduled by the excavator and the owner/operator at a mutually agreed on time to determine the action or activities required to verify the location of such installations. High priority subsurface installations are high pressure natural gas pipelines with normal operating pressures greater than 415 kPA gauge (60 p.s.i.g.), petroleum pipelines, pressurized sewage pipelines, conductors or cables that have a potential to ground of 60,000 volts or more, or hazardous materials pipelines that are potentially hazardous to employees, or the public, if damaged.

(C) Only qualified persons shall perform subsurface installation locating activities, and all such activities shall be performed in accordance with this section and Government Code Sections 4216 through 4216.9. Persons who complete a training program in accordance with the requirements of Section 1509, Injury and Illness Prevention Program (IIPP), that meets the minimum training guidelines and practices of the Common Ground Alliance (CGA) Best Practices, Version 3.0, published March 2006, or the standards of the National Utility Locating Contractors Association (NULCA), Standard 101: Professional Competence Standards for Locating Technicians, 2001, First Edition, which are incorporated by reference, shall be deemed qualified for the purpose of this section.

(D) Employees who are involved in the excavation operation and exposed to excavation operation hazards shall be trained in the excavator notification and excavation practices required by this section and Government Code Sections 4216 through 4216.9.

(2) All Regional Notification Centers as defined by Government Code Section 4216(j) in the area involved and all known owners of subsurface facilities in the area who are not members of a Notification Center shall be advised of the proposed work at least 2 working days prior to the start of any digging or excavation work. EXCEPTION: Repair work to subsurface facilities done in response to an emergency as defined in Government Code Section 4216(d).

(3) When excavation or boring operations approach the approximate location of subsurface installations, the exact location of the installations shall be determined by safe and acceptable means that will prevent damage to the subsurface installation, as provided by Government Code Section 4216.4.

(4) While the excavation is open, subsurface installations shall be protected, supported, or removed as necessary to safeguard employees.

(5) An excavator discovering or causing damages to a subsurface installation shall immediately notify the facility owner/operator or contact the Regional Notification Center to obtain subsurface installation operator contact information immediately after which the excavator shall notify the facility operator. All breaks, leaks, nicks, dents, gouges, grooves, or other damages to an installation's lines, conduits, coatings or cathodic protection shall be reported to the subsurface installation operator. If damage to a high priority subsurface installation results in the escape of any flammable, toxic, or corrosive gas or liquid or endangers life, health or property, the excavator responsible shall immediately notify 911, or if 911 is unavailable, the appropriate emergency response personnel having jurisdiction. The facility owner/operator shall also be contacted.

Note: The terms excavator and operator as used in Section 1541(b) shall be as defined in Government Code Section 4216(c) and (h) respectively. The term "owner/operator" means an operator as the term "operator" is defined in Government Code Section 4216(h).

(c) Access and egress.

(1) Structural ramps.

(A) Structural ramps that are used solely by employees as a means of access or egress from excavations shall be designed by a competent person. Structural ramps used for access or egress of equipment shall be designed by a competent person qualified in structural design, and shall be constructed in accordance with the design.

(B) Ramps and runways constructed of two or more structural members shall have the structural members connected together to prevent displacement.

(C) Structural members used for ramps and runways shall be of uniform thickness.

(D) Cleats or other appropriate means used to connect runway structural members shall be attached to the bottom of the runway or shall be attached in a manner to prevent tripping.

(E) Structural ramps used in lieu of steps shall be provided with cleats or other surface treatments to the top surface to prevent slipping.

(2) Means of egress from trench excavations.

A stairway, ladder, ramp or other safe means of egress shall be located in trench excavations that are 4 feet or more in depth so as to require no more than 25 feet of lateral travel for employees.

(d) Exposure to vehicular traffic. Employees exposed to public vehicular traffic shall be provided with, and shall wear, warning vests or other suitable garments marked with or made of reflectorized or high-visibility material.

(e) Exposure to falling loads. No employee shall be permitted underneath loads handled by lifting or digging equipment. Employees shall be required to stand away from any vehicle being loaded or unloaded to avoid being struck by any spillage or falling materials. Operators may remain in the cabs of vehicles being loaded or unloaded when the vehicles are equipped, in accordance with Section 1591(e), to provide adequate protection for the operator during loading and unloading operations.

(f) Warning system for mobile equipment. When mobile equipment is operated adjacent to an excavation, or when such equipment is required to approach the edge of an excavation, and the operator does not have a clear and direct view of the edge of the excavation, a warning system shall be utilized such as barricades, hand or mechanical signals, or stop logs. If possible, the grade should be away from the excavation.

(g) Hazardous atmospheres.

(1) Testing and controls. In addition to the requirements set forth in the Construction Safety Orders and the General Industry Safety Orders to prevent exposure to harmful levels of atmospheric contaminants and to assure acceptable atmospheric conditions, the following requirements shall apply:

(A) Where oxygen deficiency (atmospheres containing less than 19.5 percent oxygen) or a hazardous atmosphere exists or could reasonably be expected to exist, such as in excavations in landfill areas or excavations in areas where hazardous substances are stored nearby, the atmospheres in the excavation shall be tested before employees enter excavations greater than 4 feet in depth.

(B) Adequate precautions shall be taken to prevent employee exposure to atmospheres containing less than 19.5 percent oxygen and other hazardous atmospheres. These precautions include providing proper respiratory protection or ventilation.

(C) Adequate precaution shall be taken such as providing ventilation, to prevent employee exposure to an atmosphere containing a concentration of a flammable gas in excess of 20 percent of the lower flammable limit of the gas.

(D) When controls are used that are intended to reduce the level of atmospheric contaminants to acceptable levels, testing shall be conducted as often as necessary to ensure that the atmosphere remains safe.

(2) Emergency rescue equipment.

(A) Emergency rescue equipment, such as breathing apparatus, a safety harness and line, or a basket stretcher, shall be readily available where hazardous atmospheric conditions exist or may reasonably be expected to develop during work in an excavation. This equipment shall be attended when in use.

(B) Employees entering bell-bottom pier holes, or other similar deep and confined footing excavations, shall wear a harness with a lifeline securely attached to it. The lifeline shall be separate from any line used to handle materials, and shall be individually attended at all times while the employee wearing the lifeline is in the excavation.

(3) Whenever internal combustion engine-driven equipment is operated inside a shaft subject to Section 1542 of these Orders, a ventilation system shall be provided and operated in accordance with Sections 1530 and 1533(b) of these Orders.

Note: For shafts greater than 20 feet in depth and excavations unrelated to the Construction Safety Orders, refer to Title 8, Division 1, Chapter 4, Subchapter 20, the Tunnel Safety Orders.

(h) Protection from hazards associated with water accumulation.

(1) Employees shall not work in excavations in which there is accumulated water, or in excavations in which water is accumulating, unless adequate precautions have been taken to protect employees against the hazards posed by water accumulation. The precautions necessary to protect employees adequately vary with each situation, but could include special support or shield systems to protect from cave-ins, water removal to control the level of accumulating water, or use of a safety harness and lifeline.

(2) If water is controlled or prevented from accumulating by the use of water removal equipment, the water removal equipment and operations shall be monitored by a competent person to ensure proper operation.

(3) If excavation work interrupts the natural drainage of surface water (such as streams), diversion ditches, dikes, or other suitable means shall be used to prevent surface water from entering the excavation and to provide adequate drainage of the area adjacent to the excavation. Excavations subject to runoff from heavy rains will require an inspection by a competent person and compliance with Sections 1541 (h)(1) and (h)(2).

(i) Stability of adjacent structures.

(1) Where the stability of adjoining buildings, walls, or other structures is endangered by excavation operations, support systems such as shoring, bracing, or underpinning shall be provided to ensure the stability of such structures for the protection of employees.

(2) Excavation below the level of the base or footing of any foundation or retaining wall that could be reasonably expected to pose a hazard to employees shall not be permitted except when:

(A) A support system, such as underpinning, is provided to ensure the safety of employees and the stability of the structure; or

(B) The excavation is in stable rock; or

(C) A registered professional engineer has approved the determination that such excavation work will

not pose a hazard to employees.

(3) Sidewalks, pavements and appurtenant structure shall not be undermined unless a support system or another method of protection is provided to protect employees from the possible collapse of such structures.

(j) Protection of employees from loose rock or soil.

(1) Adequate protection shall be provided to protect employees from loose rock or soil that could pose a hazard by falling or rolling from an excavation face. Such protection shall consist of scaling to remove loose material; installation of protective barricades at intervals as necessary on the face to stop and contain falling material; or other means that provide equivalent protection.

(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 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.

(k) Inspection.

(1) 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 rain storm or other hazard increasing occurrence. These inspections are only required when employee exposure can be reasonably anticipated.

(2) Where the 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.

(l) Fall protection.

(1) Where employees or equipment are required or permitted to cross over excavations over 6-feet in depth and wider than 30 inches, walkways or bridges with standard guardrails shall be provided.

(2) Adequate barrier physical protection shall be provided at all remotely located excavations. All wells, pits, shafts, etc., shall be barricaded or covered. Upon completion of exploration and other similar operations, temporary wells, pits, shafts, etc., shall be backfilled.

Note: Authority cited: Section 142.3, Labor Code. Reference: Section 142.3, Labor Code; and Section 4216, Government Code.

HISTORY

1. Repealer and new section filed 8-23-82; effective thirtieth day thereafter (Register 82, No. 35). For prior history, see Registers 75, No. 21; 74, No. 35; and 74, No. 17.

2. Repealer and new section filed 8-26-91; operative 9-25-91 (Register 92, No. 13).

3. Change without regulatory effect amending subsection (h)(3) filed 10-22-92 pursuant to section 100, title 1, California Code of Regulations (Register 92, No. 43).
4. Amendment of subsections (c)(2) and (l)(1) filed 1-24-94; operative 2-23-94 (Register 94, No. 4).
5. Change without regulatory effect amending subsection (b)(2) filed 2-10-94 pursuant to title 1, section 100, California Code of Regulations (Register 94, No. 6).
6. Editorial correction restoring amendment to subsection (l)(7) (Register 94, No. 16).
7. Change without regulatory effect amending subsection (l)(1) filed 11-3-2004 pursuant to section 100, title 1, California Code of Regulations (Register 2004, No. 45).
8. Amendment of subsections (b)-(b)(1) and (b)(2)-(4) and new subsections (b)(1)(A)-(D) and (b)(5) filed 3-1-2007; operative 3-31-2007 (Register 2007, No. 9).
9. New subsection (g)(3) filed 5-1-2012; operative 5-31-2012 (Register 2012, No. 18).

 [Go Back to Article 6 Table of Contents](#)