

## Highlights of the OSHA Excavation Standard

### Subpart P, 1926.650

Excavation and trenching present numerous exposures to loss, such as employee injuries, injuries to the general public, damage to underground utilities, and damage to adjacent structures and other property. To reduce/eliminate these significant loss areas, a formalized Excavation and Trenching Loss Prevention and Safety Program should be implemented. The OSHA Excavation Standard (Subpart P, 1926.650) is the foundation upon which you should build your Excavation and Trenching Loss Prevention and Safety Program. Highlights of the Standard include the following.

- **Scope and application** – Subpart P applies to all open excavations made in the earth's surface. Excavations are defined to include trenches. A trench is defined to as a narrow excavation made below the surface of the ground in which the depth is greater than the width - the width not exceeding 15 feet.
- **Competent person** – A competent person is one who is physically on-site, is capable of identifying existing and predictable hazards in the work area which are hazardous or dangerous to employees, and who has authorization to take prompt corrective measures to eliminate them. The competent person is also responsible for performing the soil classification analysis.
- **Surface encumbrances** – All surface encumbrances that create a hazard to employees should be removed or supported. There are many hazards that can be present, but most can be placed into these categories: underground utilities, confined spaces and cave-ins.
- **Underground installations** – Underground utilities (electric, fuel, sewer, telephone, water lines) should be located and marked prior to opening an excavation. If underground utilities are exposed by the excavation, they should be protected, supported, or removed as necessary to safeguard employees.
- **Access and egress** – Structural ramps and runways used solely by employees as a means of access and egress from the excavation should be designed by a competent person. Ramp and runway structural members should be of uniform thickness, and connected together to prevent displacement. Cleats should be provided to prevent slipping. A stairway, ladder, ramp or other safe means of egress should 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 to a means of egress.
- **Exposure to vehicular traffic** – Employees exposed to vehicular traffic should be provided with, and should wear warning vests or other similar garments with or made of reflectorized or highly-visible material.
- **Exposure to falling loads** – Employees should not be permitted underneath

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loads handled by lifting or digging equipment, and should be required to stand away from any vehicle being loaded or unloaded. Operators of vehicles being loaded or unloaded may remain in the cabs when the vehicles are equipped in accordance with 1926.601(b) (6). Equipment and spoil piles must be kept back at least 2 feet from the edge of the excavation.

- Warning system for mobile equipment – Barricades, hand or mechanical signals, or stop logs should be utilized to warn mobile equipment that operates adjacent to or approaches the edge of an excavation, if the operator does not have a clear and direct view of the edge of the excavation.
- Hazardous atmospheres – Where oxygen deficiency (atmosphere containing less than 19.5% oxygen) or a hazardous atmosphere exists, or could reasonably be expected to exist, the atmosphere in the excavation should be tested before employees enter excavations greater than 4 feet in depth.
- Proper respiratory protection or ventilation in accordance with 1926 Subparts D and E should be provided. When controls are used that reduce the level of atmospheric contaminants to acceptable levels, testing should be conducted as often as necessary to ensure that the atmosphere remains safe. Emergency rescue equipment (breathing apparatus, safety harness and line, basket stretcher) should be readily available where hazardous atmospheric conditions exist or may reasonably be expected to develop during work in an excavation. Rescue equipment should be attended when in use. Also, while the employee wearing the lifeline is in the excavation, an observer must be present to ensure that the line is working properly and to maintain communication with the employee.
- Water accumulation hazards – Employees should not work in excavations in which there is accumulated water, or where there is water accumulating, unless adequate precautions (special support or shield system, water removal, safety harnesses and life lines) have been taken to protect employees against the hazards posed by water accumulation.
- Stability of adjacent structures – Support systems (shoring, bracing, underpinning) should be provided where excavation operations endanger the stability of adjoining walls, buildings, or other structures. The Standard prohibits excavation below the level of the base or footing of any foundation or retaining wall without special precautions. This also applies to sidewalks and pavement.
- Protection of employees from loose rock or soil – Adequate protection (scaling, installation of protective barricades, etc.) should be provided to protect employees from loose rock or soil. Materials and equipment should be kept at least 2 feet from the edges of the excavation, or retaining devices should be used to prevent materials or equipment from falling or rolling into the excavation.
- Inspections – Daily inspections of excavations, adjacent areas, and protective systems should be made by a competent person prior to the start of work and as needed throughout the shift. Inspections should also be made after every rainstorm or other hazard - increasing occurrence. When the competent person finds an unsafe condition, exposed employees should be removed from the hazardous area until necessary precautions have been taken to ensure their safety. Inspections are an OSHA requirement!
- Fall protection – Where employees or equipment are required or permitted

to cross over excavations, walkways or bridges with standard guardrails should be provided. In addition, adequate physical protection (barricades, covers, backfilling) should be provided at all remotely located excavations.

- Protection of employees in excavations – Each employee in an excavation should be protected from cave-ins by an adequate protection system (sloping, shoring, benching, shield systems) except when excavations are made entirely in stable rock, or when excavations are less than 5 feet deep, and examination by a competent person provides no indication of a potential cave-in. Protection systems should 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. Support systems, shield systems, and other protective systems not using tabulated data, or for excavations greater than 20 feet deep, should be designed by a registered professional engineer. Factors to consider in choosing a protective system include: soil classification, depth of cut, water content of soil, changes due to weather and climate, and other operations in the vicinity.

<b>Soil or Rock Type</b>	<b>Maximum Allowable Slope (H:V) for Excavations Less Than 20 Feet Deep</b>
Stable Rock	Vertical (90°)
Type A Soil	3/4:1 (53°)
Type B Soil	1:1 (45°)
Type C Soil	1-1/2:1 (34°)

Numbers shown in parentheses next to Maximum Allowable Slopes are angles expressed in degrees from the horizontal. A short-term Maximum Allowable Slope of 1/2:1 (63°) is allowed in excavations in Type A Soil that are 12 feet or less in depth. Short-term Maximum Allowable Slopes for excavations greater than 12 feet in depth is 3/4:1 (53°). Sloping or benching for excavations greater than 20 feet deep should be designed by a registered professional engineer.

- Soil classification system – A method of categorizing soil and rock deposits in a hierarchy of Stable Rock, Type A, Type B, and Type C, in decreasing order of stability. Soil classification must be made by one visual and at least one manual analysis.
- Stable rock – Natural solid mineral matter that can be excavated with vertical sides and remains intact while exposed.
- Type A soil – Cohesive soil with an unconfined compressive strength of 1.5 ton per square foot (tsf) or better (clay, silty clay, clay loam, caliche, hardpan). No soil is Type A if the soil is fissured; or subjected to vibration from heavy traffic, pile driving, etc.; or the soil has been previously disturbed; or the soil is part of a sloped, layered system where layers dip into the excavation on a slope of four horizontal to one vertical (4:1) or greater; or the soil is subject to other factors that would make it less stable.
- Type B soil – Cohesive soil with an unconfined compressive strength of greater than 0.5 (tsf) but less than 1.5 (tsf); or granular cohesionless soil.

The loss prevention information and advice presented in this brochure are intended only to advise our insureds and their managers of a variety of methods and strategies based on generally accepted safe practices, for controlling potentially loss producing situations commonly occurring in business premises and/or operations. They are not intended to warrant that all potential hazards or conditions have been evaluated or can be controlled. They are not intended as an offer to write insurance coverage for such conditions or exposures, or to simply that Great American Insurance Company will write such coverage. The liability of Great American Insurance Company is limited to the specific terms, limits and conditions of the insurance policies issued.  
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