WAC 296-155-650 Scope, application, and definitions applicable to this part.

(1) Scope and application. This part applies to all open excavations made in the earth's surface. Excavations are defined to include trenches.

(2) Definitions applicable to this part.

Accepted engineering requirements or practices. Those requirements which are compatible with standards of practice required by a registered professional engineer.

Aluminum hydraulic shoring. A preengineered shoring system comprised of aluminum hydraulic cylinders (crossbraces) used in conjunction with vertical rails (uprights) or horizontal rails (walers). Such system is designed, specifically to support the sidewalls of an excavation and prevent cave-ins.

Bell-bottom pier hole. A type of shaft or footing excavation, the bottom of which is made larger than the cross section above to form a belled shape.

Benching (benching system). A method of protecting employees from cave-ins by excavating the sides of an excavation to form one or a series of horizontal levels or steps, usually with vertical or near-vertical surfaces between levels.

Cave-in. The separation of a mass of soil or rock material from the side of an excavation, or loss of soil from under a trench shield or support system, and its sudden movement into the excavation in quantity that it could entrap, bury, injure, or immobilize a person.

Competent person. One who can identify existing or predictable hazards in the surroundings that are unsanitary, hazardous, or dangerous to employees. Also has authorization or authority by the nature of their position to take prompt corrective measures to eliminate them. The person must be knowledgeable in the requirements of this part.

Cross braces. The horizontal members of a shoring system installed perpendicular to the sides of the excavation, the ends of which bear against either uprights or wales.

Excavation. Any person-made cut, cavity, trench, or depression in the earth's surface, formed by earth removal.

Emergency. Any occurrence (including cave-in, collapse, or failure of a hazard control) or event internal or external to the excavation that could endanger employees.

Faces or sides. The vertical or inclined earth surfaces formed as a result of excavation work.

Failure. The breakage, displacement, or permanent deformation of a structural member or connection so as to reduce its structural integrity and its supportive capabilities.

Hazardous atmosphere. A atmosphere which by reason of being explosive, flammable, poisonous, corrosive, oxidizing, irritating, oxygen deficient, toxic, or otherwise harmful, may cause death, illness, or injury.

Kickouts. Accidental release or failure of a cross brace.

Protective system. A method of protecting employees from cave-ins, from material that could fall or roll from an excavation face or into an excavation, or from the collapse of adjacent structures. Protective systems include support systems, sloping and benching systems, shield systems, and other systems that provide the necessary protection.

Commented [SES(1]: Sources:
Chapter 809-099 Confined space
Emergency. Any occurrence (including any failure of power, hazard control or monitoring equipment) or event internal or external to the permit-required confined space that could endanger authorized entrants.

OSHA 1926.1201 Confined space
Emergency means any occurrence (including any failure of power, hazard control or monitoring equipment) or event, internal or external, to the permit space that could endanger entrants.

Merriam Webster:
Definition of emergency
1: an unforeseen combination of circumstances or the resulting state that calls for immediate action
2: an urgent need for assistance or relief

Ramp. An inclined walking or working surface that is used to gain access to one point to another, and is constructed from earth or from structural materials such as steel or wood.

Registered professional engineer. A person who is registered as a professional engineer in the state of Washington. The registered professional engineer must comply with the Washington state department of licensing requirements, chapter 18.43 RCW.

Rescue. Retrieving and providing medical assistance to one or more employees in an excavation.

Commented [SES(2]: Sources:
Chapter 809-099 Confined space
Rescue. Retrieving and providing medical assistance to one or more employees in a permit space.

29 CFR 1926.1202 Confined space
Rescue means retrieving, and providing medical assistance to, one or more employees who are in a permit space.

Merriam Webster definition:
rescue - to free from confinement, danger, or evil

Sheeting. The members of a shoring system that retain the earth in position and in turn are supported by other members of the shoring system.

Shield (shield system). A structure that is able to withstand the forces imposed on it by a cave-in and thereby protect employees within the structure. Shields can be permanent structures or can be designed to be portable and moved along as work progresses. Additionally, shields can be either premanufactured or job-built in accordance with WAC 296-155-657(3)(c) or (d). Shields used in trenches are usually referred to as "trench boxes" or "trench shields."

Shoring (shoring system). A structure such as a metal hydraulic, mechanical, or timber shoring system that supports the sides of an excavation and which is designed to prevent cave-ins.

Sides. See "faces."

Sloping (sloping system). A method of protecting employees from cave-ins by excavating to form sides of an excavation that are inclined away from the excavation so as to prevent cave-ins. The angle of incline required to prevent a cave-in varies with differences in such factors as the soil type, environmental conditions of exposure, and application of surcharge loads.

Stable rock. A natural solid mineral material that can be excavated with vertical sides and will remain intact while exposed. Unstable rock is considered to be stable when the rock material on the side or sides of the excavation is secured against caving-in or movement by rock bolts or by another protective system that has been designed by a registered professional engineer.

Structural ramp. A ramp built of steel or wood, usually used for vehicle access. Ramps made of soil or rock are not considered structural ramps.

Support system. A structure such as underpinning, bracing or shoring, which provides support to an adjacent structure, underground installation, or the sides of an excavation.

Tabulated data. Tables and charts approved by a registered professional engineer and used to design and construct a protective system.

Trench (trench excavation). A narrow excavation in relation to its length made below the surface of the ground. In general, the depth is greater than the width, but the width of a trench (measured at the bottom) is not greater than 15 feet (4.6m). If forms or other structures are installed or constructed in an excavation so as to reduce the dimension measured from the forms or structure to the side of the excavation to 15 feet (4.6 m) or less (measured at the bottom of the excavation), the excavation is also considered to be a trench.

Trench box. See "shield."

Trench shield. See "shield."

Uprights. The vertical members of a trench shoring system placed in contact with the earth and usually positioned so that individual members do not contact each other. Uprights placed so that individual members are closely spaced, in contact with or interconnected to each other, are often called "sheeting."

Wales. Horizontal members of a shoring system placed parallel to the excavation face whose sides bear against the vertical members of the shoring system or earth.

296-155-655 General protection requirements.

(1) Surface encumbrances. You must remove or support surface encumbrances that are located so as to create a hazard to employees, as necessary, to safeguard employees.

(2) Underground installations.

(a) You must locate 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, prior to opening an excavation.

(b) You must contact utility companies or owners within established or customary local response times, advised of the proposed work, and asked to locate the underground utility installation prior to the start of actual excavation.

(c) When excavation operations approach the location of underground installations, you must determine the exact location of the installations by safe and acceptable means.

(d) While the excavation is open, you must protect underground installations, supported, or removed as necessary to safeguard employees.

(3) Access and egress.

(a) Structural ramps.

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

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

(iii) Structural members used for ramps and runways must be of uniform thickness.

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

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

(b) Means of egress from trench excavations. A stairway, ladder, ramp or other safe means of egress must be located in trench excavations that are 4 feet (1.22 m) or more in depth so as to require no more than 25 feet (7.62 m) of lateral travel for employees.

(4) Exposure to vehicular traffic. You must provide employees exposed to vehicular traffic with, and they must wear, high-visibility garments meeting the requirements of WAC 296-155-200, General requirements for personal protective equipment(PPE).

(5) Exposure to falling loads. You must not permit any employee underneath loads handled by lifting or digging equipment. You must require employees 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 WAC 296-155-610(2)(g), to provide adequate protection for the operator during loading and unloading operations.

(6) 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, you must utilize a warning system such as barricades, hand or mechanical signals, or stop logs. If possible, the grade should be away from the excavation.

(7) Hazardous atmospheres.

(a) Testing and controls. In addition to the requirements set forth in parts B-1, C, and C-1 of this chapter (296-155 WAC) to prevent exposure to harmful levels of atmospheric contaminants and to assure acceptable atmospheric conditions, the following requirements apply:

(i) 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, you must test the atmospheres in the excavation before employees enter excavations greater than 4 feet (1.22 m) in depth.

(ii) You must take adequate precautions 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 in accordance with chapter 296-842 WAC.

(iii) You must take adequate precaution such as providing ventilation, to prevent employee exposure to an atmosphere containing a concentration of a flammable gas in excess of 10 percent of the lower flammable limit of the gas.

(iv) When controls are used that are intended to reduce the level of atmospheric contaminants to acceptable levels, you must conduct testing as often as necessary to ensure that the atmosphere remains safe.

(b) Emergency rescue equipment.

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

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

Note: See chapter 296-62 WAC, Part M for additional requirements applicable to confined space operations.

(8) Protection from hazards associated with water accumulation.

(a) Employees must 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.

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

(c) If excavation work interrupts the natural drainage of surface water (such as streams), you must use diversion ditches, dikes, or other suitable means 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 subdivisions (a) and (b) of this subsection.

(9) Stability of adjacent structures.

(a) Where the stability of adjoining buildings, walls, or other structures is endangered by excavation operations, you must provide support systems such as shoring, bracing, or underpinning to ensure the stability of such structures for the protection of employees.

(b) You must not permit 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 except when:

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

(ii) The excavation is in stable rock; or

(iii) A registered professional engineer has approved the determination that the structure is sufficiently removed from the excavation so as to be unaffected by the excavation activity; or

(iv) A registered professional engineer has approved the determination that such excavation work will not pose a hazard to employees.

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

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

(a) You must provide adequate protection to protect employees from loose rock or soil that could pose a hazard by falling or rolling from an excavation face. Such protection must 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.

(b) You must protect employees from excavated or other materials or equipment that could pose a hazard by falling or rolling into excavations. Protection must be provided by placing and keeping such materials or equipment at least two feet (.61 m) 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.

(11) Inspections.

(a) Daily inspections of excavations, the adjacent areas, and protective systems must 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 must be conducted by the competent person prior to the start of work and as needed throughout the shift. Inspections must also be made after every rainstorm or other hazard increasing occurrence. These inspections are only required when employee exposure can be reasonably anticipated.

(b) 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, you must remove exposed employees from the hazardous area until the necessary precautions have been taken to ensure their safety.

(12) Fall protection.

(a) You must provide walkways where employees or equipment are required or permitted to cross over excavations. You must provide guardrails which comply with chapter 296-880 WAC, Unified safety standards for fall protection where walkways are 4 feet or more above lower levels.

(b) You must provide adequate barrier physical protection at all remotely located excavations. You must barricade or cover all wells, pits, shafts, etc. Upon completion of exploration and similar operations, you must backfill temporary wells, pits, shafts, etc.

(13) ~~The employer must plan for and provide prompt, safe removal or rescue of employees in the event of an emergency.~~
You must plan for and provide, or make arrangements in advance with locally available services to provide, prompt safe removal or rescue of employees in the event of an emergency.

(14) Trench excavations

(a) You must develop and implement a written **work plan** for any trench excavation into which an employee may enter and where a protective system is required under WAC 296-155-657(1)(a).

(b) The **work plan** must:

(i) Identify all trench excavations where a protective system is required;

(ii) Identify the classification of soil and rock deposits;

(iii) Identify underground installations;

(iv) Describe the method of protecting underground installations when the trench excavation is open;

(v) Describe the method of protection from surface encumbrances;

(vi) Describe the method of stabilizing adjacent structures;

(vii) Identify potentially hazardous atmospheres;

(viii) Describe the type of protective system to be provided;

(ix) Describe the procedure for the installation and removal of the protective system that protects employees from cave- ins, structural collapses, or from being struck by members of the ~~supportive~~ protective system;

(x) Describe the frequency of inspections of trench excavations, the adjacent areas, and protective system for evidence of a situation that could result in possible cave-ins, indications of failure of protective systems, hazardous atmospheres, or other hazardous conditions.

(xi) Describe the method of protection for employees from cave-ins when entering or exiting the areas protected by shields.

(xii) Describe the method of protecting workers in a trench excavation from loose soil, rock, or equipment that could pose a hazard by falling or rolling into the excavation;

(xiii) Describe the method of protection from hazards associated with water accumulation;

(xiv) Describe the safe means of egress from trench excavations;

(xv) Describe the actions to be taken to ensure prompt, safe removal or rescue of workers in the event of a~~n emergency~~cave-in. Your description must include procedures for:

(A) Contacting rescue and emergency services.

(B) Removing or rescuing workers from excavations.

(C) Providing necessary emergency services to rescued workers.

(D) Preventing unauthorized persons from attempting a rescue.

(xvi) Be available on-site for inspection by the department.

(c) Training. Prior to permitting employees into any trench excavation where a protective system is required, the employer must ensure employees are trained and instructed on the items described in subsection (~~13~~14)(b)(i) through (~~13~~14)(b)(~~xiii~~xv) of this section.

Note: A sufficient work plan description of 'prompt, safe removal or rescue of workers in the event of an emergency' can include coordination with available local emergency services (e.g., 911) but must

Commented [SES(3]: WAC 296-155-035
General requirements.
(9) You must ensure prompt and safe removal of injured employees from elevated work locations, trenches and excavations prior to commencement of work.

WAC 296-155-110
Accident prevention program
(3) The following are the minimal program elements for all employers:
A safety orientation program describing the employer's safety program and including:
(d) The proper actions to take in event of emergencies including the routes of exiting from areas during emergencies.

Commented [SES(4]: WAC 296-155-657
Requirements for protective systems.
(1) Protection of employees in excavations.
(a) You must protect each employee in an excavation from cave-ins by an adequate protective system designed in accordance with subsections (2) or (3) of this section exce...

Commented [SES(5]: WAC 296-155-66401
Appendix A—Soil classification. ...

Commented [SES(6]: WAC 296-155-655
General protection requirements. ...

Commented [SES(7]: WAC 296-155-655
General protection requirements. ...

Commented [SES(8]: WAC 296-155-655
General protection requirements. ...

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General protection requirements. ...

Commented [SES(16]: WAC 296-155-655
General protection requirements. ...

Commented [SES(17]: WAC 296-155-035
General requirements. ...

Commented [SES(18]: Change 'emergency' to 'cave-in'. Emergency is currently required in 155-035 and 655-13. ...

Commented [SES(19]: WAC 296-809-50014
Make sure you have adequate rescue and emergency servic...

Commented [SES(20]: WAC 296-155-100
Management's responsibility. ...

account for your worksite's proximity to these local emergency services and any potential geographic, topographic, or other obstacles that could prevent immediate access to the worksite. In remote or otherwise inaccessible locations where local emergency services cannot feasibly respond to an emergency in a timely manner, your plan cannot rely upon local emergency services as a primary means of 'prompt and safe removal or rescue.'