

OREGON MILITARY DEPARTMENT	NUMBER: 99.200.16
ADJUTANT GENERAL PERSONNEL	EFFECTIVE DATE: Dec 14, 2021
SUBJECT: Excavation and Trenching Policy	

APPLICABILITY:

This policy and the procedures contained herein are applicable to state employees.

AUTHORITY/REFERENCE:

OAR 437-004-3100, 29 CFR 1926.650 – 652, 29 CFR 1926.20 (b)(1) and 29 CFR 1926.21 (b)(2).

ATTACHMENTS:

- Attachment A. Emergency Contact Information
- Attachment B. Daily Inspection Checklist

PURPOSE:

This Excavation and Trenching Policy applies to all open excavations or man-made cut, cavity, trench, or depression in an earth surface formed by earth removal. It is designed to prevent a cave-in (i.e., the separation of a mass of soil or rock material from the side of an excavation) or the loss of soil from under a trench shield or support system that could entrap, bury, or otherwise injure and immobilize a person.

Trenches are a subset of excavations. All trenches are a type of excavation, but all excavations are not trenches. See the Definitions Section of the Policy to determine whether your worksite is classified as a trench. If not, this Policy still applies but delete the references to trenches.

GUIDANCE:

This Excavation and Trenching Policy addresses the requirements and safe practices to ensure the safety of employees and contractors who work in or around trenching, and excavation activities. These requirements apply to all work involving excavation, digging, and trenching, grading, or ditching operations.

Oregon Military Department (OMD) will provide safe work areas for employees, visitors, and others who are or may be exposed to hazards in or around trenches and other excavation areas. All trenching and excavation activities will be evaluated to eliminate or minimize the potential of cave-ins, review environment contamination, and contact with underground utilities or other

subsurface impediments. No digging, trenching, or excavation activities will be performed unless the requirements of federal rules for excavations (29 CFR 1926.650 to 1926.652) and employee training (29 CFR 1926.20(b)(1) and 29 CFR 1926.21(b)(1)) and this organization's safety and environmental policies are met.

Policy Review and Update

This policy will be reviewed annually by the plan administrator or designee(s) to ensure the program's effectiveness and will be updated as determined by the review. This policy will also be updated whenever:

- New types of protective systems or equipment are introduced to an excavation site.
- Evaluations of workplace hazards, injuries, and near misses demonstrate that the current Policy is outdated or not effective.
- When regulatory or national consensus standards adopted as part of the policy change.

DEFINITIONS:

Competent person means someone who is capable of identifying existing and predictable hazards in the surroundings, or working conditions that are unsanitary, hazardous, or dangerous to employees, and who has authorization to take prompt, corrective measures to eliminate them.

Confined space means a space that is large enough and so configured that an employee can bodily enter and perform work and has limited or restricted means of entry or exit and is not designed for continuous employee occupancy.

Excavation means any man-made cut, cavity, trench, or depression in the earth's surface formed by earth removal.

Hazardous atmosphere means an atmosphere that is explosive, flammable, poisonous, corrosive, oxidizing, irritating, oxygen-deficient, toxic, or otherwise harmful that may cause death, illness, or injury to persons exposed to it.

Protective system means 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.

Registered professional engineer means a person who is registered as a professional engineer in the state where the work is to be performed. However, a professional engineer who is registered in any state is deemed to be a "registered professional engineer" within the meaning of federal rules when approving designs for "manufactured protective systems" or "tabulated data" to be used in interstate commerce.

Shield (trench box) means a structure that is able to withstand the forces imposed on it by a cave-in and thereby protects employees within the structures. 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 the OSHA regulations at 29 CFR 1926.652(c)(3) or 29 CFR 1926.652(c)(4). Shields used in trenches are usually referred to as trench boxes or trench shields. Trench boxes or shields protect employees from cave-ins that

might occur by providing sheltered space where employees may work. They are not designed to prevent cave-ins. A typical shield consists of two steel plates separated by structural members to form a box open at the top, bottom, and both ends. The box is lowered into the trench so that the steel plates face the trench's sidewalls. Employees then climb into the protected area defined by the steel plates. As the work progresses, the box is dragged along the bottom of the trench by a chain or cable suspended from a backhoe above the ground.

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

Sloping means a method of protecting employees from cave-ins by excavating to form sides of an excavation that are inclined away from the excavations 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, environment conditions of exposure, and application of exposure and application of surcharge loads.

Support system means structures such as underpinning, bracing, and shoring that provide support to an adjacent structure or underground installation or to the sides of an excavation or trench.

Surface encumbrance means anything that creates a hazardous surcharge load on the sides of a trench or excavation, such as equipment, building materials, vehicles, soil, and sources of vibration, foundations, streams, water tables, or geological anomalies, that could cause it to cave in and injure or kill those inside.

Trench means a narrow underground excavation that is deeper than it is wide, and no wider than 15 feet (ft). In general, the depth is greater than the width, but the width of a trench (measured at the bottom) is not greater than 15 ft. 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 ft or less (measured at the bottom of the excavation), the excavation is also considered to be a trench.

SCOPE:

Each OMD location will develop a trenching and digging plan that addresses the following:

- Safeguarding procedures, including protection for employees, underground installations, hazardous atmospheres, confined spaces, water accumulation, adjacent structures, surface encumbrances, and walkways
- Qualifications for the competent person
- Inspections
- Protective systems, including sloping, benching, shielding, and shoring
- Accident investigations
- Emergency operations
- Employee training

Plan Elements:

An Excavation and Trenching Plan should include the following elements:

- A hazard assessment.
- Identification and credentials of competent person.
- Diagram or sketch of the area where the work is to be done, with adjacent and nearby structures shown.
- Projected depth of the excavation.
- Projected soil type and method of testing to determine soil type.
- Planned method of shoring, sloping, and/or benching.
- Planned method for confined space entry, trench access and egress, and atmospheric monitoring processes.
- Location of utility shutoffs (if required).
- Proposed methods for preventing damage to overhead utility lines, trees designated to remain, and other man-made facilities or natural features designated to remain within or adjacent to the construction rights-of-way.
- Plan for management of excavated soil/asphalt/concrete.
- Plan for traffic control.
- Excavation permits. All underground lines/utilities (communication lines, water, fuel, electric lines) will be located and protected from damage or displacement. Utility companies and other responsible authorities will be contacted to locate and mark the locations and, if they so desire, direct or assist with protecting the underground installations. The contractor will obtain an excavation permit from an authority having jurisdiction before the initiation of any excavation work.
- For cofferdams, a controlled flooding plan and fall protection.
- Access to and exit (egress) from the excavation.
- Evacuation procedures.

EXCAVATION AND TRENCHING SAFETY PROGRAM:

Hazard Assessment

Excavation and trenching work present serious hazards to all workers involved. Cave-ins pose the greatest risk and are more likely than other excavation-related accidents to result in worker fatalities. Other potential hazards include falls, falling loads, hazardous atmospheres, and incidents involving mobile equipment.

Before work begins on an excavation or trench, the competent person(s) will evaluate the specific hazardous conditions at the worksite through jobsite studies, observations, test borings for soil type or conditions, and consultations with local officials and utility companies. The following factors will be considered to determine the hazards associated with specific site conditions:

- Traffic
- Proximity and physical conditions of nearby structures.
- Soil
- Surface water and groundwater.
- Location of the water table.
- Overhead and underground utilities.

- Weather

Documentation Requirements

OSHA requires employers to document:

- The methodology and background information used to determine whether shoring systems are required, and the type of systems used.
- The basis on which the employee excavation protection program was developed.
- The training of affected employees required under 29 CFR 1926.20(b)(1) and 29 CFR 1926.21(b)(2) of the regulations.
- Training requirements identified by periodic inspections or changes in equipment and/or procedures, including inspection procedures and training program for assessment and correction of situations resulting in near misses and/or injuries or circumstances indicating that modifications are necessary.
- The employer's enforcement of its excavation safety program. Periodic inspection of excavations as required under 29 CFR 1926.651(k)(1) of the regulations.
- All persons (e.g., competent person, registered professional engineer) responsible for excavation activities (table).

PLAN ADMINISTRATION:

Plan Administrator

The plan administrator will be a competent person and will:

- Review and approve the digging, trenching, and excavation drawing and permit.
- Ensure that known underground utilities and structures have been identified and physically located and marked.
- Ensure that precautions will be taken to protect existing underground utilities and structures.
- Ensure that all responsible organizations have given their input for the proposed excavation site.
- Ensure that adequate safety control measures have been identified and implemented.
- Approve (by signature) or disapprove trenching-related permits.
- Monitor the overall effectiveness of the program through audits and annual reviews.
- Conduct atmospheric testing, other technical assistance, or equipment selections needed.
- Provide or assist with arranging site worker training, competent person training, and retraining of those who may be involved in excavations.
- Conduct an annual audit of the trenching program.
- Maintain records relating to training and audits.
- Investigate and document all reported accidents and/or near-miss accidents that are directly or indirectly related to trenching.

The administrator may designate a competent person with the authority to administer or implement one or more components of this policy.

Competent Person

The competent person must be able to demonstrate the training, experience, and knowledge of soil analysis, use of protective systems, and the requirements of this policy and all relevant local, state, and federal regulatory requirements, including the federal rules for excavations at 29 CFR Part 1926, Subpart P.

The competent person will be able to:

- Evaluate soil conditions and select appropriate protective measures.
- Construct protective systems in accordance with the excavation regulatory requirements.
- Preplan, such as contact utilities (gas, electric) to locate underground lines; plan for traffic control, if necessary; and determine proximity to structures that could affect choice of protective systems.
- Test for low oxygen, hazardous fumes, and toxic gasses, especially when gasoline engine-driven equipment is running, or the dirt has been contaminated by leaking lines or storage tanks.
- Ensure adequate ventilation or respiratory equipment, if necessary.
- Provide safe access into and out of the excavation.
- Provide appropriate protection if water accumulation is a problem.
- Inspect the site daily at the start of each shift, following a rainstorm, or after any other hazard-increasing event.
- Keep excavations open the minimum amount of time needed to complete operations.

The competent person must be able to detect:

- Conditions that could result in cave-ins.
- Failures in protective systems.
- Hazardous atmospheres.
- Other hazards, including those associated with confined spaces.

The competent person will have the authority to take prompt corrective measures to eliminate existing and predictable hazards and stop work when required.

Supervisor

A supervisor must be classified as a competent person and will be in charge of each excavation. The supervisor will:

- Successfully complete training for classification as a competent person for trenching operations.
- Implement the Excavation and Trenching Plan for work areas under their control.
- Act as the competent person for excavation sites under his or her control.
- Ensure that the equipment necessary to complete an excavation safely is available and in good condition.
- Conduct soil tests to determine soil type.
- Ensure that all underground utility installations are located and marked before excavation begins.
- Receive written approval from the relevant utilities and landowners for digging, trenching, or excavating operations.

- Ensure that underground installations are protected, supported, or removed while the excavation is open. Notify the appropriate agencies when utility systems are exposed during the excavation process to allow the location and condition of the utility to be evaluated.
- Ensure worker protection and compliance with other applicable safety plans or programs.
- Ensure protection of the public with appropriate barricades.
- Determine what protective systems will be used to prevent cave-ins.
- Conduct daily inspections of excavations, the adjacent areas, and protective systems for evidence of a situation that could result in possible cave-ins, indications of failure of protective systems, hazardous atmospheres, or other hazardous conditions.
- Immediately notify the Administrator or Competent Person if a utility system is damaged during the trenching or excavation process.

Employee

Each employee engaged in trenching or other excavation-related activities must:

- Complete training, and request assistance when uncertain about any activity he or she must perform.
- Use appropriate personal protective equipment (PPE).
- Adhere to the requirements of the policy.
- Report all workplace injuries and unsafe conditions to the supervisor.

Emergency Personnel Contact Information

See the Emergency Contact Information form for information about contacting the appropriate personnel during emergencies.

Soil Classification

Before any work is begun on an excavation or trench, the soil classification will be determined by the competent person and in accordance with visual Soil Classification guidelines (29 CFR 1926 Subpart P) or the use of contracted geotechnical reports.

The supervisor or other competent person will determine the soil type using visual method.

Visual Test

The entire excavation site, including the soil adjacent to the site, will be observed. During the visual test, the designated supervisor will check for crack-line openings along the failure zone that indicate tension cracks and observe the open side of the excavation for indications of layered geologic structuring. Other conditions to look for are signs of bulging, boiling, or sloughing, as well as signs of surface water seeping from the side of the excavation or from the water table.

Manual Tests

Thumb Penetration Test

- When the thumb is pressed firmly into the soil and penetrates no further than the length of the nail, it is probably Type B soil. If the thumb penetrates the full length of the thumb, it is Type C. This is the least accurate of the manual test methods.

Dry Strength Test

- If a sample of dry soil is crumbled freely or with moderate pressure into individual grains, it is considered granular, or Type C. Dry soil that falls into clumps that subsequently break into smaller clumps is probably clay in combination with gravel, sand, or silt (Type B).

Plasticity or Wet Thread Test

- A moist sample of the soil is molded into a ball and then rolled into a thin thread approximately 1/8 inch in diameter by 2 inches in length. If the soil sample does not break when held by one end, it may be considered Type B. If the soil sample does break, it is considered Type C.

Soil Compression Strength Test

- A pocket penetrometer, sheervane, or torvane may also be used to determine the unconfined compression strength of soils.

Surface Encumbrances

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

Underground Installations

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, will be determined before opening an excavation.

Utility companies or owners will 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 before 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 excavation work may proceed provided that such work is done with caution, and detection equipment or other acceptable means to locate utility installations are used.

When operations approach the location of underground utilities, excavation will progress with caution until the exact location of the utility is determined. While the excavation is open, underground installations will be protected, supported, or removed as necessary to safeguard employees.

SAFETY PROCEDURES:

General Requirements

If evidence of a situation that could result in possible cave-ins, slides, failure of protective systems, hazardous atmospheres, or other hazardous condition is identified, exposed workers will be removed from the hazard and all work in the excavation or trench stopped until all necessary safety precautions have been implemented.

Competent Person

A competent person will oversee work performed at any excavation to ensure compliance with this Policy.

Worker Training

Employees who work in or around excavations will be provided training according to their work activities. See the **Training** subsection of this Policy for specific training requirements.

Protective Systems

The excavation or trench must either be sloped or supported as required to comply with OSHA worker protection requirements. See the **Protective Systems** subsection of this Policy for more information.

Personal Protective Equipment (PPE)

Employees must use PPE as required by their job task.

Electrical Installations

Work conducted on or around electrical utility systems must be performed in accordance with the procedures from the **Electrical Safety Plan**.

Lockout/Tagout

Work that may impact existing utilities that need to be locked and tagged out may be performed by following procedures from the **Lockout/Tagout Policy**.

Welding

Work requiring welding, cutting, or brazing will require a Hot Work Permit under the **Welding, Cutting, and Brazing Plan** before the start of any work of this nature in or around the trench, ditch, or excavated site.

Noise Protection

Work performed at noise levels that exceed permissible limits must meet the provisions of the **Hearing Conservation Policy**.

Safe Access and Exit

Workers will be provided with safe access into and exiting from trenches or excavations that are more than 4 ft deep.

Access

The means of access and the design specifications for such access will be determined by the competent person and in accordance with the following guidelines:

- Ladders used as access to a trench or excavation will extend from the bottom of the excavation to not less than 3 ft above the surface.
- Ramps used solely for personnel access will be a minimum width of 4 ft and provided with standard guardrails.
- Ramps used for equipment access will be a minimum width of 12 ft. Curbs not less than 8-in x 8-in timbers, or equivalent protection, will be provided. Equipment ramps will be designed and constructed in accordance with accepted engineering practice.

Exit Route

The means of exit and the design specifications for such exit will be determined by the competent person and in accordance with the following guidelines:

- A stairway, ladder, ramp, personnel hoist, or other safe means of exit will be located in trench excavations that are 4 ft or more in depth.
- Exit route(s) will be placed within 25 lateral ft of workers.
- When two or more components form a ramp or runway, they must be connected to prevent displacement and be of uniform thickness.
- Cleats or other means of connecting runway components must be attached in a way that would not cause tripping (e.g., to the bottom of the structure).
- Structural ramps used in place of steps must have a nonslip surface.
- Earthen ramps may be used as a means of exit only if a worker can walk them in an upright position and only if they have been evaluated by a competent person.

Perimeter Protection

Protection will be provided to prevent personnel, vehicles, and equipment from falling into excavations.

Fall Protection

- All wells, calyx holes, pits, and shafts will be barricaded or covered.

- Excavations will be backfilled as soon as possible. Upon completion of exploration and similar operations, test pits, temporary wells, and calyx holes will be backfilled immediately.
- Walkways or bridges will be provided with standard guardrails where people or equipment are required or permitted to cross over excavations.

Falling Loads

Workers and other personnel must be prevented from passing or standing underneath loads handled by lifting or digging equipment. They must 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 to provide adequate protection for the operator during loading and unloading operations.

Falling Material

Employees will not be permitted to work on the faces of sloped or benched excavations at levels above other employees except when employees at lower levels are adequately protected from the hazard of falling material or equipment.

Employees will be protected by scaling, ice removal, benching, barricading, rock bolting, wire mesh, or other means from loose rock or soil that could create a hazard by falling from the excavation wall. Special attention will be given to slopes that may be adversely affected by weather, moisture content, or vibration.

Placement of Excavated Material

Excavated material will be placed at least 2 ft from the edge of an excavation or will be retained by devices that are sufficient to prevent the materials from falling into the excavation. In any case, material will be placed at a distance to prevent excessive loading on the face of the excavation. Materials such as boulders or stumps that may slide or roll into the excavation will be removed or made safe.

Hazardous Atmospheres

Workers will not be permitted to work in or near hazardous atmospheres unless required testing and monitoring, worker precautions, and rescue services are in place. Work conducted in enclosed areas where hazardous atmospheres or gases could accumulate (e.g., landfills, manure pits, gas distribution lines, or hazardous materials storage locations) must be done in accordance with the **Confined Spaces Policy**.

Types of Atmospheres

Such atmospheres include those with the following:

- Atmospheric oxygen concentration below 19.5 percent or above 23.5 percent.
- A combustible gas concentration greater than 10 percent of the lower flammable limit.

- Concentrations of hazardous substances that exceed those specified in the threshold limit values (TLVs) for airborne contaminants established by the American Conference of Governmental Industrial Hygienists (ACGIH).

Atmospheric Tests

Air quality tests will be taken before employees enter excavations more than 4 ft in deep when a hazardous atmosphere exists or could be expected to exist. If there is any possibility that the trench or excavation could contain a hazardous atmosphere, the supervisor or other competent person will ensure that:

- Atmospheric testing is conducted before worker entry and continuously during work.
- Where oxygen deficiency (atmospheres containing less than 19.5 percent oxygen) or a hazardous atmosphere exists or could reasonably be expected to exist, the atmospheres in the excavation will be tested before employees enter excavations greater than 4 ft deep.
- Tests will be conducted as often as necessary to ensure the quality and quantity of the atmosphere, including checks for flammable gases and oxygen deficiency.
- A log of all test results will be maintained at the worksite.

Worker Precautions

Suitable precautions will be taken as necessary to protect workers in areas where hazardous atmospheres exist or potentially exist. These precautions will include the following:

- Engineering controls such as ventilation.
- Respiratory protection in accordance with the **Respiratory Protection Policy**.
- Full body harnesses and lifelines.

Rescue Equipment

Where hazardous atmospheres exist or may reasonably be expected to exist, emergency rescue equipment will be on the worksite and readily accessible to rescue personnel. See the **Emergency Rescue Operations** subsection of this Policy for more information about emergency procedures.

Daily Inspections

Daily inspections for hazardous atmospheres must be conducted by a competent person.

Walkways and Guardrails over Excavations

- Walkways will be provided where workers or equipment are allowed to cross over excavations.
- Guardrails will be provided on walkways used by the general public regardless of the height above the excavation.
- Guardrails will be provided on walkways used only by on-site personnel if the walkway is 4 ft or more above lower levels. If workers pass below a walkway, guardrails and toeboards will be provided.

Confined Spaces

Employees entering excavations classified as confined spaces or that otherwise present the potential for emergency rescue, such as bell-bottom pier holes or similar deep and confined footing, will wear rescue equipment and maintain communication with the confined space attendant. See the **Confined Space Policy** for more information about safety procedures related to confined spaces.

Water Accumulation

Control Measures

Employees will not work in excavations in which there is accumulated water or in which water is accumulating unless the water hazards posed by accumulation is controlled. Freezing, pumping, draining, and similar control measures will be planned and directed by a registered engineer. Consideration will be given to the existing moisture balances in surrounding soils and the effects on foundations and structures if the soil is disturbed.

Drainage

Diversion ditches, dikes, or other means will be used to prevent surface water entering an excavation and to provide good drainage of the area adjacent to the excavation.

Water Control Equipment

When continuous operation of groundwater control equipment is necessary, an emergency power source will be provided. Water control equipment and operations will be monitored by a competent person to ensure proper operation.

Mobile Equipment and Motor Vehicle Traffic Precautions

Traffic around the excavation or trench site must be controlled and barricades, signs, and/or flag persons used as needed to control both vehicular and pedestrian traffic.

High Visibility PPE

Workers exposed to public vehicular traffic will be provided with and will wear warning vests or other suitable garments marked with or made of reflective or high-visibility material.

Barricades

When vehicles or mobile equipment are used or allowed adjacent to an excavation, substantial stop logs, or barricades will be installed. The use of a ground guide is recommended.

Loading/Unloading Vehicles

Workers will stand away from vehicles being loaded or unloaded to avoid being struck by spillage or falling materials.

Hoisting Operations

Excavating or hoisting equipment will not be allowed to raise, lower, or swing loads over or adjacent to personnel in the excavation without substantial overhead protection. Personnel will maintain a safe distance from a hoisting operation until the load has been placed.

Warning system

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 will be utilized, such as barricades, hand or mechanical signals, or stop logs. If possible, the grade should be away from the excavation.

Stability of Adjacent Structures

Protective Systems

If the stability of adjoining buildings or walls is endangered by excavations, shoring, bracing, or underpinning will be provided to ensure the stability of the structure and to protect employees.

Support Systems

Sidewalks, pavements, and related structures will not be undermined unless a support system is provided to protect employees and the sidewalk, pavement, or related structure.

Excavation Below the Level of Adjacent Structures

Excavations below the level of the base of footing of any foundation or retaining wall will not be permitted unless:

- A support system, such as underpinning, is provided to ensure the stability of the structure and to protect employees involved in the excavation work or in the vicinity thereof; *or*
- The excavation is in stable rock; *or*
- 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 or determines that the excavation will not pose a hazard to employees.

Site Inspections

When personnel will be in or around an excavation, a competent person will inspect the excavation, the adjacent areas, and protective systems daily:

- Before each work shift.
- Throughout the work shifts as dictated by the work being done.
- After every rainstorm.
- After other events that could increase hazards (e.g., snowstorm, windstorm, thaw, earthquake).
- When fissures, tension cracks, sloughing, undercutting, water seepage, bulging at the bottom, or other similar conditions occur.

- When there is a change in size, location, or placement of the spoil pile.
- Where there is any indication of change in adjacent structures.

The competent person will use the attached Excavation/Trench Inspection Checklist (Attachment B) or equivalent form when conducting inspections. All completed inspection forms will be maintained at the worksite during construction after excavation work is completed.

PROTECTIVE SYSTEMS:

General Requirements

Excavations Less Than 5 ft Deep

For excavations less than 5 ft deep, the competent person will examine the excavation for potential cave-in hazards and determine if a protective system is needed. Employees must not enter any excavation less than 5 feet deep when the sides are losing their shape, are loose or show other signs of being unstable unless protective systems are in place to protect from cave-in or sloughing.

Excavations 5 ft Deep or Deeper

The OSHA standard for trenching and excavation requires protective systems for trenches that are 5 feet or deeper unless the excavation occurs in stable rock. Types of protective systems include sloping, shoring and shielding.

Excavations More Than 20 ft Deep

Protective systems for all excavations more than 20 ft deep will be designed and approved by a registered professional engineer and the work may be contracted out.

Protective System Selection

The competent person will select the method of protection that is most suitable for the particular excavation site, taking into consideration soil type and surrounding structures. Systems must be designed by a professional engineer.

Types of Protective Systems

Excavations in which employees could potentially be exposed to cave-ins will be protected by:

- Sloping or benching the sides of the excavation; *or*
- Supporting or shoring the sides of the excavation; *or*
- Placing a shield between the side of the excavation and the work area.

Exempt Excavations.

The following excavations do not require protective systems:

- Excavations made entirely in stable rock; *or*

- Excavations are less than 5 ft (1.52 m) deep and examination of the ground by a competent person provides no indication of a potential cave-in.

A fixed means to safely exit exempt excavations will be provided for workers.

Sloping and Benching Systems

The competent person or supervisor will select and construct slopes and configurations of sloping and benching systems from the option below.

Use a registered professional engineer to design the sloping or benching system based on professional judgment.

Benching Systems.

- Benching is not permitted in Type C soil.
- Benching may be one of two types:
 - Single level or step not exceeding 4 ft high; *or*
 - Multiple levels or steps, each not exceeding 4 ft high.

Benching may be used in conjunction with simple sloping. Benches must be below the maximum allowable slope for that soil type. For example, a 10-ft-deep trench in Type B soil must be benched back 10 ft in each direction with the maximum 45 degree angle.

Worker Safeguards

Workers must not work on the faces of sloped or benched excavations at levels above other employees except when employees at the lower levels are adequately protected from the hazard of falling, rolling, or sliding material or equipment.

Shoring and Shielding Systems

Use a registered professional engineer to design the shoring and shield protective systems. Designs must be in the form of a written plan kept at the jobsite during construction of the protective system.

Shoring

Trenches 5' or deeper require a protective system unless the excavation is made entirely in stable rock. Use a registered professional engineer to design the protective systems. Designs must be in the form of a written plan kept at the jobsite during construction of the protective system.

Shoring is used when the location or depth of the trench makes sloping back to the maximum allowable slope impractical. Shoring will be used for unstable soil or depths greater than 5 ft unless benching, sloping, or another acceptable plan is accepted by the competent person.

Installation and Removal of Shoring or Support Systems

Installation of a shoring or support system will be closely coordinated with the excavation of trenches. All shoring will be installed from the top down and removed from the bottom up.

Installation Procedures

Members of shoring or support systems will be securely connected together to prevent sliding, falling, kick-outs, or other predictable failure.

Support systems will be installed and removed in a manner that protects employees from cave-ins, structural collapses, or from being struck by members of the support system.

Individual members of support systems will not be subjected to loads exceeding those that those members were designed to withstand.

Removal Procedures

Before temporary removal of individual members begins, additional precautions will be taken to ensure the safety of employees, such as installing other structural members to carry the loads imposed on the support system.

Removal will begin at, and progress from, the bottom of the excavation. Members will be released slowly so as to note any indication of possible failure of the remaining members of the structure or possible cave-in of the sides of the excavation.

Backfilling Procedures

Backfilling will progress together with the removal of support systems from excavations. Excavation of material to a level no greater than 2 ft (0.6 m) below the bottom of the members of a support system will be permitted, but only if the system is designed to resist the forces calculated for the full depth of the trench and there are no indications while the trench is open of a possible loss of soil from behind or below the bottom of the support system.

Shields

A trench shield may be used as long as the protection it provides is equal to or greater than the protection that would be provided by the appropriate shoring system. The competent person or supervisor must follow manufacturer's instructions for premade boxes and shields once a design has been chosen.

Shields may be used in conjunction with sloping or benching.

Load Requirements

Shield systems will not be subjected to loads exceeding those that the system was designed to withstand.

Installation Requirements

Shields will be installed in a manner to restrict lateral or other hazardous movement of the shield in the event of the application of sudden lateral loads.

Worker Protections

Workers will be protected from the hazard of cave-ins when entering or exiting the areas protected by shields. Workers will not be allowed in shields when shields are being installed, removed, or moved vertically.

Excavations Below the Depth of the Shield

Excavations of earth material to a level not greater than 2 ft below the bottom of a shield will be permitted, but only if the shield is designed to resist the forces calculated for the full depth of the trench and there are no indications while the trench is open of a possible loss of soil from behind or below the bottom of the shield.

Protective System Materials and Equipment

Maintenance of Materials and Equipment

Materials and equipment used for protective systems will be free from damage or defects that might impair their proper function. Manufactured materials and equipment used for protective systems will be used and maintained in a manner that is consistent with the recommendations of the manufacturer and in a manner that will prevent employee exposure to hazards.

Damaged Materials and Equipment

When material or equipment that is used for protective systems is damaged, a competent person will examine the material or equipment and evaluate its suitability for continued use. If the competent person cannot ensure that the material or equipment is able to support the intended loads or is otherwise suitable for safe use, such material or equipment will be removed from service and will be evaluated and approved by a registered professional engineer before being returned to service.

Emergency Rescue Operations

In the event of any emergency situation requiring rescue from an excavation, workers will not attempt to enter an unprotected excavation or trench to perform rescue. Local emergency services will be notified using the standard reporting system.

Rescue operations that can be performed safely from outside the excavation, such as hoisting a harnessed victim, will be carried out. Other personnel in the excavation will exit immediately and may provide assistance only when their own safety is ensured.

Accident Investigation and Near-Miss Reporting

Accident Investigation

If an employee sustains a work-related injury, the employee or a co-worker will immediately notify the supervisor of the work-related injury or illness, and the supervisor will ensure that the injured or ill employee receives prompt medical treatment. The employee will complete the

employee part of the Accident Incident Report in Workday and an 801 form if medical treatment is sought. The 801 form must be submitted to AGP within 2 days of the injury.

Near-Miss Incident

The investigation procedures for near-miss incidents will follow an abbreviated outline derived from the Accident Investigation procedures. Supervisors will use the Accident Incident Report in Workday for gathering information about near misses.

Any person who observes or causes damage to property or equipment will immediately report such damage to a supervisor.

Contractors

All contractors and contractor employees must have their own excavation and trenching safety policies that are in compliance with federal and any applicable state and local regulations. They must also comply with the requirements of this Policy and any additional requirements stipulated by the plan administrator and competent person.

TRAINING:

All employees, including contractors, involved in trenching or excavation work must be trained in the requirements of this Policy before any trenching- or excavation-related activities begin.

Supervisor Training

All supervisors of trenching and excavation activities must satisfy OSHA requirements for a competent person. Such supervisors must attend competent person training conducted by a trainer approved by the plan administrator or designee.

Employee Training

Personnel who perform work in trenches or excavations must comply with the requirements of this Policy and receive appropriate training that will include:

- Safe work practices during work in excavations.
- The use of personal protective equipment (PPE) that will typically be required during work in excavations.
- Procedures to be followed if a hazardous atmosphere exists or could reasonably be expected to develop during work in an excavation.
- Emergency and nonentry rescue methods and procedures for calling rescue services.

Refresher Training

Refresher training will be performed whenever worksite inspections conducted by the supervisor or the plan administrator or designee indicate that an employee or contractor does not have the necessary knowledge or skills to safely work in or around excavations.

Training Records

Training records will be maintained by the site administrator or designee.

RECORDKEEPING:

The competent person or supervisor will ensure that the following records and documents are kept for each excavation or trench project in a place accessible for inspection by authorized personnel and regulatory agency staff:

- The credentials of the competent person(s).
- Soil classification methodology and results of tests.
- Methodology and background information used to determine which protective systems are required and the type of systems used.
- Records of the employee training program, including dates of training and attendee lists
- Safety program enforcement activities.
- Worksite inspection reports or logs.
- The aspects of the protective systems that have been designed or approved by a registered professional engineer, including the name of such individual or, if a firm, the firm's name, the name of the engineer of record that approved the work for the firm, and the registration number.
- Where applicable, evidence that the registered professional engineer of record is in fact working within a discipline applicable to the excavation work.
- Accident investigation and near-miss incident reports.
- Copies of related safety and health plans.
- Injury and illness records.

INQUIRIES / QUESTIONS: Questions pertaining to this guidance may be directed to AGP at (503) 584-3588.



Tracy Garcia
Adjutant General Personnel
Oregon Military Department

PLAN ADMINISTRATION
Personnel Contact Information
Excavation and Trenching Policy 99.200.15 Attachment A

Function	Name/Department	Contact Information
Plan Administrator		
Supervisor(s)/Competent Person(s)		
Supervisor(s)/Competent Person(s)		
Registered Professional Engineer(s)		

DAILY INSPECTION CHECKLIST FOR TRENCHING/EXCAVATION SITES

Excavation and Trenching 99.200.15 Attachment B

Competent Person:

Project:

Trench Location/Station and Dimensions:

UTILITIES

Yes N/A

1. Utility locates contacted at least 2 working days prior to start of digging, and appropriately marked and identified.
2. Underground installations have been protected, supported, or removed when the excavation is open.
3. Surface encumbrances such as utilities, utility poles, foundations, transformer vaults or other structures are supported or removed.
4. Equipment operator(s) is aware of energized overhead uninsulated powerlines and required approach distances (10' minimum for lines <50kV; 20' minimum unknown Voltage; with a dedicated spotter)

EXCAVATION/TRENCH

Yes N/A

1. Soil classified using 1 visual and 1 manual method, or default Type C.
2. Employees are protected from loose rock or soil.
3. All employees are wearing proper PPE.
4. Spoils, materials, and equipment are set back at least 2' from the edge.
5. The work area has been identified using barricades, fencing, or some other physical barrier.

6. Traffic control plan has been completed and implemented.
7. High visible clothing is worn by all employees exposed to vehicular traffic.
8. Excavations 6" or deeper with walkways or bridges are equipped with guardrails.
9. Employees are prohibited from working or walking under the suspended loads.
10. Employees are prohibited from working on faces of sloped/benched excavations above other employees.
11. A warning system has been established and used when mobile equipment is operating near the edge of the excavation.
12. A means of egress (e.g. ladders, steps, ramps) has been provided so that no employee must travel further than 25'.
13. If ladders are used for egress, they are secured and extend at least 3' above the top of the excavation.
14. If wood ramps are used for egress, they are constructed of uniform material thickness and cleated together at the bottom.
15. All employees entering the trench have documented training on requirements for excavation/trenching and protective measures

WET CONDITIONS

Yes N/A

1. Precautions have been taken to protect employees from hazards posed by water accumulation.
2. When water removal equipment is in operation, it is being monitored by the competent person.
3. Surface water is collected or diverted.
4. An inspection of the excavation, adjacent areas, and protective system is performed after each rainstorm.

HAZARDOUS ATMOSPHERE

Yes N/A

1. Where a hazardous atmosphere could reasonably exist, the atmosphere is being tested for low or high oxygen, hazardous vapors, and toxic gasses before employees enter the excavation.
2. Emergency response equipment is readily available where a hazardous atmosphere could exist (e.g., retrieval unit).

COMMENTS