

EXCAVATIONS AND SHORING

This practice describes the safety and work practices that apply to employees working in or around excavations who may be exposed to hazards such as cave-ins or collapses, hazardous atmospheres, motorized equipment or other hazards.

REGULATED TRENCHES

A trench is defined as a narrow excavation in which the depth is greater than the width, although the width is not greater than 15 feet. An excavation is any man-made cavity or depression in the earth's surface.

OSHA regulated trenches are all trenches over five feet deep (four feet in Washington and California). They must be sloped, shored, sheeted, braced or otherwise supported. When soil conditions are unstable, or other hazardous conditions are found, excavations shallower than five feet, must also be sloped, supported or shored.

Unregulated trenches are less than five feet deep but may require employees to enter and work within its confines to complete a task.

TRAINING REQUIREMENTS

All employees subject to working in OSHA regulated excavations or trenches must successfully complete, prior to such work, an initial Competent Person educational safety training course, through Training and Development. On-line trenching and excavation awareness training is required annually, thereafter.

An OSHA defined "Competent Person" is a person who has been trained and is proficient in trenching and excavation safety. A Competent Person has the authority to take prompt corrective action to eliminate existing or potential hazards and to stop work when required to protect the safety and health of an employee, public or the integrity of any structure.

CenturyLink employees can not be the designated competent person for any non-CenturyLink employee or contractor who may enter the excavation.

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Other employees, whose job does not require them to work in an OSHA regulated excavation or trench but who may work in the vicinity of, or topside of an OSHA regulated excavation or trench or who may work in an unregulated trench must complete an on-line Excavation and Trenching Awareness course available through Training and Development.

RESPONSIBILITIES

Supervisors are responsible for ensuring that all employees involved with trenching and excavation work have been properly trained and follow all company practices and the OSHA regulations.

Supervisors are responsible for ensuring that a Company trained Competent Person inspects **all regulated trenches**. Supervisors must maintain a copy of all completed Trenching and Excavation Assessment Forms.

The Competent Person is responsible for ensuring that inspections are completed daily and after any event which may change the conditions and render the trenching and excavation to be unsafe, such as a rainfall event.

The Competent Person has the responsibility to ensure an Excavation Assessment Form is completed daily, signed and given to the Supervisor.

Each employee has the responsibility of complying with all company Safety & Health Practices, OSHA requirements, properly wearing required Personal Protective Equipment (PPE) and completing required training.

Daily Inspections

Using the Excavation Assessment form found in Appendix A, a competent person must make daily inspections of the excavation and adjacent areas, as well as the protection system used in the excavation. The inspections must be conducted prior to the start of work on a daily basis and as needed throughout the shift. Inspections must be made after every rainstorm or other event that may increase the probability of a cave-in.

A re-inspection of the excavation by a competent person is required:

- After each significant rainstorm
- When other activities could negatively impact the work site (such as vibration from heavy equipment)
- If cracks or fissures appear in or adjacent to the excavation face
- If clumps of earth spill off the excavation face
- When bulging in the excavation face occurs

If one of these circumstances or other potentially hazardous condition exists, such as the smell of natural gas, leave the excavation immediately. Do not re-enter until the excavation has been re-inspected and the inspection documented by a competent person.



Note! *The Excavation Assessment form must be filled out prior to any CenturyLink employee, including the competent person, entering the excavation.*

CenturyLink employees will not enter any regulated trench without first confirming that the competent person daily inspection has been completed and documented.

Employees must contact their supervisor if conditions other than those listed on the checklist arise and could affect soil stability or present other hazards.

ATMOSPHERIC TESTING

The competent person is responsible for determining the need for atmospheric testing. Testing will be completed in trenches more than four feet deep when any of the following situations occur in or around the excavation.

- Above ground gas storage or piping within 100 feet of excavation (Check for LFL or lack of oxygen.)
- Working in an old landfill area (Check for lack of oxygen, or methane.)
- Working in high traffic area (Check for carbon monoxide.)
- Nearby storage of hazardous substances
- Any other potential hazard

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Important! *Employees are not allowed to enter excavations with hazardous atmospheres. All atmospheric hazards must be remedied before employees enter the excavation.*

The competent person will ensure monitoring throughout the work process.

At a minimum, the competent person will ensure the functional/pump “bump” test is completed each day before use. Inspect the aspirator bulb, motorized pump (if equipped), and the hose.

Test trenches one foot from the bottom, in the middle, and one foot below the top. Continue to monitor trenches as needed.

Employees will not be allowed in trenches if the oxygen content is lower than 19.5% or higher than 23.5%, if the lower flammable limit (LFL) is above 10%, or if measurements of carbon monoxide consistently exceed 50 parts per million (PPM). The competent person must investigate when carbon monoxide concentrations consistently exceeds 25 ppm and take action to reduce concentrations until the fall consistently below this level.

If the atmosphere is oxygen deficient, the competent person and the Regional Environmental Health & Safety Manager will determine safety measures to remedy the problem, such as ventilation. If a blower is used to ventilate the air, the competent person will monitor the blower operation and make sure it is placed at least two feet from edge of the trench.

WORKING IN AND AROUND A TRENCH

Protective systems (such as shoring, sloping or using “trench boxes”) are required when:

- Excavations are five feet or more deep (four feet in Washington).
- Excavations are less than five feet, but the competent person determines there is an indication of a possible cave-in

Entry and exit ladders must be placed within 25 feet laterally of employees working in an excavation deeper than four feet and must extend at least three feet from the top of the excavation.

Employees working in trenches must have a hard hat on and wear appropriate safety footwear.

Employees should be safely spaced out in a trench unless there is a necessity for working close together. Employees should stay out of the immediate area of excavation equipment and not work ahead of the shoring.

All excavated materials shall be placed a safe distance back, a minimum of two feet, from the edge of the trench. .

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Tools and rocks must either be placed on the outer slope of the excavated materials or on the other side of the excavation if the surface is flat, opposite the spoil pile.

When employees are working on hard surface roads where a flow of traffic is being maintained, it is important that small stones and other debris be removed from the road in the vicinity of the excavation. Stones can be thrown with great speed by the tires of passing vehicles, which can result in a serious accident. Work area protection, signs and cones must be placed when work interferes with vehicle traffic, in accordance with state and/or Federal Manual of Uniform Traffic Control Devices (MUTCD) requirements.

Employees are prohibited from walking under suspended loads.

Precautions must be taken to protect employees from water accumulation. All water removal equipment must be monitored by the competent person. Any surface water must be controlled or diverted.



Important! Be aware, falls can result when employees fail to look where they are going, walk too close to the edge, or when they attempt to leap across the trench.



Important! Rocks and tools near the edge are not only a hazard to people working in the trench, but can cause falls into the trench by workers on the surface.



Important! Use extra care near the edge of trenches or excavations when the weather is bad or if conditions are icy or muddy.

Any excavation left unattended must be barricaded with warning devices for protection of the general public.

When vehicles, internal combustion engines, or heavier-than-air gases (like propane) are used in or near excavations, precautions must be taken against exhaust gases entering the excavation. Calibrated and working gas monitors must be properly used to determine if the excavation is free of harmful gases.

In case of an emergency, employees must be able to leave the trench quickly. OSHA regulations require, when employees are required to be in trenches four feet deep or more, an adequate means of exit such as a ladder or steps must be provided and located so as to require no more than 25 feet of lateral travel to exit the trench.

EXCAVATION AND TRENCHING HAZARDS

Trenching and excavation accidents often result in crippling injuries or death. Many workers do not recognize the hazards associated with this work. Great care must be taken when excavation or trenching work is a part of a crew's activity.

Hazards of excavation or trenching work include and are not limited to:

- (1) Collapse or failure of excavation walls burying workers and equipment.
- (2) Materials, tools, and equipment falling into excavations and striking workers below.
- (3) Hazards involving public utilities, such as electricity, water, gas, railroad signals, natural gases and oxygen-deficient atmospheres.
- (4) Wet and muddy conditions, causing slips, trips, or falls which are complicated by limited space in the excavation.
- (5) Falls of persons when climbing into or out of the excavation.
- (6) Employees working too close together.
- (7) Stumbling over equipment or excavated material, or falling into the excavation.
- (8) Precautions must be taken to protect the general public.

PRE-JOB PREPARATION

Pre-job planning must be done prior to any project involving trenching and excavation. This planning includes consideration of:

- (1) Traffic
- (2) Nearby structures
- (3) Soil type
- (4) Surface and ground water
- (5) Water table
- (6) Underground and overhead utilities
- (7) Weather

Traffic

Patterns of vehicular and pedestrian traffic in the area must be evaluated. The time of day (peak rush hour) should be a consideration. Vehicular traffic can cause vibration, which can affect the stability of the excavation.

Barricades must protect employees working in or near roadways.

Fire hydrants must remain accessible at all times.

Flaggers must be provided with, and be required to wear ANSI Class 2 or 3 safety vests with reflectorized material. State requirements may dictate Class 2 or 2 garments.

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The job site supervisor and employee's working at the site must be familiar with work zone safety barricading and coning requirements.

Nearby Structures

A licensed Professional Engineer must evaluate any building or structure that will be within the area of operation or near the excavation. Any indication of a need for an engineering evaluation must be determined early in the pre-job planning phase to allow time for evaluations to be completed prior to any trenching/excavation activities.

Soils

OSHA regulations specify three Soil classifications; Type A, Type B or Type C.

Company policy dictates that **ALL excavations will be assumed to be in type C Soils.** Type C soils are the most unstable and require the utmost care in, inspections, sloping or placement of shoring equipment

SOIL CLASSIFICATION SYSTEM

The following information is provided for reference only. CenturyLink will classify all excavations as Type C soil. OSHA requires both manual and visual tests for soil not classified as Type C.

Soil Classifications:

- Stable Rock
- Type A
- Type B
- Type C

No soil is Type A if:

- Fissured
- Subject to vibration
- Previously disturbed
- Part of a layered system dipping into the excavation on a slope of 4H:1V or greater

Type B soils are:

- Previously disturbed soils except those that would be classed as Type C Type
- Type A soil that is fissured or subject to vibration
- Dry rock that is not stable
- Part of a layered system dipping into the excavation on a slope of less than 4H:1V, but only if soil meets requirements of Type B

Type C soils are:

- Submerged or soil from which water is seeping
- Submerged rock that is not stable
- Part of a layered system dipping into the excavation on a slope of 4H:1V or steeper

Surface and Groundwater

Surface runoff that may affect the spoil pile, the sides of the trench or excavation and the bottom of the trench or excavation must be considered. Every effort will be made to divert water away from the work area. Existing ground water such as ponds, lakes, and ditches must be carefully considered to determine what effect they may have on the trench or excavation.

Water Table

Job site water table depth shall be evaluated on a pre-job planning basis, if possible. Ground water can have serious deterioration effects on sidewall conditions. Ground water also can cause layering, which may allow different kinds and conditions of soil to slide laterally, even though cut to an appropriate angle of repose.

Employees will not work in an excavation where there is an accumulation of water. Any pumps must be monitored by a competent person to ensure proper operation. If excavation work is done in areas where natural drainage of surface water can reasonably be anticipated, dikes will be used to prevent surface water from entering the excavation and provide adequate drainage away from the area.

Underground and Overhead Utilities

The job site supervisor is responsible for contacting “one call locator services” for underground utility locating. Where these services are not available, each utility company will be contacted to provide locates for underground utilities.

Overhead utilities must be considered and blanketed by the Utility Provider as necessary to avoid contact by workers and equipment with those utilities.

For lines rated 50 kV or below, minimum clearance between the lines and any part of the equipment or load shall be 10 feet.

For lines rated over 50 kV, minimum clearance between the line and any part of equipment load shall be 10 feet plus 0.4 inch for each 1 kV over 50 kV.

A person must be designated to observe clearance of the equipment and give a timely warning for all operations where it is difficult for the operator to maintain the desired clearance by visual means.

Superimposed loads and vibrations

Superimposed loads in the vicinity of a trench or excavation increase the pressure on excavation walls. Heavy equipment and materials such as pipes, timbers, spoils, must be kept at least two feet from the edge of excavation. When heavy loads must be located near an excavation, the walls may require extra bracing or sheet piling to safely support the extra weight. In some cases, it may be necessary to lessen the pressure of these loads. Pile drivers or cranes, for example, would be mounted on wooden mats or heavy planking to spread the weight more evenly.

Buildings, curbs, trees, utility poles and other structures adjoining the excavation area can place more stress on a trench side than it can safely accommodate. In these instances, OSHA requires that shoring, bracing or underpinning be provided as necessary to protect workers and to prevent the dislocation of the soil beneath the structure in the vicinity.

Vibrations or sudden shock from passing trains, vehicles, blasting, equipment (such as trucks or pile drivers) and some tools can contribute to cave-ins by loosening the soil.

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Even machines operated in nearby buildings, such as punch presses, can create enough vibration to endanger a shoring system. If these conditions exist near an excavation site, stronger support is vital.

Weather

Anticipated weather conditions must be taken into consideration. The start and completion date of the project may potentially offer exposure to weather conditions, such as rain, freeze/thaw cycles and dry conditions. All of these weather conditions may have negative effects on the trenching or excavation.

Excavation Slope

Each employee in an excavation must be protected from cave-in by using either an adequate sloping/benching system or an adequate support/protective system.

Exceptions to this requirement are limited to; unregulated trenches less than five feet in depth (four feet in Washington and California) where examination provides no indication of a potential cave-in.

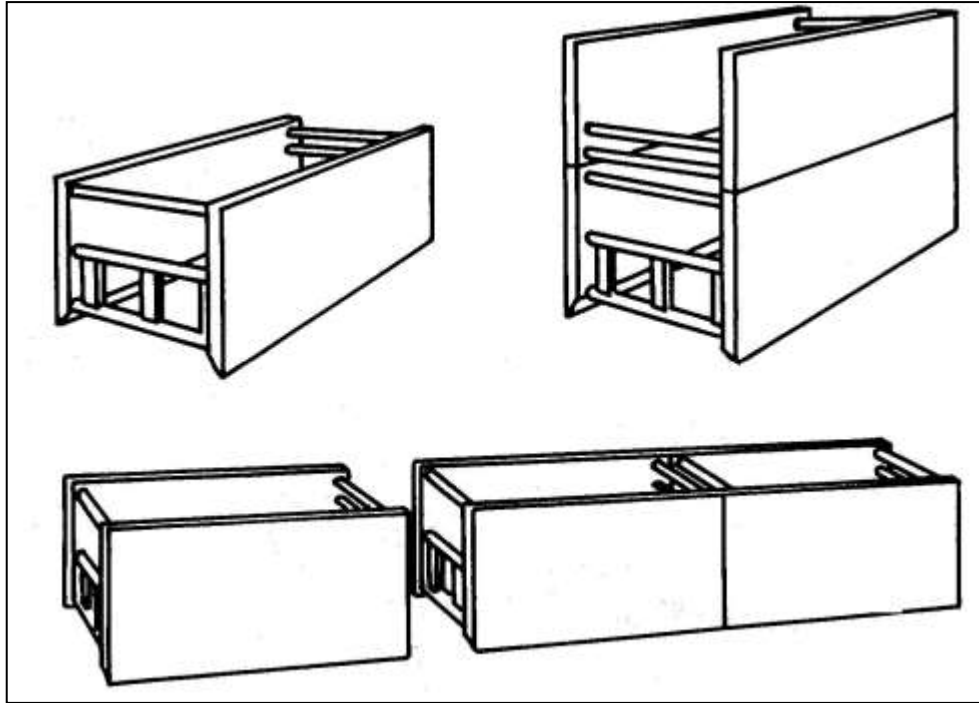
Protective systems must be capable of resisting all loads that could be reasonably expected to be applied to the system.

Best practice is to utilize Trench Boxes provided and installed by a qualified local vendor.

Trench Boxes

Trench boxes are pre-built shield systems designed to manufacturer's tabulated data. These boxes must be used in accordance with all specifications, recommendations, and limitations issued or made by the manufacturer.

Trench Box Diagram-1



Trench boxes must not be used at a depth greater than that for which they were designed.

The shield must be installed in a safe manner to restrict lateral or other hazardous movement of the shield in the event of a sudden cave-in. The closer a properly constructed trench shield/box is to the trench wall, the less chance that it could be dislodged by a lateral force.

Employees must not be allowed in trench boxes when they are being installed, removed, or moved vertically/horizontally.

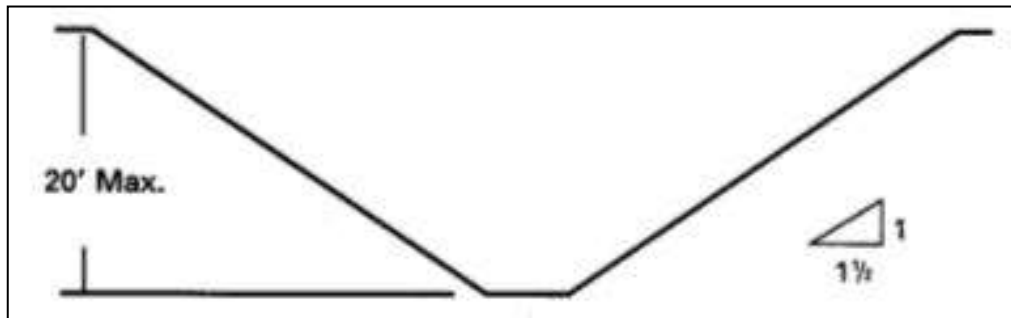
Employees must not work outside of the protective structure of the trench box where protective systems are not provided.

Sloping and Benching

Sloping and benching system requirements are specified below for Excavations between four and 20 feet deep. The angle of the slope or bench is determined by the class of soil present at the excavation site.

The competent person must assume the worst classification of soil (i.e. the most unstable), Type "C", and angle the sides of the excavation 34 degrees (i.e. 1 1/2 H to 1 V).

Sloping Diagram-2



SUPPORT SYSTEMS

Where preassembled shield systems or sloping/benching is not available or feasible, the Competent Person must implement an appropriate system designed to OSHA criteria (i.e. aluminum hydraulic shoring), or have written approval by a registered Professional Engineer to implement the system designed by the Competent Person.

CenturyLink employees must not enter an excavation supported by timber shoring. Laminate sheeting or uprights specifically designed by the manufacturer to be used with hydraulic or "speed shoring" is acceptable.

EMERGENCY AND RESCUE PROCEDURES

Be prepared for an emergency before it happens. Obtain the following information and keep it available throughout the work operation:

- Location of nearest communication system
- Address of the excavation
- Number of potential victims
- Approximate size and measurement of the excavation
- Details of any special hazard

In the event of an emergency at the work site:

- Call 911.
- Keep water removal equipment or ventilation systems working.
- Meet rescue personnel and brief them on the situation.
- Do not use heavy equipment to locate a covered worker.
- Do not allow other workers in the excavation.
- Keep people away from the trench unless they are performing tasks necessary to the emergency.

COMPETENT PERSON EXCAVATION DAILY INSPECTION

Appendix A

SITE LOCATION:			
DATE OF INSPECTION:		TIME:	
NAME(S) OF CENTURYLINK COMPETENT PERSON(S):			
PHONE NUMBER		CELL NUMBER (CIRCLE)	
NAME OF ALL CENTURYLINK EMPLOYEES ENTERING THE EXCAVATION (use the back of this sheet if necessary):			
CHECK FOR THE FOLLOWING:			
Traffic Exposure and Work Area Protection	All employees exposed to vehicle traffic must wear a reflective vest.	Hazardous Atmospheres	Test for explosive atmosphere (as you would test a utility hole) under the following criteria:
	Proper Work Area Protection is established.		Petroleum storage tanks (above or below ground) within 100 ft.
	Excavations left open are adequately protected with barriers and/or barricades.		Excavation site is in or near an existing or previous swamp or landfill.
	Where employees/equipment is required to cross over the excavation, walkways or bridges with guard rails are provided.		NOTE: If any gas level is indicated on the meter, or if you have concerns with regard to air quality, DO NOT enter the excavation. IMMEDIATELY stop work and contact your supervisor.
Utility Installations	Utility locations established prior to opening excavations.	Exposure to Falling Loads	Employees are not permitted underneath loads handled by lifting or digging equipment.
	Utilities are protected, supported or removed while excavation is open.		
Surface Encumbrances	Trees, poles, sidewalks, landscaping, etc. that create a hazard are removed, supported or properly guarded.	Water Accumulation Protection	Steps are taken to prevent water from accumulating in the excavation (pumps, diversion ditches, dikes, etc.)
Stability of Adjacent Structures	Shoring, bracing or underpinning is provided to ensure stability of adjoining buildings, sidewalks or streets, walls, etc.	Sloping	Sides of the excavation are at the proper angle.
Placement of Spoil Pi	Excavated soil or other material/equipment is at least 2 ft back from the edge of the excavation.	Shoring Systems	Trench shields/boxes are not subject to loads that exceed the capacity designed by the manufacturer.
	NOTE: Shoring must not be used to retain a spoil bank unless the height of the spoil pile is figured into the depth of the excavation in determining the requirements of the shoring system.		Aluminum hydraulic shoring is installed according to the revised OSHA "Aluminum Hydraulic Shoring" Table D-14.
Protection from Loose Rocks or Soil	Employees are protected from rocks or soil falling off the excavation face.	Access/Egress	A safe means of entry/exit is provided every 25 ft. in excavations over 48" deep.
			Ladders must be properly placed, secured and extend at least 3 ft above the excavation.
SOIL CLASSIFICATION:		EXCAVATION DEPTH:	
EXCAVATION WIDTH AND LENGTH:			
NOTE: Re-inspection is required after a rainstorm, if there has been hazard-increasing activities such as exposure to vibration from traffic, if cracks or fissures appear in or adjacent to the excavation face or if clumps of earth spill off the excavation face. If any of the above occur, exit the excavation immediately and have a competent person re-inspect the excavation and complete a new Competent Person Excavation Assessment form.			

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