



Central Washington University

Excavation, Trenching and Shoring Program

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1.0 Policy

Protecting employees in operations involving excavations or trenching is a very high priority. In order to reduce the hazards associated with excavating and trenching operations, the following specific procedures have been developed (WAC 296-155-650 Thru 664)

2.0 Definitions

- 2.1 Trenches – Trenches are defined as narrow excavations [WAC 296-155-650(26)]. Throughout this plan, all statements referring to excavations also apply to trenches.
- 2.2 Competent Person – One who can identify existing or predictable conditions in the surroundings that are unsanitary, hazardous, or dangerous to employees. They must be knowledgeable in the WAC requirements and have authorization or authority to take prompt corrective measures to eliminate the hazards [WAC 296-155(2)(f)].
- 2.3 Benching – This refers to the method of protecting employees from excavation cave-ins by cutting the excavation sides to form one or a series of horizontal levels or steps, usually with vertical or near-vertical surfaces between levels. See WAC 296-155-66403 figures N-3, N-8, and N-9.
- 2.4 Utility Locates – This refers to the process of identifying the specific location of all utilities before excavating begins (see section 15.0: Underground Utilities).
- 2.5 Exceptions - Approval from a supervisor is necessary to perform operations or use procedures that differ from the guidelines in the following sections.

3.0 Excavations 4 Feet Deep or Greater

Except in solid rock, the sides of trenches and excavations (including embankments) more than 4 feet in depth must be sloped, benched, supported, shored, sheeted or braced in a manner sufficient to protect against hazards associated with the collapse of vertical excavation walls.

4.0 Excavations Less Than 4 Feet

Trenches less than 4 feet in depth must be effectively protected when there are indications that hazardous ground movement is possible.

5.0 Equipment Procedures

5.1 Backhoe Operations

- 5.1.1 Trained Operators – Only persons with prior training and experience are permitted to operate a backhoe. Documentation of training and experience will be maintained at the Jongeward Plant Services building office.
- 5.1.2 Spotter/Safety Monitor – A spotter/safety monitor must assist the backhoe operator when digging in areas of potential hazard from electrical or gas utilities or when working in high pedestrian activity areas (also see section 18.0: Observers).
- 5.1.3 Hard Hats – Workers within the caution area, as well as the backhoe operator, must wear an approved hard hat.
- 5.1.4 Workers Within the Excavation – No worker is allowed within the excavation while the end of the backhoe arm is also within the excavation. Workers must exit to a safe location while materials are being positioned

above or lowered into the excavation. While a person is within the excavation, the backhoe arm shall be positioned away from the top edge of the excavation, so that the end of the arm cannot reach the worker, in case of an inadvertent activation.

5.2 Skid Loader (Bobcat) Operations

5.2.1 Trained Operators – Only persons with prior training and experience are permitted to operate a skid loader (also referred to as a Bobcat). Documentation of training and experience will be maintained at the Jongeward Plant Services building office.

5.2.2 Caution Area – A designated caution perimeter should be maintained around excavations, by using barriers, caution tape and/or signage. The size of the caution perimeter is to be 6 feet greater than (when available) the reach of the skid loader. Observers are to remain outside this perimeter at all times.

5.2.3 Spotter/Safety Monitor – A spotter/safety monitor must assist the backhoe operator when digging in areas of potential hazard from electrical or gas utilities or when working in high pedestrian activity areas (also see section 18.0: Observers).

6.0 **Deep Excavations**

Protection systems for use in excavations more than 20 feet in depth must be designed by a registered professional engineer.

7.0 **Storage of Excavated Material**

7.1 Away From the Edge – In excavations or trenches where employees are required to work, excavated or other material will be stored and retained at least 2 feet away from the upper edge.

7.2 Barriers – Barriers or other effective retaining devices may be used to prevent excavated or other material from falling or rolling into the excavation or trench.

8.0 **Excavation and Trench Escape Routes**

When employees are required to be in excavations or trenches 4 feet deep or more, an adequate means of exit, such as a ladder or steps, must be provided and located within 25 feet of lateral travel. An earth ramp is acceptable providing all following are met:

- The stability of the earth is adequate for good footing.
- The total travel distance does not exceed 25 feet.
- Adequate shoring or equivalent protection is provided for the entire escape route.

9.0 **Selection of Shoring, Sloping or Benching System**

Whenever excavations are deeper than 4 feet, the use of sloping, benching, or shoring is required to protect the workers. The project supervisor will select the type of system that best suits the soil and work site conditions of each particular excavation.

10.0 **Sloping System Procedures**

10.1 Slope Faces – Employees must not work on the faces of sloped excavations at levels above other employees unless employees at the lower levels are protected from the hazard of falling, rolling, sliding material or equipment.

10.2 Allowable Sloped – A maximum slope of 1.5:1 or 34-degrees, will be the standard slope for CWU campus excavating work until further notice.

10.2.1 Actual Slope – The actual slope must be less than the maximum allowable slope when there are signs that a cave-in is imminent or might occur as a result of fissures, slumping, bulging, the edge sinking or lowering, or materials separating from the face. In this case the slope should be reduced by a factor of at least ½ horizontal to 1 vertical which would bring the maximum allowable slope to 2:1.

The actual slope must be less than the maximum allowable slope whenever there is excess material or equipment next to the excavation or traffic next to the edge.

10.3 Slope Shoring, When Over 3.5 Feet Deep

Whenever sloping does not reduce the vertical slides of the excavation to 3.5 feet or less, shoring is required to support the vertical sides. The shoring must extend above the bottom of the slope a minimum of 18-inches to prevent material from sliding or rolling into the trench.

10.4 Other Requirements

For more information concerning soil types, soils testing procedures or other related issues and requirements WAC 296-155-657 through 664 in the WISHA Safety Codes – Construction Standards Chapter.

11.0 Shoring Systems

When sloping or benching is not feasible, then a shoring system meeting the WISHA requirements of WAC 296-155-661 must be provided. The supervisor must be consulted for instructions.

12.0 Surface Encumbrances

Trees, boulders, utility poles and other surface encumbrances in the vicinity that might create a hazard during excavating, must be made safe or removed before excavating work begins or continues.

13.0 Use of Backfilling, Covering or Barriers

13.1 Adequate physical barrier protection must be provided at all excavations or trenches.

13.2 All wells, pits, shafts, etc., must be barricaded or covered and clearly identified as a hazard.

13.3 Upon completion of exploration and similar operations, temporary wells, pits, shafts, etc., must be completely backfilled.

14.0 Inspections

14.1 Unusual Hazardous Conditions

Daily inspections of excavations, adjacent areas, and protective systems will be made by a designated competent person in situations that might result in a cave-in, failure of protective system, or other hazardous condition. An inspection will be conducted by the competent person before the day's work and throughout the shift as conditions require. Inspections will be made after every rainstorm or other hazard increasing event.

14.2 Potential Cave-ins

Whenever evidence of a situation that could result in a possible cave-in, failure of protective systems or other hazardous conditions is found, exposed employees will be removed from danger until the hazardous conditions have been corrected.

15.0 Underground Utilities

Whenever excavation operations approach the location of underground installations, the exact location of the installations shall be determined by a safe and acceptable means [WAC 296-155-655(2)(c)].

15.1 Utility Locating Policy

Utility installations, such as steam lines, electrical power lines, natural gas, sewer, telephone, and water lines, or any other underground installation shall be located prior to opening an excavation.

A request for a utility locate will be done on a “Utility Locate Form” (see sample at the end of this program). Testing shall be performed by a competent person using proper test equipment. After testing has been completed, this form must be filled out, signed and returned to the supervisor who will forward it to the crew, thereby alerting affected employees in writing of utility locations before digging begins.

15.2 Contacting Utility Companies

Utility companies must be contacted within established or customary local response times, advised of the proposed work, and asked to locate their underground utility installation prior to the start of actual excavation. This may require a 48 hour lead time. Notification of utility companies may be accomplished by using the Utility Locate Service (1-800-424-5555) or calling each individual utility company.

15.3 Support and Protection

While an excavation is open, underground installations will be protected, supported, or removed as necessary to safeguard employees.

15.4 Signs of Possible Unknown Utility Lines or Pipes

When digging, use caution if pea gravel, and, concrete, colored plastic tape or other evidence under the surface is discovered that might indicate the location of a utility line.

16.0 Water Hazards

Employees should not work in an excavation where water is seeping in unless adequate precautions have been taken to protect employees against the hazards of excess water accumulation. Protective measures may vary with each situation, but could include one or all of the following:

- Special shoring/support
- Shield systems to protect from cave-ins
- Water removal to control the water level or other effective means

17.0 Walkway and Bridge Requirements

Where employees or equipment cross over excavations or trenches, walkways or bridges with standard guardrails must be provided. Such walkways or bridges must be designed by competent persons according to accepted safety codes, procedures and practices.

18.0 Observers

Employees next to excavations, and not directly involved in the excavation work, will be protected by standard guardrails or equivalent means.

19.0 Top Person (Spotter/Safety Monitor)

No person is allowed to work in a trench over 4 feet in depth unless there is a top person in constant attendance. The top person must be in addition to the equipment operator when the person in the trench is not in constant view of the equipment operator.

