



EXCAVATION SAFETY PROGRAM

Document History

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0.1	May 2016	Initial Draft
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This document will be reviewed routinely and updated with changes as needed. Departments listed as having roles and responsibilities are provided with updated version of this document upon revision.

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Introduction

The purpose of this Guide is to establish work practices and procedures that will protect employees from hazards originating from excavation, and to ensure that every excavation project is reviewed as required, that all permits have been submitted before work begins, and so that all records are updated after work is completed. This program complies with the requirements of the Occupational Safety and Health Administration (OSHA) regulations, 29 CFR 1926 (Construction), Subpart P, *Excavations*.

Application

This program applies to excavation work on all University of Virginia properties or being performed by University of Virginia employees regardless of jobsite location.

Scope

This Guide applies to all University of Virginia employees and persons who are involved with excavation and trenching activities and/or operations. It discusses the proper procedures required of any employee participating in excavation projects.

Definitions

Benching (Benching system) means 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 means 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, and its sudden movement into the excavation, either by falling or sliding, in sufficient quantity so that it could entrap, bury, or otherwise injure and immobilize a person.

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

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

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

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

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.

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

Shield (Shield system) means 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 §1926.652 (c)(3) or (c)(4). Shields used in trenches are usually referred to as “trench boxes” or “trench shields.”

Shoring (Shoring system) means 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.

Sloping (Sloping system) means 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 means 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.

Trench (Trench excavation) means 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 (4.6 m). 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.

Responsibilities

All employees shall know and understand the laws for safe excavation set forth in the Virginia Professional Excavator’s Manual and the Virginia Underground Utility Marking Standards Also Known as the Damage Prevention Act. All employees shall complete the Damage Prevention “CARE” Training

Supervisor

- Shall oversee all excavation projects involving his or her personnel.
- Shall be responsible for ensuring all “competent persons” are trained and knowledgeable of additional duties.
- Shall identify all other persons responsible for excavation activities and/or operations and ensure they have the appropriate training.
- Will ensure a valid excavation permit has been submitted and that a signed copy is available on site. Maintain form for recordkeeping purposes.
- Responsible for ensuring that excavation equipment is in a safe operating capacity before beginning work.

- Are responsible for ensuring employees use the proper personal protective equipment and that they conduct themselves in a safe manner.

Competent Person

- Each day before work may begin, shall inspect the excavation, protective systems, and surrounding areas. Inspection will also be required after any hazardous occurrence, such as a rainstorm, or after damage to a trench box.
- Air quality tests shall be taken before employees enter excavations more than 4 feet deep if a hazardous atmosphere exists or when one is expected to exist (this includes checks for flammable gases and oxygen deficiency)
- Shall monitor water removal
- Shall have the assigned duty to remove individuals exposed to possible cave-ins or other hazardous conditions until necessary precautions have been taken to ensure their safety
- Shall conduct both visual and manual test/analysis
- Shall classify soil, then reclassify if necessary

Employee

- Employees are responsible for following the guidelines stated in this Guide as part of an effort to foster a safe work environment for all parties involved.
- Attend required training
- Wear assigned personal protective equipment.

General Requirements

- Before digging, locate underground utilities.
 - All excavation areas must be white lined before VA 811 ticket is called in.
 - Shall call in a valid VA 811 ticket before excavation is to start.
 - Shall have a valid VA 811 ticket on the job site
 - Shall allow the required time for utility marking
 - Shall read and understand all response codes from VA 811 tickets before excavation.
 - Shall know and understand the difference between an emergency ticket, a 3-hour notice ticket, and a normal ticket per the Professional Excavators Manual.
 - Shall look for unmarked utilities on site before excavation.
 - Shall do a site walk through before excavation to understand utility markings within excavation area
 - Shall call VA 811 for a utility remark when utility marks are disturbed by weather or construction
 - Shall respect and preserve the utility marks
 - Shall not excavate within two feet of a utility with mechanized equipment.
 - Shall plan and excavate carefully
 - Shall pothole and protect all utility crossings and exposed utilities
- Personal Protective Equipment (PPE) should be worn by all person's involved with excavation and trenching operations i.e. steel-toe safety boots or shoes, eye protection, leather gloves, hard hat, and hearing protection.
- There must be a safe means of access and egress to all excavations by way of ladders, steps, ramps, or other means of exit for employees working in trench excavations 4 feet or deeper. All access and

egress devices must be located within 25 feet of all workers. All ladders must be ANSI approved, extend at least 3 feet above the top surface of the excavation, and tied off if possible.

- Trenches 5 feet deep or greater require a protective system. If less than 5 feet deep, a “competent person” may decide whether a protective system is required.
- Trenches of 20 foot or greater depth will require protective systems designed by a professional engineer.
- Walkways shall be provided where employees or equipment are required or permitted to cross over excavations. Guardrails shall be provided where walkways are 4 feet or more above lower levels.
- Workers should not work in excavations where water is accumulating unless a means of water removal is in place.
- Ensure sufficient lighting is available for excavation operations occurring at night or during low-light situations.
- If hazardous conditions exist or have the potential to exist, emergency rescue equipment must be readily available on the worksite.
- Identify other sources that create instability within the trench.
- Keep excavated soil (spoils or spoil piles) at least 2 feet away from trench edges; to include other materials also.
- Keep heavy equipment at least 2 feet away from trench edges
- Do not work under suspended or raised loads and materials.
- Vehicle operators should stay inside of their vehicles during loading or unloading.
- All mobile equipment should be equipped with a backup alarm if possible. In cases where they are not, ground guides and hand and arm signals should be utilized.
- Vehicle and equipment operators should seek help when visibility is obscured.
- Excavations, when unattended, should have barriers or some type of physical protection to prevent people from falling into the excavation.
- Backfill all trenches when work is complete.

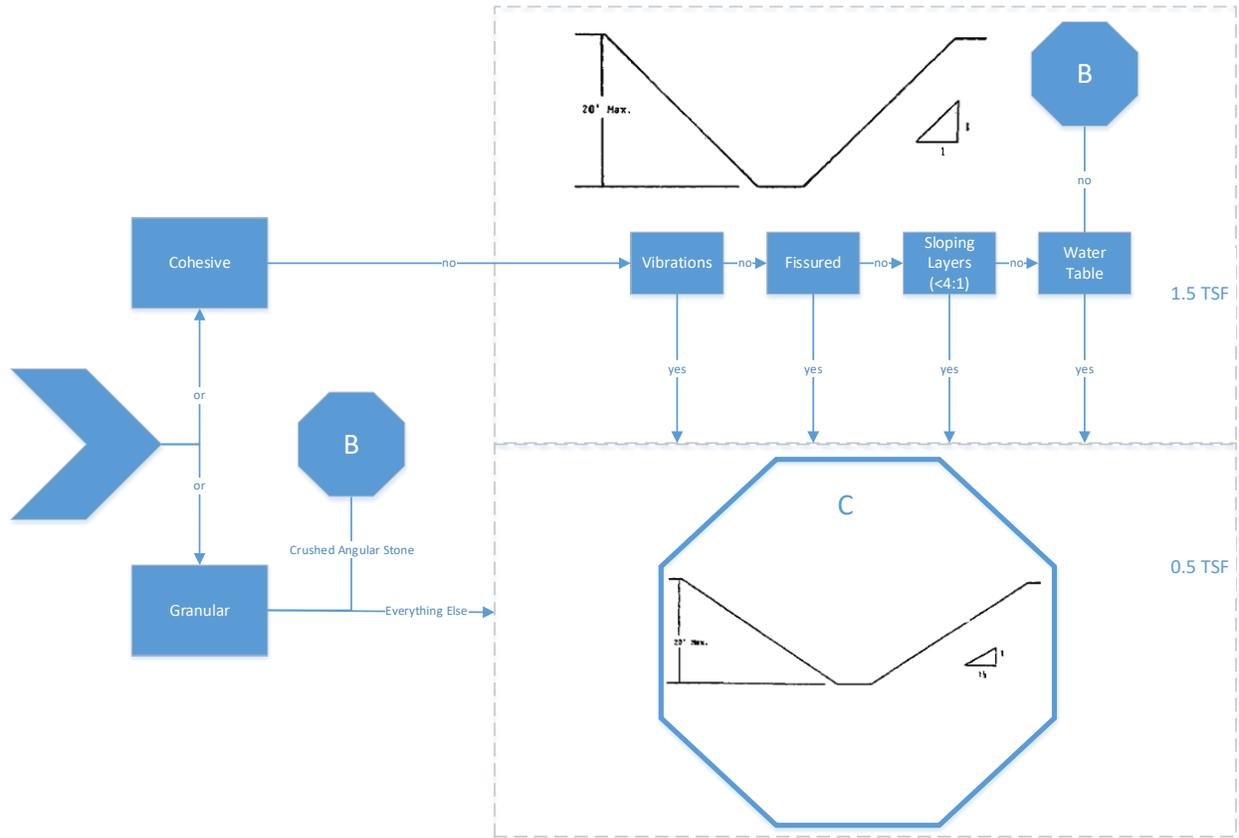
Excavating Equipment

These rules apply to the following types of earthmoving equipment: scrapers, loaders, crawler or wheel tractors, bulldozers, off highway trucks, graders, agricultural and industrial tractors, and similar equipment. Seat belts shall be provided on all equipment covered by this section and shall meet the requirements of the Society of Automotive Engineers. Seat belts need not be provided for equipment, which does not have rollover protective structure (ROPS) or adequate canopy protection.

- Rollover protective structures (ROPS) and supporting attachment shall meet the minimum criteria detailed in OSHA.
- All earthmoving equipment shall have a service braking system capable of stopping and holding the equipment fully loaded, as specified by the Society of Automotive Engineers.
- All bidirectional machines, such as earthmoving or compacting equipment, and similar equipment, shall be equipped with a signal alarm at an audible level, distinguishable from the surrounding noise, which is operational when the machine is moving in either direction. The signal alarm shall be maintained in an operative condition.
- Unauthorized personnel shall not be permitted to ride on powered industrial trucks. A safe place to ride shall be provided where riding of trucks is authorized.

Soil classification

UVA-FM Soil Classification



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MAXIMUM ALLOWABLE SLOPES

ROCK OR SOIL TYPE	MAXIMUM ALLOWABLE SLOPES (FOR EXCAVATIONS LESS THAN 20 FEET DEEP)
Type B	45° degrees
Type C	34° degrees