**Introduction**

The University of South Carolina has established this guide for compliance with the Occupational Safety and Health Administration (OSHA) regulation, "Excavations, Trenching and Shoring", 29 CFR 1926.650, .651, and .652.

**Scope and Application**

This Excavation Guide shall apply to all employees and contractors who are involved in excavation operations on property owned and/or operated by the University of South Carolina and shall apply for employees and contractor protection equivalent to aforementioned OSHA regulations. This guide conjunction with Occupational Safety and Health Administration (OSHA) regulation, "Excavations, Trenching and Shoring", 29 CFR 1926.650, .651, and .652 requires that a “Competent Person” onsite to evaluate and determine all appropriate safety requirements of the employees or contractors performing and/or working in the excavation or trench site.

Competent Person - means someone who is capable of identifying existing and predictable hazards in the surroundings, or working conditions which are unsanitary, hazardous, or dangerous to associates and who has the authority to take prompt corrective measures to eliminate them.

**Program Description**

**General Guidelines Prior To and During Excavation or Trenching**

1. **Project Development and Impact to Utilities.** The Designated Supervisor shall ensure that a campus project is coordinated with Facilities Management Construction Services early in the programming and development stages, so that conflicts with utilities can be resolved early.

2. **Utilities and Pre-work Site Inspection.** A Competent Person shall inspect the site before the excavation is started to determine what safety measures are to be taken. Underground sewer, telephone, gas, water and electric lines shall be located and clearly marked. The Designated Supervisor shall arrange to have these utilities protected, removed or relocated as directed by Facilities Management Construction Services and as may be needed to do the work safely. Excavation shall be done in a manner that does not endanger the underground installations or those engaged in the work. Barricades, shoring, suspension or other means as necessary, shall protect utilities left in place.

   Areas where excavation is planned must have all utilities marked before excavation shall start.

3. **Stability of Adjacent Structures.** A Competent Person shall take precautions as needed to protect workers, nearby buildings or other structures. A Registered Professional Engineer
should evaluate these structures and recommend precautions such as shoring, bracing, or underpinning. The Designated Supervisor shall ensure that the recommendations of the engineer are carried out. Plans that outline the design of such precautions approved by the engineer shall be maintained on site while the work is in progress.

4. Protection of the Public. Barricades, walkways, lighting and signs shall be provided for the protection of the public prior to the start of excavation operations. Guardrails, fences, or barricades shall be provided adjacent to walkways, driveways and other pedestrian or vehicle thoroughfares.

5. Protection of Workers in Excavations. A Competent Person shall assure that workers are protected from hazards that may arise during excavation work.

Stairs, ladders or ramps shall be provided when workers enter excavations over 4 feet deep. Two or more means of exit shall be provided if the excavation is more than 20 feet in length. A means of exit shall be provided every 25 feet of trench length.

Those workers exposed to vehicular traffic shall wear warning vests made of high visibility material.

No one shall work underneath loads handled by lifting or digging equipment. Workers shall stand away from any vehicle being loaded or unloaded to avoid being struck by any spillage or falling materials.

A warning system shall be used when mobile equipment is operated next to the edge of an excavation if the operator does not have a clear, direct view of the edge of the excavation.

Materials and equipment should be kept at least 2 feet from the edge of the excavation with the proper protective system in place.

6. Hazardous Atmospheres and Confined Spaces. Workers shall not be permitted to work in hazardous and/or toxic atmospheres. Such atmospheres include those with the following:

Atmospheric oxygen concentration below 19.5% or above 23.5%.

A combustible gas concentration greater than 10% 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 Industrial Hygienists (ACGIH).

If there is any possibility that the trench or excavation could contain a hazardous atmosphere, the Competent Person shall ensure that atmospheric testing is conducted prior to worker entry and continuously during work. Excavations near underground storage tanks or that contain gas pipelines should be monitored. Suitable precautions shall be taken as necessary to protect workers. These precautions may include the following:

Engineering controls such as ventilation;
Respiratory protection; University of South Carolina employees required to wear respiratory protection must be enrolled in the University of South Carolina Respiratory Protection Program. Enrollment in the program requires workers to:

a. Complete respiratory protection training;
b. Obtain a PFT and fit test provided;
c. Complete a medical examination;
d. Maintain annual re-certification.

Some trenches qualify as permit-required confined spaces. The Designated Supervisor shall ensure compliance with the University of South Carolina Confined Space Plan when an excavation has one or more of the following characteristics:

Contains or has the potential to contain a hazardous atmosphere, OR

Contains a material that has the potential for entrapping, engulfing or suffocating an entrant, OR

Has an internal configuration such that an entrant could be trapped or asphyxiated by inwardly converging walls or by a floor which slopes downward and tapers to a smaller cross-section, OR

Contains any other recognized serious or health hazard.

7. Personal Protective Equipment (PPE). A Competent Person shall ensure that all workers wear all required safety equipment as detailed below. Hardhats, safety eye ware, gloves, the worker’s department or the contractor’s employer shall furnish hearing protection and fall protection devices. The department or employer must ensure that anyone conducting work in excavations wears safety footwear approved by the American National Standards Institute (ANSI).

Everyone working in trenches or excavations shall wear ANSI approved hardhats at all times.

Everyone working in trenches or excavations shall wear ANSI approved steel-toed shoes or boots.

Those exposed to flying fragments, dust or other materials produced by drilling, sawing, sanding, grinding and similar operations shall wear safety glasses with side shields.

Those exposed to hazards produced by welding, cutting, or brazing shall wear approved eye protection or a welding face shield or helmet. The Competent Person shall obtain a Hot Work Permit from the Department of Environmental Health and Safety.

Those workers entering deep and confined excavations shall wear a harness with a lifeline securely attached to it. The lifeline shall be separate from any line used to handle materials.
The lifeline shall be attended by a person at all times while the employee wearing the lifeline is in the excavation.

All workers shall wear gloves or other suitable hand protection as determined by the supervisor.

Workers at the edge of an excavation 6 feet or more deep shall be protected from falling by guardrails systems, fences, barricades, or other approved means such as harnesses and lanyards.

The supervisor or other qualified person according to the requirements described in the University of South Carolina Personal Protective Equipment Program should conduct a Workplace Hazard Assessment.

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

9. Hazards Associated with Water Accumulation. No one shall work in excavations with standing water or where water is collecting unless the Designated Supervisor gives prior approval or instruction. Methods for controlling water accumulation must be provided and should consist of the following if anyone must work in the excavation:

   Use of special support or shield systems approved by a Registered Professional Engineer.

   Water removal equipment, such as well pointing, used and monitored by the Designated Supervisor.

   Use of safety harnesses and lifelines.

   No one shall work in excavations during a rainstorm unless circumstances warrant it and adequate precautions are taken.

   Trenches shall be inspected by the Designated Supervisor after each rain and before anyone is permitted to re-enter the excavation.

10. Protection of Workers from Falling Objects: A Competent Person shall ensure that workers are protected from loose rock or soil that could fall or roll from an excavation face. Such protection shall consist of:

   Scaling to remove loose material;

   Installation of barricades such as wire mesh or timber as needed to stop and contain falling material; OR

   Sloping may be used instead of barricades when practical.

   Workers shall be protected from excavated materials, equipment or other objects that could pose a hazard by falling or rolling into excavation. These materials or equipment should be
kept at least 2 feet from the edge of the excavation or otherwise restrained. Materials piled, grouped or stacked near the edge of an excavation must be stable and self-supporting.

11. Inspections A Competent Person shall conduct daily inspections of excavations, adjacent area, and protective systems for evidence of a situation that could result in a cave-in, failure of protective systems, hazardous atmospheres, or other hazardous conditions. Inspections should be conducted prior to the start of work and as needed throughout the shift. Inspections should also be made after every rainstorm. These inspections are only required when the trench will be or is occupied. When a hazardous condition is found, exposed workers shall be removed from the area until precautions have been taken to assure their safety.

Training

Training is to be conducted by a Competent Person on all the requirements of OSHA CER 1926 Subpart P-Excavation and any established “Best Practices” which may apply for all employees which will be required to work in or around Excavation or Trench activities.

Use of Equipment

The Competent Person will determine the Use of Equipment.

Roles and Responsibilities

Department
Provide specific training for qualified and compete workers.
Provide and maintain necessary protective equipment and materials.

Supervisors
Ensure workers receive training appropriate to their assigned tasks.
Ensure workers are provided with and use protective equipment and materials.

EHS
Provide general training.
Provide assistance with evaluation to determine regulatory requirements and / or best work practices.
Provide a periodic auditing of work site.

Individual
Attend training.
Use appropriate electrical safety-related work practices, including all necessary protective equipment and materials.

For More Information:

Contact the USC Employee Safety Manager, Buddy Harley at 777-5269