



# *Trenching & Excavation Program*

14945 La Palma Drive, Chino, CA 91710  
Office (909) 393-5419 Fax (909) 606-0163  
<http://secc-corp.com>

## **Table of Contents**

### **Contents**

<i>Trenching and Excavation</i> .....	3
<b>General Precautions</b> .....	3
<b>Prior to Digging</b> .....	3
<b>While Digging</b> .....	3
<b>Open Trenches and Excavations</b> .....	4
<i>Soils Analysis Checklist</i> .....	6
<i>Daily Trenching and Excavation Checklist Over 4' in Depth or More</i> .....	6

## **Trenching and Excavation**

Our construction activities occasionally require our employees to work in trenches and excavations. The following precautions are mandatory when our employees work in trenches or excavations that are 5 feet deep or greater. They are also required in trenches less than 5 feet deep if the soil appears unstable. These precautions apply even if we did not dig the trench.

### ***General Precautions***

- All trenching and excavation activities will be conducted in accordance with Cal/OSHA regulations.
- All trenching and excavation work or entry will be supervised by a competent person with the skills, training, and experience to recognize hazards and implement corrective action.
- All trenches and excavations 5 feet deep or greater will be protected from cave-ins by sloping, shoring, or benching.
- No employee is permitted to work in any trench or excavation that is not safe. Work will stop until the hazard is corrected.
- All trenches and excavations will be inspected prior to the start of work and at least daily by the competent person.
- Suitable access and egress will be maintained at all times.
- Employees will wear reflective garments when exposed to vehicular traffic or heavy equipment.

### ***Prior to Digging***

- A trenching and excavation permit will be obtained from Cal/OSHA.
- 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, shall be determined prior to opening an excavation.
- All Regional Notification Centers in the area involved and all known owners of underground facilities in the area who are not members of a Notification Center shall be advised of the proposed work at least 2 working days prior to the start of any digging or excavation work. EXCEPTION: Emergency repair work to underground facilities.

### ***While Digging***

- When excavation operations approach the estimated location of underground installations, the exact location of the installations shall be determined by safe and acceptable means.
- Contact with live electrical lines and gas mains can cause death or serious injury. Extra care should be taken in these areas. If you are unsure, ask your supervisor or our safety manager.
- While the excavation is open, underground installations shall be protected, supported, or removed as necessary to safeguard employees.
- All surface encumbrances that are located so as to create a hazard to employees shall be removed or supported, as necessary, to safeguard employees.
- Where the stability of adjoining buildings, walls, or other structures is endangered by excavation operations, support systems such as shoring, bracing, or underpinning shall be provided to ensure the stability of such structures for the protection of employees.
- Sidewalks, pavements and appurtenant structures shall not be undermined unless a support system or another method of protection is provided to protect employees from the possible collapse of such structures.
- No employee shall be permitted underneath loads handled by lifting or digging equipment. Employees shall be required to stand away from any vehicle being loaded or unloaded to avoid being struck by any spillage or falling materials.

- Adequate barriers or physical protection shall be provided at all remotely located excavations. All wells, pits, shafts, etc., shall be barricaded or covered. Upon completion of exploration and other similar operations, temporary wells, pits, shafts, etc., shall be back filled.

### ***Open Trenches and Excavations***

- Daily inspections of excavations, the adjacent areas, and protective systems shall be made by a competent person for evidence of a situation that could result in possible cave-ins, indications of failure of protective systems, hazardous atmospheres, or other hazardous conditions. An inspection shall be conducted by the competent person prior to the start of work and as needed throughout the shift. Inspections shall also be made after every rainstorm or other hazard increasing occurrence. These inspections are only required when employee exposure can be reasonably anticipated.
- Where the competent person finds evidence of a situation that could result in a possible cave-in, indications of failure of protective systems, hazardous atmospheres, or other hazardous conditions, exposed employees shall be removed from the hazardous area until the necessary precautions have been taken to ensure their safety.
- A stairway, ladder, ramp or other safe means of egress shall be located in trench excavations that are 4 feet or more in depth so as to require no more than 25 feet of lateral travel for employees.
- Where employees or equipment are required or permitted to cross over excavations over 6 feet and wider than 30 inches, walkways or bridges with standard guardrails shall be provided.
- 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 shall be utilized such as barricades, hand or mechanical signals, or stop logs. If possible, the grade should be away from the excavation.
- Adequate protection shall be provided to protect employees from loose rock or soil that could pose a hazard by falling or rolling from an excavation face. Such protection shall consist of scaling to remove loose material; installation of protective barricades at intervals as necessary on the face to stop and contain falling material; or other means that provide equivalent protection.
- Employees shall be protected from excavated or other materials or equipment that could pose a hazard by falling or rolling into excavations. Protection shall be provided by placing and keeping such materials or equipment at least 2 feet from the edge of excavations, or by the use of retaining devices that are sufficient to prevent materials or equipment from falling or rolling into excavations, or by a combination of both if necessary.
- Where oxygen deficiency (atmospheres containing less than 19.5 percent oxygen) or a hazardous atmosphere exists or could reasonably be expected to exist, such as in excavations in landfill areas or excavations in areas where hazardous substances are stored nearby, the atmosphere in the excavation shall be tested before employees enter excavations greater than 4 feet in depth.
- Adequate precautions shall be taken to prevent employee exposure to atmospheres containing less than 19.5 percent oxygen and other hazardous atmospheres. These precautions include providing proper respiratory protection or ventilation.
- Adequate precautions shall be taken, such as providing ventilation, to prevent employee exposure to an atmosphere containing a concentration of a flammable gas in excess of 20 percent of the lower flammable limit of the gas.
- When controls are used that are intended to reduce the level of atmospheric contaminants to acceptable levels, testing shall be conducted as often as necessary to ensure that the atmosphere remains safe.

- Emergency rescue equipment, such as breathing apparatus, a safety harness and line, or a basket stretcher, shall be readily available where hazardous atmospheric conditions exist or may reasonably be expected to develop during work in an excavation. This equipment shall be attended when in use.
- Employees shall not work in excavations in which there is accumulated water, or in excavations in which water is accumulating, unless adequate precautions have been taken to protect employees against the hazards posed by water accumulation. The precautions necessary to protect employees adequately vary with each situation, but could include special support or shield systems to protect from cave-ins, water removal to control the level of accumulating water, or use of a safety harness and lifeline.
- If water is controlled or prevented from accumulating by the use of water removal equipment, the water removal equipment and operations shall be monitored by a competent person to ensure proper operation.
- If excavation work interrupts the natural drainage of surface water (such as streams), diversion ditches, dikes, or other suitable means shall be used to prevent surface water from entering the excavation and to provide adequate drainage of the area adjacent to the excavation. Excavations subject to runoff from heavy rains will require an inspection by a competent person.

### Soils Analysis Guidelines

This checklist must be completed when soil analysis is made to determine the soil type (s) present in the excavation. A separate analysis must be performed on the excavation (trench) is stretched over a distance where soil type changes.

#### Visual Test

- Particle type:       Fine grained (cohesive)       Granular (sand / gravel)  
Water conditions:  Wet       Dry       Seeping water  
                          Surface water present       Submerged

Previously disturbed soils:       Yes       No

Underground utilities:       Yes       No

If yes, what type? \_\_\_\_\_

Layered soils? Note: the less stable layer controls soil type.       Yes       No

Layered soils dipping into excavation:       Yes       No       Unknown

Excavation exposed to vibrations:       Yes       No

If yes, from what? \_\_\_\_\_

Crack like openings or spalling observed:       Yes       No

Conditions that may create a hazardous atmosphere:       Yes       No

If yes, identify condition and source: \_\_\_\_\_

Surface encumbrances:       Yes       No

If yes, what type? \_\_\_\_\_

Work to be performed near public vehicular traffic:       Yes       No

Possible confined space exposure:       Yes       No

#### Manual Test

- Plasticity:       Cohesive       Non-Cohesive  
Dry Strength:  Granular (crumbles easily)       Cohesive (broken with difficulty)  
Wet shake:       Water comes to surface (granular material)       Surface remains dry (clay material)

**Note:** The following unconfined compressive strength tests should be performed on undisturbed soils.

**Thumb Test used to estimate unconfined compressive strength of cohesive soil.**

Test performed:  Yes  No

Type A - soil indented by thumb with very great effort.

Type B - soil indented by thumb with some effort.

Type C - soil easily penetrated several inches by thumb with little or no effort. If soil is submerged, seeking water, subjected to surface water, runoff, exposed to wedging.

**Penetrometer or Shearvane used to estimate on confined compresses strength of the cohesive soils:**

Test performed:  Yes  No Device Used: \_\_\_\_\_

**Type A soil:** Cohesive soils with an unconfined, compressive strength of 1.5 ton per square foot (tsf) or greater. Examples of cohesive soils are: clay, silty clay, sandy clay, clay loam and, in some cases, silty clay loam and sandy clay loam. Cemented soils such as caliche and hardpan are also considered Type A. However, no soil is Type A if: (1) The soil is fissured; or (2) The soil is subject to vibration from heavy traffic, pile driving, or similar effects; or (3) The soil has been previously disturbed; or (4) The soil is part of a sloped, layered system where the layers dip into the excavation on a slope of four horizontal to one vertical (4H:1V) or greater; or (5) The material is subject to other factors that would require it to be classified as a less stable material.

**Type B soil:** (1) Cohesive soil with an unconfined compressive strength greater than 0.5 tsf but less than 1.5 tsf; or (2) Granular cohesionless soils including: angular gravel (similar to crushed rock), silt, silt loam, sandy loam and, in some cases, silty clay loam and sandy clay loam. (3) Previously disturbed soils except those which would otherwise be classed as Type C soil. (4) Soil that meets the unconfined compressive strength or cementation requirements for Type A, but is fissured or subject to vibration; or (5) Dry rock that is not stable; or (6) Material that is part of a sloped, layered system where the layers dip into the excavation on a slope less steep than four horizontal to one vertical (4H: 1V), but only if the material would otherwise be classified as Type B.

**Type C soil:** (1) Cohesive soil with an unconfined compressive strength of 0.5 tsf or less; or (2) Granular soils including gravel, sand, and loamy sand; or (3) Submerged soil or soil from which water is freely seeping; or (4) Submerged rock that is not stable, or (5) Material in a sloped, layered system where the layers dip into the excavation or a slope of four horizontal to one vertical (4H: 1V) or steeper.

**Soil Classification**

Stable Rock  Type A  Type B  Type C

**Selection of Protective System**

Protective System: Sloping Specify angle \_\_\_\_\_  
Timber Shoring  
Aluminum hydraulic shoring  
Trench shield maximum depth in this soil

