

# City of Urbandale Trenching & Shoring Safety Policy

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## **Purpose**

This policy was created to protect Urbandale's employees from cave-ins and trench collapses while working in or near trenches. This policy covers the correct procedures and equipment employees are to use while setting up and working in trenches.

Each employee in an excavation shall be protected from cave-ins by an adequate protective system except when trenches are made entirely in stable rock or are less than 5 feet (1.52m) in depth, and examination of the ground by a competent person provides no indication of a potential cave-in.

Copies of this policy will be made available to all employees during their work shifts and is located:

- Parks & Facilities (3310 86<sup>th</sup> Street), in safety resource cabinet.
- Public Works (9401 Hickman Road), in the office.
- Water Utility (3720 86<sup>th</sup> Street), in the office.
- Online at [www.Urbandale.org/413/Employee-Intranet](http://www.Urbandale.org/413/Employee-Intranet)
- By contacting the Director of Risk Management/Support Services.

Each employee working in or near a trench will be trained on this policy. Training on this policy will be provided to new employees (or those newly assigned to a position covered under this policy).

## **Leadership and Accountability**

The Director of Risk Management and Support Services, or the Safety Leadership representative will be responsible for annually evaluating the trenching and shoring safety policy's effectiveness and selecting appropriate equipment.

Employees are accountable to know and follow this policy. Employees are also accountable for the proper care, maintenance, and correct use of equipment provided for the job according to their training.

Employees should refer questions or comments about this policy to:

- Parks & Facilities - Facilities Maintenance Supervisor and/or Parks Supervisor
- Public Works - Assistant Director of Public Works
- Water Utility - Distribution Manager
- Director of Risk Management/Support Services

## **Competent Persons**

Competent Persons are employees who have received the required training. A list of Competent Persons is included as an appendix to this policy (See Appendix A). Each trench will have a designated competent person who has the following duties and responsibilities:

- The competent person shall have the authority to stop all work to correct or eliminate dangerous conditions.
- The competent person shall be on-site during all trenching activity.
- The competent person shall be responsible for completing a daily inspection log of the trench site.

## **Employee Information and Training**

Training will be provided to all employees in a position that is required to work in or near a trench. Employees will have the understanding, knowledge and skills necessary for the safe performance of their duties. Training records will be documented and retained by the Director of Risk Management and Support Services.

## **Protective Systems**

The employee designated as the competent person for a trench site shall determine and oversee the installation of the appropriate protective system for that trench, and conduct an inspection of the system before employees are allowed to work in the trench.

- For all trenches 20 feet or deeper, a registered engineer shall design the protective system.

## **Outside Contractors**

Whenever outside contractors are engaged in work covered by the scope and application of this policy, the City's contracting department and the contractor shall inform each other of their respective trenching and shoring safety programs and procedures.

## Soils Analysis Checklist

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

<b>SITE LOCATION:</b>		
<b>DATE:</b>	<b>TIME:</b>	<b>COMPETENT PERSON:</b>
<b>WHERE THE SAMPLE WAS TAKEN:</b>		
<b>TRENCH DEPTH:</b>	<b>TRENCH WIDTH:</b>	<b>TRENCH LENGTH:</b>

VISUAL TEST	
<b>Particle type:</b>	Fine grained (cohesive) _____ Granular (sand/silt or gravel) _____
<b>Water conditions:</b>	Wet _____ Dry _____ Seeping Water _____ Surface water present _____ Submerged _____
<b>Previously disturbed soils:</b>	Yes _____ No _____
<b>Underground utilities:</b>	Yes _____ No _____ If yes, what type?
<b>Layered soils? Note: The least stable layer controls soil type.</b>	Yes _____ No _____
<b>Layered soils dipping into trench:</b>	Yes _____ No _____ Unknown _____
<b>Trench exposed to vibrations:</b>	Yes _____ No _____ If yes, from what?
<b>Crack like openings or spalling observed:</b>	Yes _____ No _____
<b>Conditions that may create a hazardous atmosphere:</b>	Yes _____ No _____ If yes, identify condition and source:
<b>Surface encumbrances:</b>	Yes _____ No _____ If yes, what type?
<b>Work to be performed near public vehicular traffic:</b>	Yes _____ No _____
<b>Possible confined space exposure:</b>	Yes _____ No _____

MANUAL TEST	
<b>Plasticity:</b>	Cohesive _____ Noncohesive _____
<b>Dry strength:</b>	Granular (crumble easily) _____ Cohesive (broken with difficulty) _____
<b>Wet shake:</b>	Water comes to surface (granular material) _____ Surface remains dry (clay material) _____

## Soils Analysis Checklist (continued)

**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, seeping water, subjected to surface water, runoff, exposed to wetting.		

**Penetrometer or Shearvane** used to estimate unconfined compressive strength of cohesive soils:

Test performed:	Yes _____	No _____	Device used:
_____ Type A – soil with unconfined compressive strength of 1.5 tsf or greater.			
_____ Type B – soil with unconfined compressive strength greater than 0.5 tsf and less than 1.5 tsf.			
_____ Type C – soil with unconfined compressive strength of 0.5 tsf or less.			
If soil is submerged, seeping water, subjected to surface water, runoff, exposed to wetting.			

**NOTE: Type A – no soil is type A if soil is fissured, subject to vibration, previously disturbed, layered dipping into trench on a slope of 4H:1V.**

<b>SOIL CLASSIFICATION</b>			
Stable Rock _____	Type A _____	Type B _____	Type C _____

<b>SELECTION OF PROTECTIVE SYSTEM</b>	
Protective System:	_____ Sloping                      Specify angle _____
	_____ Timber shoring
	_____ Aluminum hydraulic shoring
	_____ Trench shield                      Maximum depth in this soil _____

## Daily Inspection Log

DATE:	SIGNATURE:
WEATHER:	PROJECT:

Was One Call System contacted:      Yes _____      No _____
Protective system:      Trench shield (box) _____      Wood shoring _____ Sloping _____      Other _____
Purpose of trenching:      Drainage _____      Water _____ Sewer _____      Gas _____ Other _____
Were visual soil test made:      Yes _____      No _____
If yes, what type?
Were manual soil tests made:      Yes _____      No _____
If yes, what type?
Type of soil:      Stable Rock _____      Type A _____      Type B _____      Type C _____
Surface encumbrances:      Yes _____      No _____
If yes, what type?
Water conditions:      Wet _____      Dry _____      Submerged _____
Hazardous atmosphere exists:      Yes _____      No _____ <b>(If yes, follow confined space entry procedures, complete Confined Space Entry Permit, monitor for toxic gas)</b>
Is trenching or trench exposed to public vehicular traffic (exhaust emission):      Yes _____      No _____ <b>(If yes, refer to confined space entry procedures, complete Confined Space Entry Permit, monitor for toxic gas)</b>
Measurements of trench:      Depth _____      Length _____      Width _____
Is ladder within 25 feet of all workers:      Yes _____      No _____
Is excavated material stored two feet or more from edge of trench:      Yes _____      No _____
Are employees exposed to public vehicular traffic:      Yes _____      No _____ (If yes, warning vests required)
Are other utilities protected:      Yes _____      No _____ (Water, sewer, gas, or other structures)
Are sewer or natural gas lines exposed:      Yes _____      No _____ <b>(If yes, refer to confined space entry procedures policy, complete Confined Space Entry permit, monitor for toxic gas)</b>
Periodic inspection:      Yes _____      No _____      Last (date) _____
Have all employees on-site received training in excavating:      Yes _____      No _____

## Trench Checklist

(To be completed by a “Competent Person”)

<b>SITE LOCATION:</b>		
<b>DATE:</b>	<b>TIME:</b>	<b>COMPETENT PERSON:</b>
<b>SOIL TYPE (See attached completed form)</b>		
<b>SOIL CLASSIFICATION:</b>	<b>TRENCH DEPTH:</b>	<b>TRENCH WIDTH:</b>
<b>TYPE OF PROTECTIVE SYSTEM USED:</b>		

(Indicate for each item: YES -- NO -- or N/A)

<b>1.) General inspection of job site:</b>	
A. Trenches, adjacent areas, and protective systems inspected by a competent person daily prior to the start of work.	
B. Competent person has the authority to remove employees from the trench immediately.	
C. Surface encumbrances removed or supported.	
D. Employees protected from loose rock or soil that could pose a hazard by falling or rolling into the trench.	
E. Hard hats worn by all employees.	
F. Spoils, materials, and equipment set back at least two feet from the edge of the trench.	
G. Barriers provided at all remotely located trenches, wells, pits, shafts, etc.	
H. Walkways and bridges over trenches four feet or more in depth are equipped with standard guardrails and toe boards.	
I. Warning vests or other highly visible clothing provided and worn by all employees exposed to public vehicular traffic.	
J. Employees required must stand away from vehicles being loaded or unloaded.	
K. Warning system established and utilized when mobile equipment is operating near the edge of the trench.	
L. Employees prohibited from going under suspended loads.	
M. Employees prohibited from working on the faces of sloped or benched trenches above other employees.	
<b>2.) Utilities:</b>	
A. Utility companies contacted and/or utilities located.	
B. Exact location of utilities marked.	
C. Underground installations protected, supported, or removed when trench is open.	
<b>3.) Means of Access and Egress:</b>	
A. Lateral travel to means of egress no greater than 25 feet in trenches four feet or more in depth.	
B. Ladders used in trenches secured and extended three feet above the edge of the trench.	
C. Structural ramps used by employees designed by a competent person.	
D. Structural ramps used for equipment designed by a registered professional engineer.	
E. Ramps constructed of materials of uniform thickness, cleated together on the bottom, equipped with no-slip surface.	
F. Employees protected from cave-ins when entering or exiting the trench.	

## Trench Checklist (continued)

<b>4.) Wet Conditions:</b>	
A. Precautions taken to protect employees from the accumulation of water.	
B. Water removal equipment monitored by a competent person.	
C. Surface water or runoff diverted or controlled to prevent accumulation in the trench.	
D. Inspections made after every rainstorm or other hazard increasing occurrence.	
<b>5.) Hazardous Atmosphere:</b>	
A. Atmosphere within the trench tested where there is a reasonable possibility of an oxygen deficiency, combustible, or other harmful contaminant exposing employees to a hazard.	
B. Adequate precautions taken to protect employees from exposure to an atmosphere containing less than 19.5 percent oxygen and/or to other hazardous atmosphere.	
C. Ventilation provided to prevent employee exposure to an atmosphere containing flammable gas in excess of 10 percent of the lower explosive limit of the gas.	
D. Testing conducted often to ensure that the atmosphere remains safe.	
E. Emergency equipment, such as breathing apparatus, safety harness and lifeline, and/or basket stretcher readily available where hazardous atmospheres could or actually do exist.	
F. Employees trained to use personal protective and other rescue equipment.	
G. Safety harness and lifeline used and individually attended when entering bell bottom or other deep confined trenches.	
<b>6.) Support Systems:</b>	
A. Materials and/or equipment for support systems selected based on all analysis, trench depth, and expected loads.	
B. Materials and equipment used for protective systems inspected and in good condition.	
C. Materials and equipment not in good condition have been removed from service.	
D. Damaged materials and equipment used for protective systems inspected by a registered professional engineer after repairs and before being placed back into service.	
E. Protective systems installed without exposing employees to the hazards of cave-ins, collapses, or threat of being struck by materials or equipment.	
F. Members of support system securely fastened to prevent failure.	
G. Support systems provided to ensure stability of adjacent structures, buildings, roadways, sidewalks, walls, etc.	
H. Trenches below the level of the base or footing supported, approved by an RPE.	
I. Removal of support systems progresses from the bottom and members are released slowly as to note any indication of possible failure.	
J. Backfilling progresses with removal of support system.	
K. Trench of material to a level no greater than two feet below the bottom of the support system and only if the system is designed to support the loads calculated for the full depth.	
L. Shield system placed to prevent lateral movement.	
M. Employees are prohibited from remaining in shield system during vertical movement	



## Appendix A

### Competent Persons:

#### **Public Works:**

1. Steve Chambers
2. Shane Huston
3. Matt Lamberti
4. Steve Landers
5. Scot Markla
6. Joe Morris
7. Josh Robertson
8. Tim Staley
9. Mark VanDerSluis

#### **Parks and Facilities:**

1. Kevin James, Assistant Director of Parks/Facilities
2. Dick Lilly, Facility Maintenance Supervisor
3. Chad Millang, Parks Supervisor

#### **Water Utility:**

1. Bob Gerleman
2. Rob Light
3. Doug Jacobs
4. Nick Pinqel
5. Austin TeBrink
6. John Thomas