

<p align="center"><b>CITY OF APPLETON PERSONNEL POLICY</b></p>	<p align="center">TITLE: <b>TRENCHING &amp; EXCAVATION</b> OSHA CFR 1926.650, 651 &amp; 652</p>	
<p>ISSUE DATE: April 1, 2002</p>	<p>LAST UPDATE: April 2008 June 2013</p>	<p>SECTION: Safety</p>
<p>POLICY SOURCE: Human Resources Department</p>	<p>AUDIENCE: Employees involved in trenching and excavation</p>	<p>TOTAL PAGES: 5</p>
<p>Reviewed by Legal Services Date: November 7, 2001 June 5, 2008 July 2013</p>	<p>Committee Approval Date: May 22, 2002 August 13, 2008 August 12, 2013</p>	<p>Council Approval Date: June 5, 2002 August 20, 2008 August 21, 2013</p>

**I. PURPOSE:**

To protect employees involved in trenching and excavation processes.

**II. POLICY:**

The city is committed to providing a safe work environment for all its employees. This policy covers the regulations relating to OSHA 29 CFR 1926.650, 651, and 652. Violations of this policy will be subject to disciplinary action, up to and including discharge.

**III. DISCUSSION:**

The city recognizes that trenching and excavation work presents serious risks to all workers. Strict compliance with all sections of this policy will prevent or greatly reduce the risk of cave-ins as well as other excavation-related incidents.

**III. DEFINITIONS:**

Accepted Engineering Practices – means those requirements which are compatible with standards of practice required by a registered professional engineer.

Aluminum Hydraulic Shoring – means a pre-engineered shoring system comprised of aluminum hydraulic cylinders (crossbraces) used in conjunction with vertical rails (uprights) or horizontal rails (wales). Such system is designed specifically to support the sidewalls of an excavation and prevent cave-ins.

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 – One who has been trained and 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.

Cross Braces – the horizontal members of a shoring system installed perpendicular to the sides of the excavation, the ends of which bear against either uprights or horizontal rails.

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

Faces or sides – The vertical or inclined earth surfaces formed as a result of excavation work.

Failure –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 – 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.

Kickout –The accidental release or failure of a cross brace.

Mac-Tel – A telemessaging service with whom the City has contracted.

Tabulated Data –Tables and charts approved by a registered professional engineer and used to design and construct a protective system.

Type C Soil – The least stable soil.

#### IV. PROCEDURES

A. Classification of Soil types. For purposes of this policy, all soil for the City of Appleton’s Trenching & Excavation procedures is considered Type C.

B. Responsibilities:

1. Safety Coordinator/Supervisor

- a. Will enforce regulatory safety practices in all excavation operations.
- b. Will ensure at least one competent person is on-site at all times.
- c. Will ensure that all guidelines outlined in the Trenching/Excavation Policy are followed.

2. Competent Person

- a. Will be in charge of all excavations.
- b. Will conduct inspections:
  - Daily and before the start of any work.
  - After every rainstorm.
  - After other events that could increase hazards such as snowstorms, windstorm, thaw, dramatic change in weather, etc.
  - When fissures, tension cracks, sloughing, undercutting, water seepage, bulging at the bottom, or other similar conditions occur.
  - When there is a change in the size, location, or placement of the soil pile.
  - When there is any indication of change or movement in adjacent soil.
  - Each time site is left unattended.

3. Employees
  - a. Must follow all rules and regulations as outlined in this policy.
  - b. Must not enter any non-city excavation site unless it complies with all state and federal regulations relating to trenching & excavation.

#### C. Soils

1. Temporary soil shall be placed no closer than 2 feet from the surface edge of the excavation measured from the nearest base of the soil to the cut. This distance should not be measured from the crown of the soil deposit. This distance requirement ensures that loose rock or soil from the temporary soil will not fall on employees in the trench.
2. Soil should be placed so that it channels rainwater and other run-off water away from the excavation. Soil should be placed so that it cannot accidentally run, slide, or fall back into the excavation.

#### D. Surface Crossing of Trenches

1. Surface crossing of trenches should not be made unless absolutely necessary. However, if necessary, they are only permitted under the following conditions:
  - a. Vehicle crossings must be designed by and installed under the supervision of a registered professional engineer.
  - b. Walkways or bridges must:
    - Have a minimum clear width of 20 inches.
    - Be fitted with standard rails.
    - Extend a minimum of 24 inches past the surface edge of the trench.

#### E. Access & Egress

1. Trenches 4 feet or more in depth shall be provided with a fixed means of egress.
2. Spacing between ladders or other means of egress must be such that a worker will not have to travel more than 25 feet laterally to the nearest means of egress.
3. Ladders must be secured and extend a minimum of 36 inches above the landing. Metal ladders should be used with caution, particularly when electric utilities are present.

#### F. ~~Exposure to Vehicles~~ **Work in Street Right-of-Way**

1. **All City of Appleton personnel performing work within or infringing upon the street right-of-way shall conduct said work in compliance with the MUTCD and the City of Appleton Temporary Traffic Control Manual.**
2. Employees **working within the road right of way or active construction site** ~~exposed to vehicular traffic~~ shall be provided with and required to wear reflective vests or other suitable garments, that meet ANSI 107 Class II standard.
3. Trained flag persons, signs, signals, and barricades shall be used when necessary.

#### G. Exposure to ~~Falling Loads~~ **Overhead Hazards**

1. All employees who are in a work zone, in an active excavation site, and/or in a trench must wear a hard hat.
2. Employees are not allowed to work under raised loads.
3. Employees are not allowed to work under loads being lifted or moved by heavy equipment for digging or lifting.

4. Employees are required to stand away from equipment that is being loaded or unloaded to avoid being struck by falling materials or spillage.
5. Equipment operators or truck drivers may remain in their equipment during loading and unloading if the equipment is properly equipped with a cab shield or adequate canopy.

H. ~~Warning Systems for Mobile Equipment~~ **Components for Traffic Control**

1. **All temporary traffic control signs, devices, and practices shall conform to WisDOT Specifications and the city of Appleton Temporary Traffic Control Manual.**
2. **High Intensity Vehicle Safety Lights-** All vehicles and equipment equipped with safety lighting shall have safety lights on when working in the street right-of-way, day or night.
3. **Advanced Warning Illuminated Arrow/Message Panel – Shall be used in accordance with City of Appleton Temporary Traffic Control Manual, specifically when posted speeds are 35mph and greater, or when lane closures/shifts are needed on roadways in the Central Business District.**
4. ~~Barricades must be installed where necessary.~~
5. ~~Hand or mechanical signals must be used as required.~~
6. ~~Stop logs~~ **Wheel Chocks** must be installed if there is danger of vehicles ~~falling~~ **rolling** into the trench.
7. Soil should be graded away from the excavation. This will assist in vehicle control and channeling of run-off water.
8. Trenches left open overnight ~~must~~ **shall** be fenced and barricaded, ~~or otherwise protected in accordance with the City of Appleton Temporary Traffic Control Manual.~~

I. Hazardous Atmospheres and Confined Spaces

1. 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 atmospheres in the excavation shall be tested before employees enter excavations greater than 4 feet (1.22 m) in depth. **Readings shall be recorded on the competent person checklist.**

J. Protection from hazards associated with water accumulation.

1. 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.
  - a. If water accumulation occurs in the trench, the trench must be protected from cave-in with special systems or remove the accumulated water with equipment monitored by the competent person.

K. Sloping, Shoring, Shielding and Tabulated Requirements (note: benching is not allowed in Type C soil).

1. Sloping is cutting back the sides of the trench until soil no longer slides. The angle at which the soil will no longer slide down is called the “angle of repose” and is different for each class of soil. It is known to be the safest method of protection. The angle specified by OSHA for class C soil is:

SOIL TYPE	HEIGHT/DEPTH RATIO	SLOPE ANGLE
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Type C	1 ½:1	34 degrees
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- a. All excavations or trenches 5 feet or greater in depth shall be appropriately shored or sloped according to OSHA 1926.650, 651, and 652.
  - b. Excavations or trenches 20 feet deep or greater must have a protective system designed by a registered professional engineer.
  - c. Sidewalks and pavement shall not be undermined unless a support system or another method of protection is provided to protect employees from their possible collapse.
2. Shoring:
- a. Shoring is used when the location or depth of the cut makes sloping back to the maximum allowable slope impractical.
  - b. All shoring shall be installed from the top down and removed from the bottom up.
  - c. Manufacturer’s specifications are to be maintained on the job site for all but timber systems.
  - d. Shoring equipment is to be maintained and used according to manufacturer’s specifications.
  - e. If shoring equipment is damaged, it must be examined by the Competent Person to evaluate its use.
  - f. Shoring uprights must extend a minimum of 2” above the surface of the trench and must extend to the bottom of the bench.
  - g. Shoring uprights must not be farther apart than 4 feet.
  - h. Cross braces must be installed no greater than 4 feet apart.
  - i. Cross braces must not be greater than 2 feet from the top of the trench or excavation
  - j. Cross braces must not be greater than 2.5 feet from the bottom of the trench.
  - k. When setting shores, no worker shall be lower than waist deep to the lowest cross brace.
  - l. All shoring must be re-inspected for possible protective failures or other hazardous conditions by the Competent Person each time the trench or excavation is left unattended (i.e. lunch, breaks or overnight).
3. Shielding
- a. The shield must extend at least to the top of the trench. If the shield is located below the trench mouth, the trench section is to be sloped at the above noted angle.
  - b. Employees are not allowed in shields during installation, removal or movement of the shields within the trench.
  - c. Employees and escape ladders are only allowed within the shielded area.
  - d. All shields are to be used according to manufacturer’s instructions. If multiple shields are used, they are to be connected using appropriate locking devices.
4. Tabulated Data
- a. Designs of support systems, shield systems, or other protective systems shall be selected from and be in accordance with tabulated data, such as tables and charts.
  - b. The tabulated data shall be in written form and include all of the following:
    - Identification of the parameters that affect the selection of a protective system drawn from such data.
    - Identification of the limits of use of the data.

- Explanatory information as may be necessary to aid the user in making a correct selection of a protective system from the data.
- c. At least one copy of the tabulated data, which identifies the registered professional engineer who approved the data, shall be maintained at the job-site during construction of the protective system. After that time the data may be stored off the job site, but a copy of the data shall be made available upon request.
5. Rescue:
- a. Fire personnel are to be contacted immediately by calling 911 with your cell phone or communicating via your two-way radio. City personnel must not enter the excavation site.
  - b. Sewer Truck – is available to help in rescue efforts. Contact the Municipal Garage from 7:00am to 4:30pm (920-832-5580). After hours call Mac-Tel (920-730-3004) and/or refer to the City call book.