**EXCAVATION, TRENCHING, & SHORING SAFETY PROGRAM**

**Prepared for:**

**(INSERT YOUR AGENCY HERE)**

Reviewed by (print name): \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Signature:\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Date: \_\_\_\_\_\_\_\_\_\_

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# PURPOSE

The purpose of this program is to prevent personal injury and illness to **INSERT AGENCY'S NAME** employees and contractors while performing excavation duties as per 29 CFR 1926.650 to 1926.652, the Occupational Safety and Health Administration's (OSHA) Excavation and Trenching Standard.

The objectives of this program are to establish a written program outlining general guidelines governing excavations and trenches.

This written program will address the following:

1. Definitions

2. Hazards

3. Pre-Planning

4. Soil Classification

5. Testing of Soil

6. Protective Support Systems

7. Backfilling

8. Excavating Near Utilities

9. Inspections

10. Emergencies, Rescue Policy

11. Records, Reports, Notifications

# DEFINITIONS

**Excavation** is any man-made cut, cavity, trench, or depression in the earth's surface formed by earth removal. Excavations produce unsupported soil conditions.

**Trench** is a narrow excavation made below the surface of the ground in which the depth is greater than the width. The width does not exceed 15 feet.

**Benching Systems** 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.

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

**Cave-ins** 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** is an individual, designated by the employer, who is capable of identifying existing and predictable hazards in the surroundings or working conditions which are unsanitary, hazardous or dangerous to workers, and who is authorized to take prompt corrective measures to eliminate them.

**Hazardous Atmosphere** means an atmosphere which, because of being explosive, flammable, poisonous, corrosive, oxidizing, irritating, oxygen-deficient, toxic, or otherwise harmful, may cause death, illness, or injury.

**Protective Systems** 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.

**Registered Professional Engineer** means a person who is registered as a professional engineer in the state where the work is to be performed. However, a professional engineer, registered in any state is deemed to be a "registered professional engineer" within the meaning of this standard when approving designs for "manufactured protective systems" or "tabulated data" to be used in interstate commerce.

**Sloping Systems** means a method of protecting employees from cave-ins by excavating to form sides inclined away from the excavation to prevent cave-ins.

**Shield Systems** means a pre-constructed structure that can withstand the forces imposed on it by a cave-in and thereby protect employees within the structure. Shields used in trenches are usually referred to as trench boxes or trench shields.

**Shoring Systems** 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.

# RESPONSIBLE PARTIES

**INSERT AGENCY'S NAME have the responsibilities:**

I. Train appropriate supervisors and assist in the training of employees in the **INSERT AGENCY'S NAME** excavation safety program.

II. Audit and evaluate each department's compliance with this program on an annual basis. The effectiveness of the program shall be evaluated annually, and corrective action is taken to eliminate defects found in the program.

III. Designate and train a Competent Person (s)

**Department Heads have the responsibility to:**

I. Implement this excavation program by:

1. Identifying competent persons
2. Directing all supervisors to assess the hazards of each excavation and to determine which employees may be affected.
3. Providing all employees with information, training, and the equipment they need to protect themselves and others from excavation hazards.
4. Ensuring that all necessary equipment is available to comply with this program.
5. Identify a local fire department or rescue company.

II. Enforce compliance with this program. All appropriate employees, presently employed and all new employees must be trained and responsible for the purpose and the use of this program.

**Competent Person (s) have the responsibility to:**

Certain activities or safety procedures at a construction site require design, inspection or supervision by a competent person. Trenching and excavation work is dependent on these specialized employees because its highly technical nature, as well as its inherent hazards, require a greater level of training and experience than a normal worker would possess. In addition to the above, the competent person must be familiar with protective systems, the appendices found 29 CFR 1926.650 to 29 CFR 1926.652 subpart P and the hazards associated with Confined Spaces. The Competent Person shall be identified in writing and having an understanding of their role and responsibilities.

1. The OSHA Construction Standard defines a competent person as someone who is:
	1. Capable of identifying existing and predictable hazards in the surroundings, or
	2. Working conditions which are unsanitary, hazardous, or dangerous to employees,
	3. Who has the authorization to take prompt corrective measures to eliminate them.
2. Protective Systems or Equipment
	1. Monitoring water removal equipment and operations.
	2. Inspecting excavation subject to runoff from heavy rains to determine the need for diversion ditches, dikes, or other suitable protection.
	3. Determining cave-in potential to assess the need for shoring or other protective systems.
	4. Examining damaged material or equipment used for protective systems to determine its suitability for continued use.
	5. Classifying soil and rock deposits, by both visual analysis and by testing, to determine appropriate protection; re-classifying, if necessary, based on changing conditions.
	6. Determining the appropriate slope of an excavation to prevent collapse due to surcharge loads from stored material or equipment, operating equipment, adjacent structures, or traffic, and assuring that such slope is achieved.
3. Inspecting Trench and Protective Systems
	1. Authorizing immediate removal of employees from the hazardous area where evidence of possible cave-in, failure of protective systems, hazardous atmospheres, or other hazardous condition exists.
4. Unsafe Access/Egress
	1. Designing structural ramps that are used solely by employees as a means of access or egress. Structural ramps used for access or egress of equipment must be designed by a competent person qualified in structural design.

**Supervisors have the responsibility to:**

I. Act as or work with the Competent Person to Identify and assess the hazards of each excavation area.

II. Ensure that all employees receive the appropriate training and equipment they need to protect themselves and others.

III. Enforce compliance with this policy.

**Employees have the responsibility to:**

1. Understand their assigned tasks relating to excavation safety.
2. Apply the proper training and equipment to work in excavations and trenches safely. All personnel that performs work in excavations shall comply with the requirements of this program. This personnel shall receive appropriate training that shall include, at a minimum:
	1. The work practices that must be followed during excavating or working in excavations;
	2. The use of personal protective equipment that will typically be required during work in excavations, including but not limited to safety shoes, hardhats, and fall protective devices;
	3. Procedures to be followed if a hazardous atmosphere exists or could reasonably be expected to develop during work in an excavation; and,
	4. Report unsafe or changing conditions
	5. Emergency and non-entry rescue methods, including procedures for calling rescue services.
3. Assist with assessment & the identification of excavation hazards.
4. Comply with the directives of this policy.

# HAZARDS

The most common hazards that should be recognized and associated with work in excavations can be categorized as follows:

* **Cave-ins** -- are the most common excavation hazard. They occur when a mass of soil or rock material separates from the side of an excavation or when soil is lost from under a trench shield or support system. The mass of earth or rock material then moves suddenly into the excavation either by falling or sliding. Cave-ins can entrap, bury, or otherwise injure and immobilize a worker. Protective Support Systems such as sloping, benching, shielding, and shoring should be used to protect workers from cave-ins.
* **Falls** -- Use warning systems such as mobile equipment, barricades, hand or mechanical signals, or stop logs to alert operators of the edge of an excavation. Don't let employees work on faces of sloped or benched excavations at levels above other employees unless the employees at lower levels are adequately protected.
* **Equipment Related Accidents** -- Keep all equipment that might fall into an excavation at least 2 feet from the edge of the excavation. Also, keep excavated soil at least 2 feet from the edge of the excavation.
* **Water Accumulation** -- Employees are not to work in excavation areas where water has accumulated unless water removal equipment is being used. The Competent Person must inspect the excavation following any water removal and before any employees re-enter the excavation. Diversion ditches, dikes, or other means should be used to prevent surface water from entering an excavation. Drainage should be provided.
* **Hazardous Atmospheres** -- Any excavation deeper than four feet or where the competent person should check the potential for a hazardous atmosphere exists. If dangerous conditions exits, all work will stop until controls are in place to reduce or eliminate hazards
* **Access and Egress** -- **If an excavation is deeper than four feet**, adequate means of exit, such as ladders, steps, ramps or other safe means of egress must be provided and be within 25 feet of the worker. They must extend three feet above the ground.

# PRE-PLANNING

* A Competent person as described in Sub Part P shall be on-site at each excavation
* Before beginning any excavation, the competent person will identify and evaluate specific job hazards. These can include traffic, nearness of structures and their conditions, soil, surface and groundwater, the water table, overhead and underground utilities, and weather.
* Contact the designated rescue service to ensure that rescue services are available.
* Consider providing an emergency signaling device such as a hand-held air horn and train employees in its use during an emergency.
* Contact NJ One-Call hotline 72 hours before digging **(1-800-Dig-Safe or 8-1-1)** for the exact location of all utilities including electric, gas, telephone, sewer, water, and cable television lines.
* All known or estimated location of underground facilities and utilities shall be marked or staked for identification purposes. The markings placed by the utility owners or marking services typically follow the American Public Works Association Uniform Color Code as described in ANSI Standard Z 535.1. This code follows:

**American Public Works Association Uniform Color Code**

|  |  |  |
| --- | --- | --- |
| Red |  | Electric Power Lines, Cables, Conduit |
| Orange |  | Communications, Telephone, Cable TV |
| Yellow |  | Gas, Oil, Steam, Petroleum or Gaseous Materials |
| Green |  | Sewers and Drains |
| Blue |  | Potable Water Systems |
| Purple |  | Reclaimed Water, Irrigation, Slurry Lines |
| Pink |  | Temporary Survey Markings |
| White |  | Proposed Excavation |

* In the event markings or identifications are faded, illegible, missing or in any other manner not visible; excavation and trenching shall not be allowed; **INSERT NAME** and/or appropriate party shall arrange for another mark-out.
* All know or estimated locations of underground facilities and utilities shall be documented on jobsite plans.
* When excavation operations approach the estimated location of underground installations, the exact location is to be determined by safe and acceptable means.
* Pick the correct type of personal protective equipment for the job. If you are to be working near vehicular traffic, wear an ANSI Type II or a better rated reflective vest or other suitable garments marked with or made of reflectorized or high-visibility material. Also, wear hard hats, goggles, adequate footwear, and respirators as necessary.
* Barricades, walkways, lighting, and posting shall be provided as required by the MUTCD for the protection of the public before the start of excavation operations.
* Guardrails, fences, or barricades shall be provided on excavations adjacent to walkways, driveways, and other pedestrian or vehicle thoroughfares. Warning lights or additional illumination shall be maintained as necessary for the safety of the public and employees from sunset to sunrise.
* Wells, holes, pits, shafts, and all similar hazardous excavations shall be effectively barricaded or covered and posted as necessary to prevent unauthorized access. All temporary excavations of this type shall be backfilled as soon as possible.
* Walkways or bridges protected by standard guardrails shall be provided where employees and the general public are permitted to cross over excavations and be capable of supporting four times the intended load. Where workers in the excavation may pass under these walkways or bridges, a standard guardrail and toeboard shall be used. Information on the requirements for guardrails and toeboards may be obtained by contacting the Safety Coordinator.

# SOIL CLASSIFICATION

For the purpose of this Program, soils shall be classified as Type C with the associated protective systems. The Competent Person shall document and notify employess, prior to excavating/trenching, of Type C classification.

# PROTECTIVE SUPPORT SYSTEMS

The Competent Person shall determine the type of protection required from 29 CFR 1926.650 to 29 CFR 1926.652 subpart P

The Trench Protective system for trenches 20 or more feet in depth must be designed and approved by a Registered Professional Engineer.

The designs should include the sizes, types, and configuration of materials to be used and the engineer's identity. A copy of the design should be kept at the job site.

**Protective support systems are required to protect employees from cave-ins while working in any excavation unless:**

1. The excavation is made entirely in stable rock, or
2. The excavation is less than 5 feet deep, and a competent person has examined the ground and found no indication of a potential cave-in. When soil conditions are unstable, excavations less than 5 feet deep must also be protected from cave-ins.

Protective systems shall have the capacity to resist without failure, all loads that are intended or could reasonably be expected to be applied or transmitted to the system.

# BACKFILLING

Backfilling will be accomplished by using machines to fill the excavated area as soon as work is completed in that area. Backfill materials shall not be pushed or dumped into an excavation while an employee is still in it. After a backfill operation, excess fill and other debris should be thoroughly cleaned up, especially on paved roads.

# EXCAVATING NEAR UTILITIES

When excavating near utility lines, always follow all excavation safety rules, as well as these special situation rules.

* 1. If you are digging within eighteen inches of a utility line, ask the utility company to expose and protect the line.
	2. A Safety Data Sheet (SDS) should be obtained for all chemicals that may be contained in pipelines and vessels. The warnings on the SDS should be followed.
	3. Mechanical digging is not allowed near the utility lines.
	4. Power tools and mechanical equipment such as concrete breakers, drills, and backhoes should be effectively grounded with a 2/0 ground lead. All electrically powered hand tools will be GFCI protected.
	5. Be careful not to drop large rocks, roots, or clumps of soil directly on to the exposed utility line while backfilling.
	6. When utilities are exposed in a trench and are unsupported, supports shall be installed as needed to prevent damage or to create a hazardous situation.

# INSPECTIONS

The Competent Person must inspect the excavation and the adjacent area frequently for possible cave-ins, for failure of protective systems and equipment, for hazardous atmospheres, or for other hazardous conditions. Inspections are also required after any occurrence that could increase the potential hazard to employees. The minimal inspection requirement is daily. Competent Persons must be on-site or immediately available when persons are working in a trench or directly adjacent (within the prescribed safety zone). Natural events, such as rain, freezing or thawing weather, or man-made events, such as blasting and vibration, are examples of situations requiring more frequent inspection.

Daily and as-needed inspectionsmust be documented on applicable portions of the Inspection-Permit, the Audit Checklist, or an approved Daily Inspection documentation form. The Audit Checklist is designed as a more comprehensive inspection/audit document. All inspections shall be documented.

During inspections, danger signs that should be evaluated can include the following:

* Bulges in the side walls.
* Cracks running parallel to the excavation edge.
* Material sloughing into the excavation.
* Exposed utilities.
* Loose chunks of the excavation edge or lip breaking up.
* Rocks, or refuse from earlier work or any other material that could fall from the excavation walls.
* Undermined structures, poles, or trees.
* Water seepage.
* Spoils piles or other materials too close to the excavation edge.
* Apparent changes in soil classification.

Failure to implement this procedure shall be considered and documented as noncompliance; noncompliance will result in a management-imposed suspension of the activity and may include disciplinary action.

# EMERGENCIES

In the event of a cave-in trapping employees,procedures include but are not limited to:

1. Alerting employees of the danger
2. Do not enter the excavation and and never try to dig out victims using heavy equipment.
3. Notify the designated rescue service by calling \_\_\_\_\_\_\_\_\_ or 911 if appropriate. Give the proper authority personal information about the exact location of the accident, the number of victims involved, the trench measurements, and unique hazard information.
4. Shutdown all heavy equipment and move other workers away from the area. Maintain a perimeter around the excavation. Direct any representatives from the media to the supervisor. Prevent unauthorized access.
5. Keep all life-support and de-watering systems operating.
6. Monitor the situation until the designated rescue service arrives.

If a utility is damaged due to the excavation operation, operations are to cease upon discovery. Personnel are to move to a safe location until the hazard has been resolved. The owner of the utility and any other necessary emergency resources are to be contacted immediately

# RECORDS/REPORTS/NOTIFICATIONS

The following records shall be maintained in the site files:

* Excavation inspection records.
* Soil classification test records.
* Evaluations of need to stabilize adjacent structures.
* Structural ramp designs.
* Approved tabulated data used for protective systems.
* Protective system designed by a PE

# EXCAVATION: SAFETY BY NUMBERS

**2 Feet:** Minimum distance spoil pile from edge of excavation/trench

**2 Feet:** Hand digging to locate underground utilities

**3 Feet:** Ladder extending above excavation/trench

**4 Feet:** Monitor for hazardous atmospheres

**4 Feet:** Setup ladders, step, ramps, etc. for entry and exit

**5 Feet:** Use Protective Systems i.e. Shoring, Sloping or Trench Boxes)

**Note: For excavations/trenches less than 5 feet, Competent Person shall determine likelihood of cave-in and take appropriate protective actions**

**6 Feet:** Install fall protection around excavation/trench

**20 Feet or Deeper:** Protective System designed by Professional Engineer

**25 Feet:** Maximum travel to exit (Ladders, steps, ramps, etc.)