10335 Hedden Road
Evansville, IN 47725
Phone (812)867-5959
Fax (812)867-5993
www.jbiconst.com

Excavation and Trenching Program

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I. PURPOSE

The purpose of the Excavation and Trenching Safety Program is to prevent injury and illness to JBI Construction Inc. employees, while performing excavation duties as per 29 CFR 1926.650 to 1926.652, the Occupational Safety and Health Administrations (OSHA) Excavation and Trenching Standard

II. OBJECTIVE

The objective of this policy is to establish a written program outlining general guidelines governing excavations and trenches.

A. This program will address the following
   1. Responsibilities
   2. Hazards
   3. Planning
   4. Protection of the Public
   5. Protection of the Employee
   6. Testing and Classification of Soil
   7. Protective Supports Systems
   8. Emergencies

III. RESPONSIBILITIES

A. Safety Manager will:
   1. Monitor the overall effectiveness of the program
   2. Assist with atmospheric testing and equipment as needed
   3. Provide training for designated “Competent Persons” and employees
   4. Enforce compliance with this policy
   5. Review and update the program on an annual basis as necessary

B. Foremen and employees have the responsibility to:
   1. Understand their assigned tasks related to safety
   2. Apply the proper training and equipment to safely work in excavations and trenches
   3. Assist with the assessment of identification of excavation hazards
   4. Comply with the directives of this policy

IX. HAZARDS

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

A. Cave- Ins – Cave ins are the most common excavation hazard. They occur when a mass of soil or rock material separates from the side of the excavation or when soil is lost from under a trench shield or support system. Cave-ins can entrap, bury or otherwise injure and immobilize a worker. Protective support systems such as sloping, benching, shielding or shoring should be used to protect workers from cave-ins.
B. Falls – Using 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 the faces of sloped or benched excavations at levels above other employees.
C. Equipment Accidents – Keep all equipment that might fall into an excavation at least 2' from the edge of excavations
D. Water accumulation – Employees are not to work in excavations where water has accumulated unless water removal equipment is being used. Diversion ditches, dikes, or other means should be used to prevent surface water from entering an excavation and to provide drainage.
E. Hazardous Atmospheres – Any excavation deeper than 4' or where an oxygen deficiency or a hazardous atmosphere exists or could exist needs to be checked by a competent person. If hazardous condition exists, respirators must be worn or ventilation must be provided and the atmosphere need to be monitored.

X. PLANNING

A. Utilities and Pre-work Site Inspection: Prior to excavation the site shall be thoroughly inspected by the Competent Person to determine if special safety measures must be taken.

B. Surface encumbrances within the Zone of Influence: All equipment, materials, supplies, permanent installation(for example roadways), trees, and other objects at the surface that could present a hazard to employees working in the excavation shall be removed or supported as necessary to protect employees. Zone of influence is the width of the trench plus the adjacent areas/sides equal to the trenches depth. (Example a 4' wide trench that is 6' deep would have a zone of influence of 16'. Anything within 6' on either side of the trench would need to be considered)

C. Underground Installations

1. Call for locates at least 48 hours prior to digging. Includes sewers, telephone, fiberoptic, fuel, electric, water lines or any other underground installations that may be encountered during excavation work shall be determined and marked prior to opening an excavation. The foreman shall make arrangements as necessary with the appropriate utility agencies for the protection, removal, shutdown, or relocation of underground installations. Call 811 hotline before digging.
2. If not possible to establish the exact location of these installations, the work may proceed with caution if detection equipment or other safe and acceptable means are used to locate the utility.
3. Excavation shall be done in a manner that does not endanger the underground installations or the employees engaged in the work. Barricades, shoring, suspension or others means as necessary to protection the employee, shall protect utilities left in place.

XI. PROTECTION OF PUBLIC

Barricades, walkways, and postings shall be provided as necessary for the protection of the public prior to start of excavation operations.

A. Guardrails, fences, or barricades shall be provided on excavations adjacent to sidewalks, driveways, and other pedestrian or vehicle thoroughfares. Warning lights or other illumination shall be maintained as necessary for the safety of the public and employees from sunset to sunrise.

B. Wells, holes, pits, 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.

XII. PROTECTION OF WORKERS IN EXCAVATIONS

A. Access and Means of Egress. Stairs, ladders, or ramps shall be provided where employees are required to enter trench excavations over 4' deep. The maximum distance of lateral travel (e.g. along the length of trench) required to reach means of egress shall not exceed 25'.

    1. Earth ramps used solely by employees, as a means of ingress and egress shall conform to sloping requirements for soil type.
    2. Ladders: When portable ladders are used, the side rails shall extend a minimum of 3' above the upper surface of the excavation. Ladders shall be used only on stable and level surface unless secured. Ladders placed in any location where they can be displaced by workplace activities shall be secured. Non-self supporting ladders shall be positioned so that the foot of the ladder is one-quarter of the working length away from the support. Employees are not to carry any object or load while on the ladder. Employees are to face the ladder when ascending or descending

B. Exposure to Vehicular Traffic. Employees exposed to vehicular traffic shall be provided with, and shall wear, warning vests or other suitable garments marked with or made of reflectorized or high-visibility material. Warning vests worn by flagmen shall be yellow or orange, and shall be of reflectorized material

C. Employee exposure to falling loads. 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. Operators may remain in the cabs of vehicles being loaded or unloaded when the vehicles provide adequate protection for the operator during loading and unloading operations.

D. Warning System for Mobile Equipment. A warning system shall be used when mobile equipment is operated adjacent to the edge of an excavation if the operator does not have a clear and direct view of the edge of the excavation. The warning system shall consist of barricades, hand or mechanical signals, or stop logs. If possible, the grade should be away from the excavation

E. Hazardous Atmospheres. The Competent Person will test the atmosphere in excavations over 4 feet deep if a hazardous atmosphere exists or could reasonably be expected to exist. A hazardous atmosphere could be expected, for example, in excavations in landfill areas, in excavations in areas where hazardous substances are stored nearby, or in excavations near or containing gas pipelines.

F. Personal Protective Equipment

1. All employees working in trenches or excavations shall wear approved hardhats.

2. Employees exposed to flying fragments, dust or other materials produced by drilling, sawing, sanding, grinding, or similar operations shall wear approved safety glass with side shields.

3. Employees shall wear gloves or other suitable hand protection.

4. Employees using or working in immediate vicinity of hammer drills, saws, jackhammers, or similar high noise producing equipment shall wear suitable hearing protection.

5. Each employee at the edge of a 6' feet or more deep trench shall be protected from falling. Guardrails systems, fences, barricades, covers or tie-back system shall be installed.

6. Walkways with guardrails shall be provided where employees or equipment are permitted to cross over excavations. Guardrails shall be provided where walkways, accessible only to onsite project personnel, are 6' feet of more above lower level.

G. Water Accumulation. Employees shall not work in excavations that contain or are accumulating water unless precautions have been taken to protect employees against the hazards posed by water accumulation. The precautions taken could include, for example, special support or shield systems to protect from cave-ins, water removal to control the level of accumulating water, or use of safety harnesses.

1. If water is controlled or prevented from accumulating by the use of water removal equipment, the water removal equipment and operation shall be monitored by a person trained in the use of the equipment

2. 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. Precautions shall also be taken to provide adequate drainage of the area adjacent to the excavation. Excavations subject to runoff from heavy rains shall be re-inspected by the Competent Person to determine if additional precautions should be taken

3. The Competent Person shall inform workers of the precautions or procedures that are to be followed if water accumulates or is accumulating in an excavation.

H. Stability of adjacent structures. The Competent Person will determine if the excavation work could affect the stability of the adjoining structures, sidewalks, etc.

1. Support systems (such as shoring, bracing, or underpinning) shall be used to assure the stability of the structures and protection of the employees where excavations could affect the stability of adjoining structures.

2. Sidewalks, pavements, and appurtenant structures shall not be undermined unless a support system or other method of protection is provided to protect employees from possible collapse.

I. Protection of employees from falling objects and loose rock/soil.

1. All materials or equipment to be kept at least 2' from edge of excavation. Materials piles, grouped or stacked near the edge of an excavation must be stable and self-supporting.

2. Personnel shall not be permitted to work above one another.

3. Scaling can be utilized to remove loose material.

4. Sloping or benching to contain falling materials.

J. Inspection by Jobsite Foremen or Competent Person(Competent Persons are as follows Jeff Beatty, Greg Ficker, and Michael Sigler)

1. Foremen or Competent Person shall conduct daily inspections of excavations, adjacent areas, and protective systems for evidence of a situation that could result in possible cave-in, failure of protective systems, hazardous atmosphere, or other conditions. An inspection shall be conducted by the Foremen or Competent Person prior to the start of work and as needed throughout the shift. Inspections shall be also made after every rainstorm or other hazard increasing occurrence. These inspections are only required when the trench will be occupied by employees.

2. Where the competent person finds evidence of a situation that could result in a possible cave-in, failure of protective systems, hazard atmosphere, or other hazardous conditions, exposed employees shall be removed from the hazardous area until precautions have been taken to assure safety.

3. Foremen or Competent Persons shall maintain a written log of all inspections conducted. This log shall include the date, site locations, results of inspections, and a summary or any action taken to correct existing hazards.

K. Backfilling – fill the excavated areas as soon as work is done in that area. Backfill materials shall not be pushed or dumped into an excavation while an employee is still in it. At the completion of the backfill operation, excess fill and other debris should be completely cleaned up.

XIII. TESTING AND CLASSIFICATION OF SOIL

Classification and tests of soil shall be performed by a competent person using at least one visual test and one manual test.

A. Visual tests provide qualitative information on the excavation side in general, the soil adjacent to the excavation, the soil forming the sides of the open excavation, and the soil taken as samples from the excavated materials. To perform a visual test:

1. Observe samples of soils and estimate the range of particle sizes and their relative amounts. Soil that is primarily composed of fine grained materials is cohesive material. Soil composed primarily of coarse grained sand or gravel is granular material.

2. Observe soil as it is excavated. Soil that remains in clumps is cohesive and soil that breaks up easily is granular.

3. Observe the side of the opened excavation and adjacent surface. Crack like openings, tension cracks, and chunks of soil that spall off a vertical side could indicate fissured material. Small spalls are evidence of moving ground and are potentially hazardous.

4. Observe the surrounding area and the excavation area itself for existing utility and other underground structures, and to identify previously disturbed soil.

5. Observe the sides of the excavation for layered systems.

6. Observe the excavation area for evidence of surface water, water seeping from the sides of the excavation, or the level of the water table.

7. Observe the excavation area for sources of vibration that may affect the stability of the excavation face.

B. Manual Tests provide quantitative as well as qualitative properties of soil. They provide more information in order to classify the soil properly. Manual tests include:

1. Plasticity
2. Dry Strength
3. Thumb penetration
4. Shearvane
5. Pocket Penetometer
6. Drying Test

C. Every soil and rock deposit needs to be classified by a competent person as stable rock, type A, type B, or type C before excavation can begin. In a layered system, the system is classified according to its weakest layer. Any time the properties, factors, or conditions affecting the soil type change in any way, the area needs to be reevaluated and reclassified to reflect the changed circumstances.

1. Stable rock is natural solid mineral matter.

2. Type A soil is cohesive soil with an unconfined, compressive strength of 1.5 tons per square foot or greater. Examples of Type A soils are: clay, silty clay, sandy clay, clay loam, caliche, hardpan and, in some cases, silty loam and sandy clay loam. No soil is Type A if:

   a. The soil is fissured.
   b. The soil is subject to vibration from heavy traffic, pile driving, or similar effects.
   c. The soil has been previously disturbed.
   d. 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 or greater.
   e. The material is subject to other factors that would require it to be classified as a less stable material.

3. Type B soil is:
    a. Cohesive soil with an unconfined compressive strength greater than 0.5 tons per square foot, but less than 1.5 tons per square foot.
    b. Granular cohesionless soil including: angular gravel, silt, silt loam, sandy loam and, in some cases, silty clay loam and sandy clay loam.
    c. Previously disturbed soil except that which would otherwise be classed as Type C soil.
    d. Soil that meets the unconfined compressible strength or cementation requirements for Type A, but is fissured or subject to vibration.
    e. Dry rock that is not stable.
    f. Material that is part of a sloped, layered system where the layers dip into the excavation on a slope less steep that four horizontal to one vertical, but only if the material would otherwise be classified as Type B.

4. Type C soil is:
    a. Cohesive soil with an unconfined compressive strength of 0.5 tons per square foot or less.
    b. Granular soil including gravel sand and loamy sand.
    c. Submerged soil or soil from which water is freely seeping.
    d. Submerged rock that is not stable.
    e. Material in a sloped, layered system where the layers dip into the excavation or a slope of four horizontal to one vertical or steeper.

XIV. PROTECTIVE SYSTEMS

A. Employees in an excavation shall be protected from cave-ins by using either an adequate sloping or benching system (CRF 1926, P, App B) or an adequate support or protective systems – trench box. The only exceptions are:

1. Excavations made entirely in stable rock; or

2. Excavations less than 5’ in depth where examination of the ground by the Competent person provided no indication of a potential cave-in.

B. Protective systems shall be capable of resisting all loads that could reasonably be expected to be applied to the system.

C. Sloping and Benching Systems – see attached Table for horizontal distance to vertical rise(H:V)allowed in soil types.

D. Shields (Trench boxes) installed must extend above the ground level or the trench walls above the top of the boxes must be sloped. Shield must not be moved with employees in the trench.

E. Shoring systems shall be installed from the top down and removed from the bottom up. Unless they are installed and removed from outside the trench.

F. Materials and equipment used for protective systems shall be free from damage or defects that might affect their function. Equipment shall be used and maintained in accordance with recommendations of the manufacturer. When protective system is damaged, the Competent Person, shall evaluate its suitability for continued use. If competent person cannot assure the suitability for safe use, then the equipment shall be removed from service. This equipment shall be evaluated and approved by a registered professional engineer before being returned to service.

G. Excavation of materials to a level no greater than 2’ below the bottom of the members of a support system is allowed, but only if the system is designed to resist the force calculated for the full depth of the trench.

V. EMERGENCIES

If employee is about to be buried in a cave-in:

1. Yell to get attention
2. Cover your face with your arms
3. Do not struggle to free yourself, wait calmly for rescue

If you are watching someone be buried in a cave-in:

1. Do not attempt to rescue them yourself. Never enter the excavation.
2. Notify the fire department by calling 911. Give the emergency personal information about the exact location of the accident, the number of victims involved, the trench measurements, and special hazard information if applicable.
3. Shut down all heavy equipment and move other workers away from area.
4. Monitor the situation until rescue personnel arrive.