



Trenching and Excavations



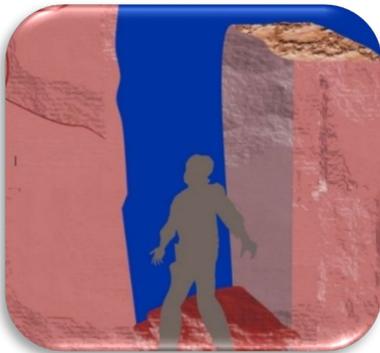
American Road & Transportation Builders Association

According to the U.S. Occupational Safety and Health Administration (OSHA), “caught-in” or “caught-between” hazards are one of the leading causes of death and injury in the construction industry. OSHA defines these incidents as injuries resulting from a person being squeezed, caught, crushed, pinched, or compressed between two or more objects, or between parts of an object. *

Trenches and excavations are a source of caught-in incidents because soil can crush workers in a cave-in, workers can be trapped against equipment, pipes or other utility infrastructure, or crushed by equipment and materials from above the trench.



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Example: A worker was in the bottom of a 9.5-foot deep trench, setting grade for concrete pipe while the employer was installing additional shoring. During the shoring installation, the west wall at the south end of the excavation caved in and covered the worker. There was no shoring or protective system at that location in the trench. Co-workers and the fire department dug the employee out, and the individual survived.

The most common caught-in hazards for trenching and excavation are:

1. Cave-ins that can bury and crush workers in soil.
2. Equipment, pipes or other objects that come loose and pinch or crush workers inside the excavation.
3. Equipment or materials held or lowered from overhead that can crush, pinch or trap workers.

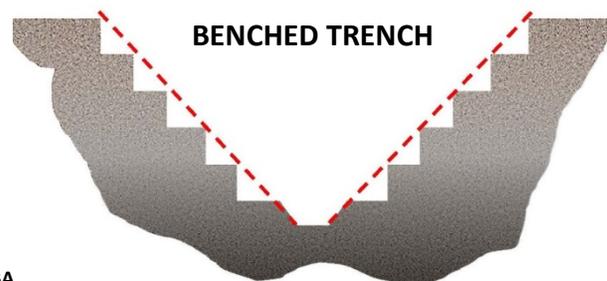
How can caught-in or caught-between incidents like this be prevented? They can be prevented by:

- Using a protection system designed for the specific excavation.
- Providing safe means to enter (access) and exit (egress) the excavation.
- Employing safe operating procedures for equipment and materials in and around the excavation.

Protection Systems

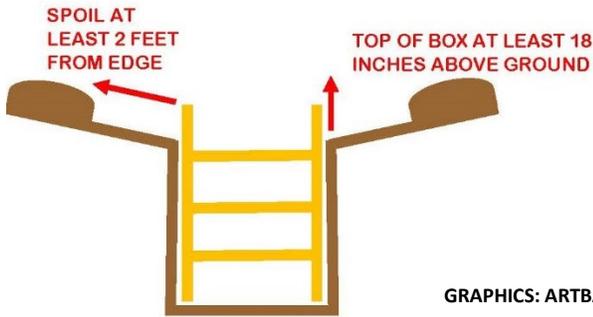
All excavations and trenches five (5) feet deep or more—but less than 20 feet deep—must be protected by sloping or benching, a trench box or shield, or shoring. Do not work in an unprotected trench that is 5 or more feet deep.

Sloping or Benching. Sloping is cutting back the sides of the trench to a safe angle, so it won't collapse. Benching uses a series of steps that approximate the safe sloping angle. The required angle depends on the soil type.

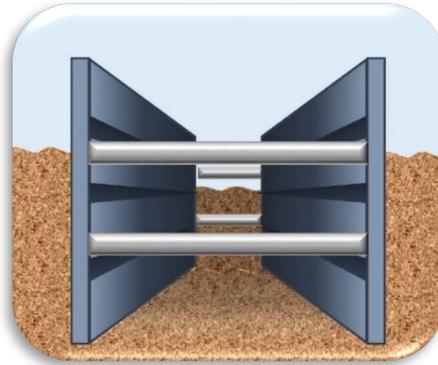


GRAPHICS: ARTBA

Trench Box or Shield. Trench boxes are placed inside a trench so workers can labor inside their protective frame. They do not prevent cave-ins but protect the workers who are in them if a cave-in happens.



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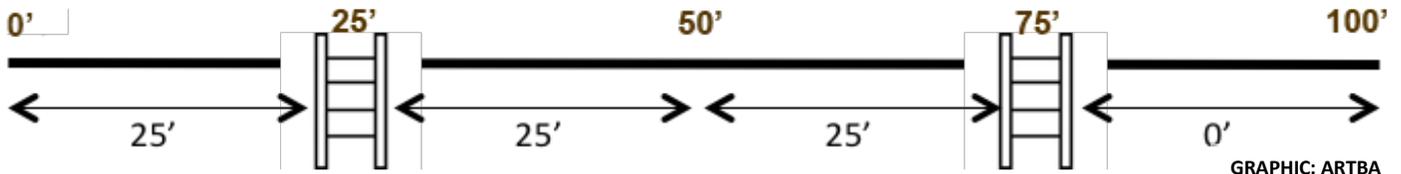
Shoring. Shoring are wooden structures, or mechanical or hydraulic systems that support the sides of an excavation.

Access and Egress. A stairway, ladder, or ramp must be provided for workers to get into and out of any excavation. All excavations that are 4 or more feet deep (1.21 meters) must have a ladder available within 25 feet of workers so they can climb into and out of the excavation. Long trenches must provide multiple ladders so that no one has to travel more than 25 feet to escape.

Ladders must extend 3 feet above the excavation and they cannot be lashed together to make them long enough to meet this requirement. Ladders or other means of egress must be present at all times and cannot be withdrawn temporarily to make more room to work or for other reasons.



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Safe Operating Procedures. Workers must be protected from equipment or materials that could fall or roll into excavations. Spoil piles (earth removed from the excavation) must be stationed at least 2 feet from the edge of the excavation so that it does not slide into the excavation or cause a cave-in due to excess weight near the edge. Buried pipes or other utility infrastructure must be clearly marked before any digging takes place. If lines or pipes look fragile or show any damage, stop digging, get out of the trench, and notify the utility company. Any edges of an excavation that are not visible to mobile equipment operators working near or over it should have a warning system in place. Warning systems can include barricades, hand or mechanical signals, or stop logs. If possible, the grade should slope away from the excavation.

If a crane or earthmoving equipment is operating directly over the top of a trench, no one should not be working underneath.

***NOTE:** Transportation incidents in which at least one vehicle was in normal operation are **not** considered caught-in or -between hazards; rather these incidents are classified as "struck-by."

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