ASSURANCE
CONSTRUCTION & SERVICES

HAZARD RATING **12/20**

TRENCHING AND EXCAVATION SAFE WORK PRACTICES

REVIEWED June 14 2016 OH&S Code Part 32 & Schedule 9

An excavation is a depression dug in the ground. A trench is defined as an excavation deeper than it is wide at the bottom. Excavations and trenches pose many hazards and require that extra precautions be taken.

Trenching accidents usually involve cave-ins, but there are other risks to workers:

- Material falling into the trench
- Improper handling and placing of material
- Workers falling as they climb in and out of the trench Workers falling over equipment or excavation material Workers falling into the trench
- Workers being exposed to toxic, irritating, or flammable gases

Understanding trenching and excavation terminology is necessary to implementing trenching and excavating safe work practices:

Excavation — a man-made cavity or depression in the earth's surface formed by earth removal that includes a trench, deep foundation, tunnel, shaft, or open excavation

Trench — an excavation having a depth that exceeds its width measured at the bottom

Shoring — a construction procedure (includes a trench cage) used to maintain the stability of the **walls and ceiling of an excavation**

Sheathing — a continuous row of wood or steel sheets in close contact that are used to provide a tight wall to resist the pressures of the walls of an excavation

Uprights — the vertical members of shoring system placed in contact with the earth

Waler — a horizontal member of the shoring system that is placed parallel to the excavation face

Strut — a horizontal cross-member of a shoring system that directly resists pressure from a waler or upright

Trenching and excavation safe work practices

A number of facts must be kept in mind regarding trenching and excavations:

- Use the C-8 Trenching & Excavating checklist.
- A worker does not need be completely buried to be seriously injured or killed. The pressure of the soil may prohibit him from inhaling.
- It is impossible to accurately predict whether an excavation is safe to enter if there is not a proper support structure in the trench or excavation.

- Confirm location of underground utilities with a shovel not a piece of mobile equipment like a back hoe.
- Excavations in or near " back filled " or previously excavated ground are dangerous because the soil is loose and does not support itself
- Water increases the possibility of a cave-in
- Clay can be extremely treacherous if dried by the sun, and large chunks of material can break off a trench wall
- Frozen ground is not an alternative to proper shoring
- An excavation should be considered a confined space and appropriate evaluations and controls should be carried out before a worker is allowed to enter what could be a potentially hazardous atmosphere
- Shoring must be adequate to overcome additional pressures from piles, excavating material, adjoining structures, vehicular traffic, and nearby equipment

Before excavating

Do the following before excavating:

- Obtain clearance from the public utilities. Once all locates have been established and before using heavy equipment expose the lines with a shovel. This is not a time to be estimating.
- Obtain engineering approvals in situations where workers are required to enter an excavation that has **one** of the following characteristics:

Is a straight-cut trench exceeding 15 feet (4.57m) in depth or 5 feet (1.52m) in width. .

  - Anything less than 45 degrees from vertical is dangerous.
  - Requires a shoring support structure due to the nature of the excavation or soil conditions
  - Requires a trench cage to be used as a shoring support structure
  - Is a shaft or tunnel
  - Is a deep foundation excavation
  - May affect the structural integrity of an adjacent building, foundation, utility pole, or other structure

A hazard assessment must be undertaken to determine the risks associated with workers entering an excavation, risks such as the following:

- Explosive and toxic atmospheres
- Lack of oxygen
- Restricted access and egress

- Weather/Flooding
- Utility contacts (gas, electrical, etc.)
- Human factors (phobias, physical conditions, etc.)

Figure 32.3 Factors that may cause cave-in of an excavation or trench

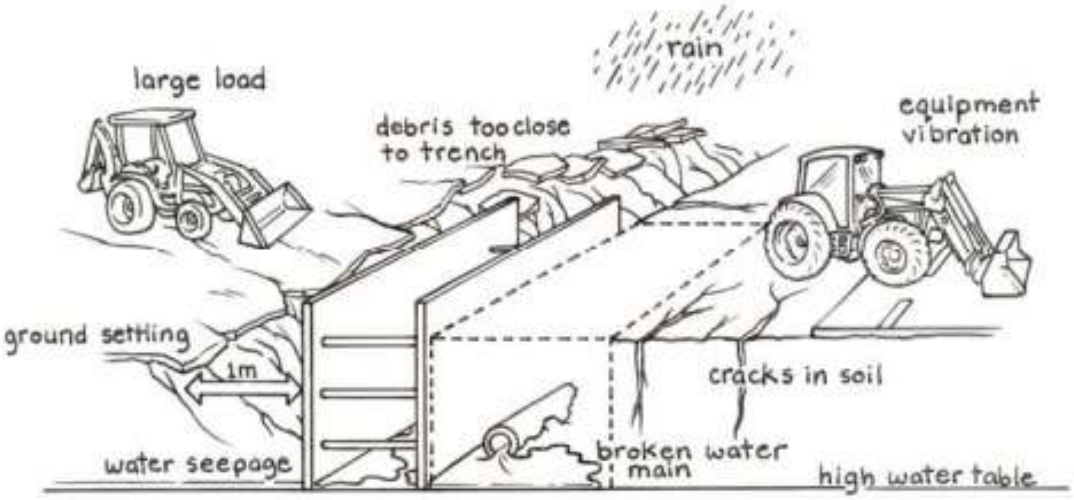

Table 32.1 Classification of soil types

Soil characteristics	Soil type		
	Hard and compact soil	Likely to crack and crumble soil	Soft, sandy or loose soil
Consistency	Hard, very dense in compactive condition	Stiff, compact in compactive condition	Firm to very soft, loose to very loose in compactive condition
Ability to penetrate	Only with difficulty by a small, sharp object	With moderate difficulty with a small, sharp object	With ease
Appearance	Dry	Damp after it is excavated, has low to medium natural moisture content	Appears solid but flows or becomes unstable when disturbed. Can be dry, running easily into a well-defined conical pile, or wet
Ability to excavate with hand tools	Extremely difficult	Moderately difficult	With ease
Water seepage	Shows no signs of water seepage	Shows signs of localized water seepage	
Other	Does not include previously excavated soil	Shows signs of surface cracking	▪ Is granular soil below the water table, unless the soil has been dewatered ▪ Exerts substantial hydraulic pressure when a support system is used

Protecting workers

To protect workers, do the following:

- Train workers
- Appoint an experienced Supervisor
- Mandate the use of personal protective equipment (PPE) and make it available (All workers doing excavation work must wear approved safety footwear and hard hats, and additional PPE may be required such as hearing protection, hand protection, etc.)
- Appoint an observer who must remain on the surface and keep the workers informed of unsafe conditions

Access and egress

A suitable means of access and egress must be provided for trenches and excavations. Ladders must extend 3 feet (.914m) above the excavation and the ladder must be located within 10 feet (3.05m) of the worker and would require shoring..

Location of excavated materials and equipment

All excavated materials must be piled so that the material cannot roll back into the excavation. The excavated material must never be closer than 3 feet (9.14m) from the edge of the excavation and should be placed as far away as possibleTools, equipment, and heavy machinery must not be placed or used near an area where they may fall into or affect the structural stability of the walls of an excavation.

Public protection and traffic control

All excavations in areas where the public has access must have barriers and signage to protect the public from falls, falling material, and excavating equipment. Proper covers or fencing must be used to prevent the public from gaining access during “off” hours.

First Aid

First aid and emergency supplies must be kept at the excavation project at all times. One worker per shift must be a trained in first aid with a CPR certification.

Engineering Information

Engineering design specifications for shoring support structures must be available at the excavation site

Working Alone

Totally prohibited no exceptions.

RELATED SWP & HAA.

Power Lines & Underground

Working Alone

Skid Steer

ASSURANCE
CONSTRUCTION & SERVICES

HAZARD RATING **12/20**

Confined Space

Hand Tools

Lifting & Carrying

Severe Weather

Designated Traffic Controller

Mini Hoe (NOT COMPLETED)

Defective Equipment

Schedule 9 Shoring Component Dimensions

[See subsections 457(1), 457(2)]

Shoring components used in excavations, trenches, tunnels and underground shafts

Soil type	Depth of excavation (metres)	Uprights		Stringers		Cross-braces			
		Minimum dimensions (millimetres)	Maximum horizontal spacing (millimetres)	Minimum dimensions (millimetres)	Maximum vertical spacing (millimetres)	Minimum dimensions (millimetres) Width of trench: Less than 1.8 metres	Minimum dimensions (millimetres) Width of trench: 1.8 to 3.7 metres	Maximum spacing (millimetres): Vertical	Maximum spacing (millimetres): Horizontal
Hard and compact	1.5 to 3.0	38 x 235	1800	89 x 140	1200	89 x 89	140 x 140	1200	1800
	More than 3.0 to 4.5	38 x 235	1200	89 x 140	1200	89 x 140	140 x 140	1200	1800
	More than 4.5 to 6.0	38 x 235	10	140 x 140	1200	140 x 184	140 x 184	1200	1800
Likely to crack or crumble	1.5 to 3.0	38 x 235	1200	89 x 140	1200	89 x 140	140 x 140	1200	1800
	More than 3.0 to 4.5	38 x 235	900	140 x 140	1200	140 x 140	140 x 184	1200	1800
	More than 4.5 to 6.0	38 x 235	10	140 x 184	1200	140 x 184	140 x 184	1200	1800
Soft, sandy or loose	1.5 to 3.0	38 x 235	10	140 x 140	1200	140 x 140	140 x 184	1200	1800
	More than 3.0 to 4.5	38 x 235	10	140 x 184	1200	140 x 184	184 x 184	1200	1800
	More than 4.5 to 6.0	38 x 235	10	184 x 184	1200	140 x 184	184 x 235	1200	1800