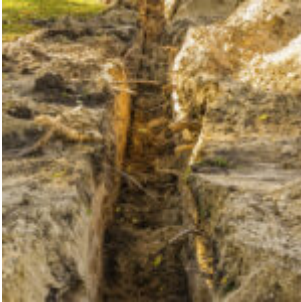


Take 7 Steps to Comply with Trench & Excavation Requirements



Work in and around excavations and trenches is particularly dangerous, exposing workers to the risk of the dig collapsing, filling with water or developing a toxic atmosphere. (See the box at the end for common trench and excavation hazards.) As a result, the OHS regulations in every jurisdiction contain detailed requirements covering various aspects of excavating and trenching work. Here's a look at seven steps you should take to comply with these requirements and ensure the safety of workers in and near excavations and trenches.

Defining Our Terms

The OHS laws usually define the terms 'excavation' and 'trench.' You should check your jurisdiction's OHS regulations for its definitions of these terms. But in general, 'excavation' is a broader term that includes *any* dug-out area of ground or earth, including foundations, trenches, tunnels and shafts. 'Trench' is a subset of excavation and typically refers to a type of excavation that's deeper than its width at the bottom.

[[learn_more](#) caption="TRENCH/EXCAVATION INSPECTION CHECKLIST"]

Download a [trench/excavation inspection checklist](#) that a 'competent person' can use to inspect excavations and/or trenches before your workers begin working inside of them.

[/learn_more]

TAKE 7 STEPS

The OHS regulations in each jurisdiction have sections dedicated to the safety requirements for trenches and excavations. (Qu bec's trench and excavation requirements can be found in its *Safety Code for the construction industry*.) Note that many trenches and excavations qualify as confined spaces under the OHS laws and so may need to comply with the confined space requirements as well. Although the trench and excavation requirements vary to some degree by jurisdiction, taking the following steps will generally help you comply:

[learn_more caption="Step #1: Classify the Soil"]

The first step is to determine the type of soil in the area where the excavation or trench is going to be dug. That's because the soil type will determine the stability of the dig's walls and thus what safety measures, if any, will be needed. So you must make this determination *before* workers begin to dig the excavation or trench.

Many OHS regulations have specific soil classification categories. For example, Sec. 442 of Alberta's *OHS Code 2009* classifies soil into three categories:

- Hard and compact;
- Likely to crack or crumble; and
- Soft, sandy or loose.

In addition, if the area in which the trench or excavation will be dug contains several different soil types, you should generally operate as if all of the soil is of the least stable type.

[/learn_more]

[learn_more caption="Step #2: Identify Any Buried Utilities in Area"]

Another step that's critical to take before workers start excavating is to identify any buried utilities, such as underground pipes, electrical cables and oil or gas lines, and mark their locations. You may need the utility company's assistance in locating any such utility equipment on your site. (This information is often referred to as the 'locates.')

In addition, you may need the utility to turn off those services while the excavating is being done. If workers hit buried utility equipment, they may not only cut off the service provided by that equipment but also cause explosions or fires.

Example: In Ontario, seven people died and others were injured in a gas explosion caused when a backhoe struck a gas pipe while doing excavation work. The pipe hadn't been located and marked prior to the start of the excavating. The construction company pleaded guilty and was fined \$225,000 [[R. v. Enbridge Gas Distribution Inc.](#), [2010] ONSC 2013 (CanLII), April 14, 2010].

Insider Says: Utilities located *above* ground can also pose a hazard. For example, if an excavation is dug too close to a utility pole, it could cause the pole and the power lines attached to it to topple. So also note where any above ground utility equipment is located and determine whether digging a trench or excavation in that area could compromise it. If so, you may need to provide additional support for that equipment.

[/learn_more]

[learn_more caption="Step #3: Safely Locate Excavated Material"]

Once you've located buried utilities and determined the soil type, you can start to dig. When you dig an excavation or trench, you'll end up with a lot of excavated material that must go somewhere. Because it's easy, you may be tempted to store this material close to the excavation or trench. But doing so could endanger workers. The dug up soil could fall

back into the excavation and bury workers inside. In addition, a very large 'spoil pile' located near the excavation can exert lateral pressure on the dig's walls and cause them to collapse. So the OHS laws typically bar you from piling excavated material closer than one metre from the excavation's edge. In addition, if the spoil pile is very deep (say, over 60 cm) and is next to the excavation, the shoring you install in the excavation should take into account this additional lateral pressure.

[box]**Insider Says:** It's not just excavated material that should be kept away from the edge of trenches and excavations. Tools, materials and powered mobile equipment could also fall into a trench or excavation and injure the workers inside. So the OHS regulations often require employers to also keep such items a minimum distance from the edge of a trench or excavation. For example, Sec. 3.12(6) of the federal *OHS Regulations* says tools, machinery, timber, excavated materials or other objects can't be placed within one metre from the edge of an excavation or trench. [/learn_more]

[learn_more caption="Step #4: Determine if Shoring Is Required"]

Excavations that meet certain criteria must have 'shoring' that is, supports placed within the excavation to 'shore' or hold up the walls. Without adequate shoring or bracing, the walls of the dig can collapse or cave-in, often with fatal results.

Example: An Alberta truck driver was killed when a 15-metre-high wall of dirt and rock collapsed on him in an excavation pit. The prosecution argued that two related companies knew about the dangers associated with an improperly shored-up wall of the pit for about two months. The court convicted the companies and fined them \$1,437,500 and \$1,035,000 respectively plus the 15% victim surcharges, for a record total fine of \$2,472,500 [*Perera Development Corp. and Perera Shawnee Ltd.*, [Edmonton Journal](#), June 5, 2012].

The factors you should consider in determining if shoring is required typically include:

- The excavation's depth;
- The type of soil;
- Sloping of the excavation's walls; and
- Work conditions surrounding the excavation, such as the presence of vibrations.

These factors will also determine the *type* of shoring needed and other requirements, such as the spacing of support beams. Some jurisdictions include detailed charts in their OHS regulations spelling out the minimum shoring requirements for various types of excavations. Consult your jurisdiction's OHS regulations for these specifications.

[box]Insider Says: In some cases, you may be permitted to slope the walls of the excavation instead of using shoring. For example, under Nova Scotia's *Occupational Safety General Regulations*, if a wall of an excavation or trench is greater than 1.2 m in height, the employer must use adequate shoring or bracing *unless* the excavation or trench is sloped to within 1.2 m of the bottom of the excavation or trench and the slope doesn't exceed one metre of vertical rise to each one metre of horizontal run [Sec. 166(1)(b)].

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[learn_more caption="Step #5: Provide Safe Means of Entry and Exit"]

Once the excavation or trench has been dug and appropriately shored or braced, you must ensure that there's a safe way for workers to enter and exit it, such as a ladder, stairway or ramp. Ladders should generally extend at least one metre above the top of the excavation or trench. And the entry and exit areas must be located near where workers will be working, that is, generally within eight metres, and be safely braced and supported. [/learn_more]

[learn_more caption="Step #6: Ensure Atmosphere Is Safe"]

The surrounding soil isn't the only hazard to which workers in an excavation or trench may be exposed. The air inside a dig can become toxic, such as if it fills with gas or the oxygen level drops to dangerous levels. And workers may not even realize they're in danger from a toxic atmosphere until it's too late. So the OHS laws require employers to take safety precautions to ensure that the atmosphere in an excavation contains sufficient oxygen and is free from hazardous levels of dust, vapour or gases. For example, employers may be required to test the air in the excavation, ventilate it and provide [appropriate respirators](#) for workers. In addition, you should bar workers from operating gas-powered equipment inside an excavation or trench, which can cause a dangerous buildup of carbon monoxide.

[box]**Insider Says:** There are other hazards within a trench or excavation from which you must also protect workers, such as the risk of flooding if water could accumulate in the dig.
[/learn_more]

[learn_more caption="Step #7: Protect Workers Outside of Trench/Excavation"]

The workers who actually work inside an excavation or trench are at the most risk. But workers who work near or around these digs'and passersby or visitors'may also be in danger, primarily of falling into an excavation. So most OHS laws require excavations and trenches to be covered or protected with a barrier, fence or guardrail to prevent people on the surface from getting too close to the edge and tumbling inside of them. [This chart](#) shows when each jurisdiction requires barricades, barriers or other types of guarding to be installed around trenches and/or excavations.

In addition to people, powered mobile equipment, such as the backhoes being used to dig the excavation, can also fall into

it's endangering the workers in the dig as well as those operating this equipment. (See, [SPOT THE SAFETY VIOLATION: Don't Let Safety Hazards Get En-Trenched.](#)) That's why the OHS laws generally require companies to erect barriers near the access points for powered mobile equipment that are high enough to keep such equipment from sliding or rolling into the excavation. [/learn_more]

BOTTOM LINE

Violations of the excavation and trench requirements are very common. And because such violations can have tragic consequences, employers may be hit with administrative penalties or fines for them even in the absence of a safety incident, injury or fatality. For example, if an inspector sees a trench that doesn't have adequate bracing, you're almost guaranteed to be penalized in some way. So ensure that your workplace takes these requirements as seriously as the OHS regulators do.

[box]COMMON TRENCH & EXCAVATION HAZARDS

The most common hazards posed by trenches and excavations include:

Cave-ins or excavation collapses'when you remove soil to make an opening, the remaining soil 'relaxes' and increases the pressure on the walls surrounding the opening, making the walls unstable;

Excavated material'if soil dug out of an excavation is piled too close to the excavation, it can fall back into the opening or destabilize the opening's walls;

Falling objects or objects near an excavation'tools, equipment and barriers around an excavation can fall into the opening if they're placed too close to the edge;

Powered mobile equipment'back hoes, concrete trucks and the

like can strike workers in and around excavations or collapse on top of workers inside them;

Slips, trips, and falls 'excavation entrances and exits and uneven ground can cause workers to fall;

Hazardous atmospheres 'the air in trenches is often dangerously lacking in oxygen and may also contain common atmospheric hazards, such as gasoline vapours, methane and other explosive gases;

Flooding/water hazards 'if an excavation is below the water table or near a water source or if it absorbs a lot of rain, the excavation can flood or collapse; and

Underground utilities 'workers in trenches and excavations may strike electrical, oil and gas lines and suffer injuries as a result.