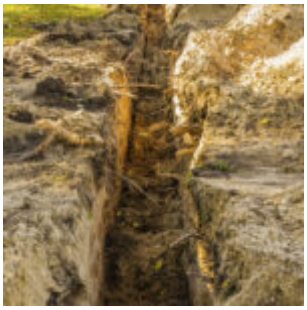
TRENCHES & EXCAVATIONS: How to Comply with Shoring Requirements



Trenches and excavations poses various safety hazards to the workers who must work in and around them. One particular hazard is the risk of cave-ins or collapses. When you remove soil to make a hole, the remaining soil ‘relaxes’ and increases the pressure on the walls surrounding the opening, which makes the walls unstable. As a result, the OHS regulations in every jurisdiction contain specific requirements for shoring, bracing or otherwise supporting the walls of excavations and trenches to prevent collapses. Here’s a look what you need to do 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,’ and may use these terms differently. For example, ‘excavation’ is usually a broader term that includes *any* dug-out area of ground or earth, such as foundations, trenches, tunnels and shafts; ‘trench’ is often a subset of excavation and typically refers to a type of excavation that’s deeper than its width at the bottom. You should check your jurisdiction’s OHS regulations for its specific definitions of these terms. But in this article, we’ll use the term ‘excavation’ to refer to all regulated digs, including

trenches. In addition, we won't cover the specific requirements for trench cages, which serve a similar purpose as shoring but are capable of being moved as a unit (as opposed to shoring, which is fixed in place).

TRENCH/EXCAVATION INSPECTION CHECKLIST: Download a trench/excavation inspection checklist that a 'competent person' can use to inspect excavations and/or trenches before workers begin working inside of them and ensure that they comply with all requirements, including those on shoring.

TAKE 4 STEPS

The OHS regulations in every jurisdiction have sections dedicated to the safety requirements for trenches and excavations. (Québec's trench and excavation requirements can be found in its *Safety Code for the construction industry*.) Note that many excavations also qualify as confined spaces under the OHS laws and so may need to comply with the confined space requirements as well. Although the shoring requirements vary to some degree by jurisdiction, taking these steps will generally help you comply with them regardless of where your workplace is located:

[learn_more caption="Step #1: Determine if Shoring Is Required"]

The first step is to determine whether shoring is required for a particular excavation'and you must make this determination *before* workers enter or work in it. (This chart spells out when shoring is required under each jurisdiction's OHS laws.) One clear rule is that shoring is only required if a worker will have to enter or work in the excavation. In addition, you'll generally need to consider the following factors:

Soil type. The type of soil in the area where the excavation is going to be dug is a key factor because the soil type will determine the stability of the dig's walls. Many OHS regulations have specific soil classification categories. For

example, Ontario's *Construction Projects Regulation* classifies soil into four categories:

- *Type 1 soil*, which is hard, very dense and only able to be penetrated with difficulty by a small sharp object; has a low natural moisture content and a high degree of internal strength; has no signs of water seepage; and can be excavated only by mechanical equipment;
- *Type 2 soil*, which is very stiff, dense and can be penetrated with moderate difficulty by a small sharp object; has a low to medium natural moisture content and a medium degree of internal strength; and has a damp appearance after it's excavated;
- *Type 3 soil*, which is previously excavated soil; or soil that's stiff to firm or compact to loose in consistency and has one or more of the following characteristics:
  - It exhibits signs of surface cracking;
  - It exhibits signs of water seepage;
  - If it's dry, it may run easily into a well-defined conical pile; or
  - It has a low degree of internal strength.
- *Type 4 soil*, which is soft to very soft and very loose in consistency, very sensitive and upon disturbance is significantly reduced in natural strength; runs easily or flows, unless it is completely supported before excavating procedures; has almost no internal strength; is wet or muddy; and exerts substantial fluid pressure on its supporting system.

Note that, if the area in which the 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.

***Insider* Says:** An excavation in solid rock typically doesn't need shoring. However, it may still need certain safety measures such as bolts, rock anchors or wire mesh to prevent rock from falling off the walls and onto workers.

The excavation's depth. In most jurisdictions, excavations that are more than 1.2 metres deep may require shoring. But some jurisdictions have tiers of requirements depending on the excavation's depth. For example, Manitoba has separate requirements for excavations under 1.5 m in depth, between 1.5 m and 3 m in depth, and more than 3 metres deep.

Sloping of the excavation's walls. In some cases, shoring may not be necessary despite the excavation's soil and/or depth if you properly slope or cut back its walls. For example, in Saskatchewan, when a worker is in an excavation that's more than 1.2 metres deep and is required to be closer to the wall or bank than the distance equal to the depth of the excavation, the employer or contractor must ensure that the worker's protected from cave-ins or sliding material by:

- Cutting back the upper portion of the walls of the excavation;
- Installing a temporary protective structure; or
- A combination of cutting back the walls to the slope specified in the regulations and installing a temporary protective structure that extends at least 300 millimetres above the base of the cut-back.

Conditions surrounding the excavation. The final factor you should consider is the work or activity near the excavation. For example, passing traffic or the use of cranes and similar equipment near an excavation can create vibrations, which may destabilize its walls. Also, the weight of heavy equipment close to an excavation can put additional stress on its walls that needs to be taken into account.[/learn_more]

[learn_more caption="Step #2: Determine Appropriate Type of Shoring"]

If you determine that shoring *is* necessary in an excavation, you'll next need to determine the specific type of shoring needed and how it must be constructed. Some jurisdictions have

detailed charts in their OHS regulations spelling out the minimum shoring requirements for various types of excavations. So consult your jurisdiction's OHS regulations for these specifications. But whether contained in a chart or spelled out in the regulations, these requirements typically cover:

- Type of materials to be used. For example, if you're using wood, the lumber or plywood may need to meet certain standards or come from certain kinds of trees, such as spruce or Douglas fir;
- The minimum number and size of its components, including uprights, stringers or wales, and cross-braces or struts;
- The maximum spacing between components; and
- How far the shoring must extend above the top of the excavation (usually 300 millimetres).

Note that most jurisdictions require shoring, bracing or other 'temporary protective structures' for excavations to be either designed by a professional engineer or inspected and certified by an engineer. So make sure to involve an engineer in this process.[/learn_more]

[learn_more caption="Step #3: Properly Install'and Remove'Shoring"]

In most cases, the installation and/or removal of shoring may need to be done or supervised by a 'competent' person. (For more on what constitutes a 'competent' person under the OHS laws, see '[Compliance 101: What Makes a Worker a 'Competent Person' Under OHS Laws']('). Other common requirements for installing and removing shoring include:

- The walls of the excavation should be scaled and trimmed, where necessary, to reduce the danger of falling material;
- Shoring should be installed from the top to the bottom of an excavation in descending order and removed in the

reverse order from which it was installed;

- Shoring components must be securely connected together to prevent sliding, falling, kick outs or other possible failure;
- Such components should be installed in firm contact with the walls of the excavation, which may require backfilling of the voids between the walls and the shoring;
- Components should also be installed in a manner that ensures no loss of soil from behind or below the bottom of the shoring; and
- Workers shouldn't enter an excavation to remove shoring materials if ground conditions have deteriorated so as to make entry for shoring removal unsafe.

TRENCH/EXCAVATION INSPECTION CHECKLIST: Download a trench/excavation inspection checklist that a 'competent person' can use to inspect excavations and/or trenches before workers begin working inside of them and ensure that they comply with all requirements, including those on shoring.[/learn_more]

[learn_more caption="Step #4: Implement Safe Work Procedures"]

Of course, you should have safe work procedures for working in excavations and trenches and those procedures should address the shoring requirements. For example, your procedures should cover the installation and removal of shoring as discussed above. They should also bar workers from entering any excavation until it's been determined whether it needs shoring and from entering any part of an excavation beyond the point at which shoring has been installed.[/learn_more]

BOTTOM LINE

Collapses of excavations are all too common and, sadly, often fatal. For example, a trench at a construction site was about 10-11 feet deep. Its sides weren't sloped and although a

shoring box was available, its dimensions weren’t sufficient to shore this excavation. So it wasn’t being used. A worker entered this trench to clear dirt that had fallen onto a pipe. The side of the excavation collapsed, burying him up to the chest. A second cave-in completely buried the worker, who died. An MOL investigation found that the company had no documented training of its employees on that crew relating to the hazard of working in trenches or the legal requirement for the use of shoring boxes if entering an unsloped trench. It pleaded guilty and was fined $75,000 [*Utility Force Inc.*, Ontario Govt. News Release, Oct. 12, 2016]. So it’s critical that you ensure your workplace takes all necessary steps to comply with the shoring requirements to protect workers from similar tragedies.