TRENCH EMERGENCY!

Trenching and Shoring

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Introduction

If you work in a trench and haven't seen one cave-in, chances are that you will. If a cave-in does happen, what you do may mean the difference between life and death.

In this handbook you will learn what to do and what not to do if a trench collapses and someone is trapped. But, before we review safe trench emergency procedures, we'll look at some basic facts about trenches and explain the dangers trench excavations pose.

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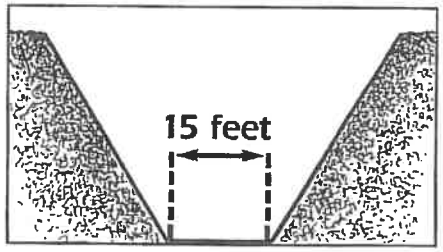
The Trench

A trench is defined as any excavation that is:

- Less than 15 feet wide.
- Longer and deeper than it is wide.



Protective Systems

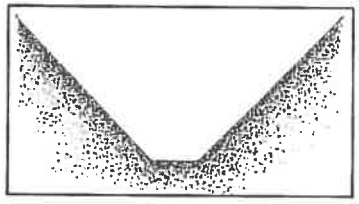
According to one recent study, 85 percent of all trenching cave-in fatalities occurred in trenches that did not have adequate protection. To prevent accidents, a protective system must be used in every excavation, except those:

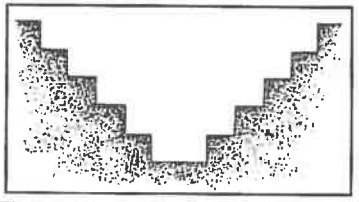
- Less than five feet deep that have been inspected for collapse.
- In stable rock.

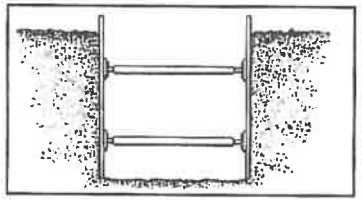
But remember, once you have begun excavating stable rock, it is no longer stable. It will most likely become Soil Type-A.

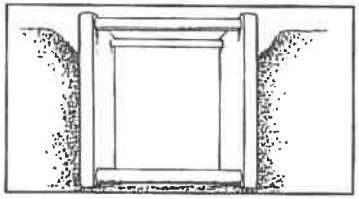
Employers may choose from two basic methods:

- Sloping or Benching
- Shoring or Shielding.









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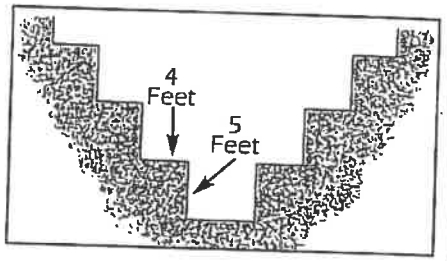
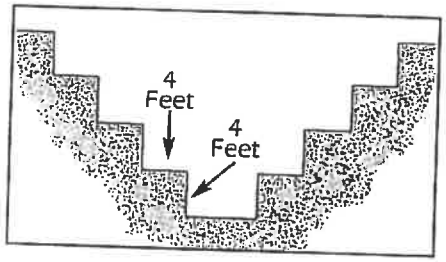
The type of protective system chosen is based partly on soil stability.

- Type-A soil is the most stable class of soil. It is hard to break up when dry and holds together when wet. Clay, silty clay, and hardpan are examples of Type-A soils.



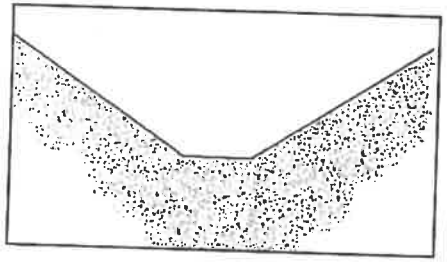
- Type-A soil can be sloped at a ratio of .75:1 and benched in steps of four feet horizontal to five feet vertical.

- Type-B soil, the next most stable, is made up of soils like silt, sandy loam, medium clay and unstable dry rock.



- Type-B soil can be sloped at a ratio of 1:1 and benched in steps of four feet horizontal to four feet vertical.

- Type-C soil is the least stable. It is made up of gravel, loamy sand, soft clay, submerged soil or heavy, unstable rock.



- Type-C soil must be sloped at a ratio of 1.5:1 and because of the soil instability, Type-C is not benched.

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Shoring and Shielding

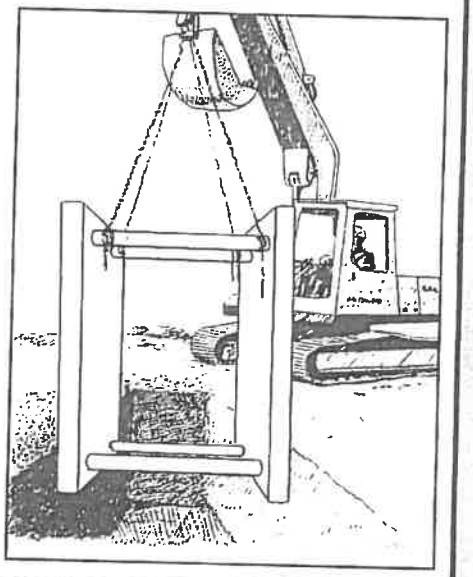
Shoring

Shoring is designed to prevent cave-ins by supporting trench walls with vertical shores called uprights or sheeting. Cross braces and horizontal supports complete the framework that distributes the weight of the soil.

- Inspect the shoring of a trench regularly.
- Always keep an eye out for changes in the structure and surrounding ground conditions.

Shielding

Shielding is designed to give employees a safe work area by protecting them from collapsing material. It can be either pre-manufactured or job-built under the specifications of a registered professional engineer.



Shields used in trenches are called trench boxes or trench shields. These are usually portable steel structures placed into the trench by heavy equipment.

Shields must be installed in a way that will restrict side-to-side movement. No person may stand in the shield while it is being raised or lowered into place.

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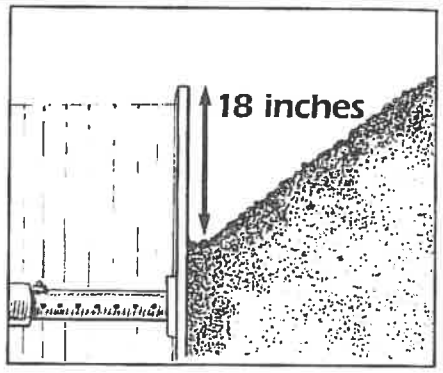
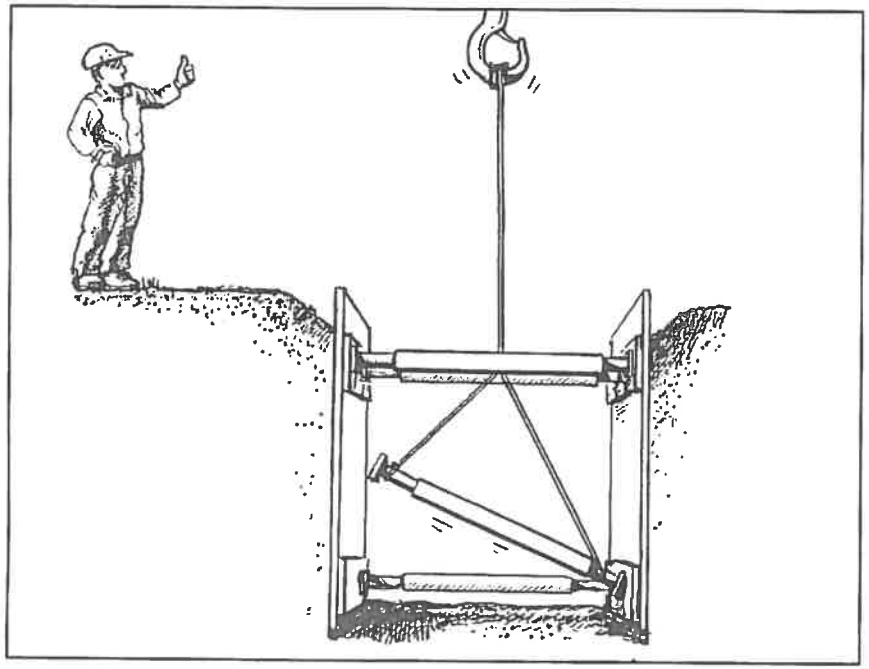
If either shielding or sheeting is used along with sloping, it must extend at least 18 inches above the bottom of the sloped part of the excavation.



Whenever you remove a trench support system:

- Begin at the bottom.
- Release the individual shores slowly, so that any sign of failure of the remaining parts can be noted.
- Back fill excavations immediately after support systems are removed.



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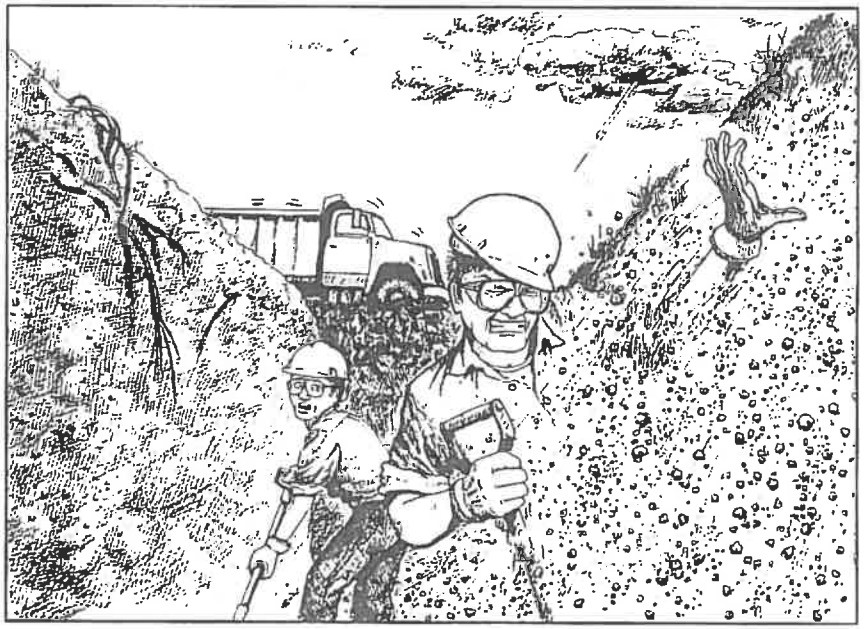
Shores and shields are only as good as the people who build them and use them. Unfortunately trenches still collapse because safe work practices are ignored. Hundreds of workers die and thousands are seriously injured every year in trench accidents.

Accidents can occur when:

- Shoring isn't installed.
- Shoring isn't installed properly.
- Utilities aren't marked correctly.
- Utilities are so old they don't show up on today's maps.
- The ground shifts.
- A truck drives by.
- There is a surprise thunderstorm.

A trench can collapse for a wide variety of reasons. Make sure to follow safe trenching procedures and never work in a trench that does not have a protective system in place.



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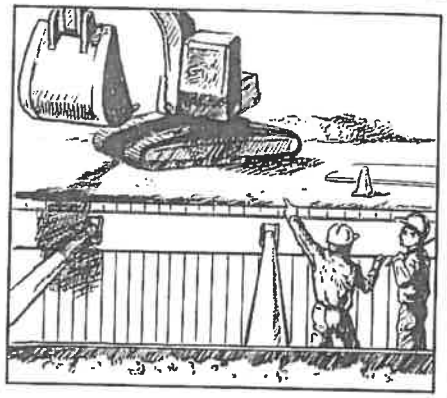
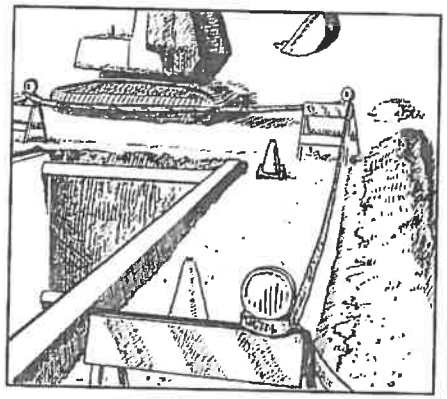
Safety Requirements in Excavation Work

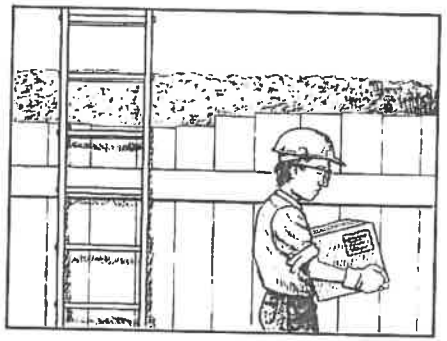
If any danger signals are noticed, employees must be removed from the hazardous area until corrective steps have been taken.



- No one is allowed underneath loads handled by lifting or digging equipment.
- No one but the operator may be near a vehicle being loaded or unloaded.
- Excavated material and other objects must be kept at least two feet from the opening or held in place by retaining devices.



- No one may work on the sides of sloped or benched excavations above other employees unless the lower worker is protected from falling material.
- Workers must be protected from soil, equipment, spoil piles and other materials that could fall into an excavation.
- Trenches four feet or more in depth must have a safe means of exit, such as a ramp or ladder, within 25 feet of every worker.



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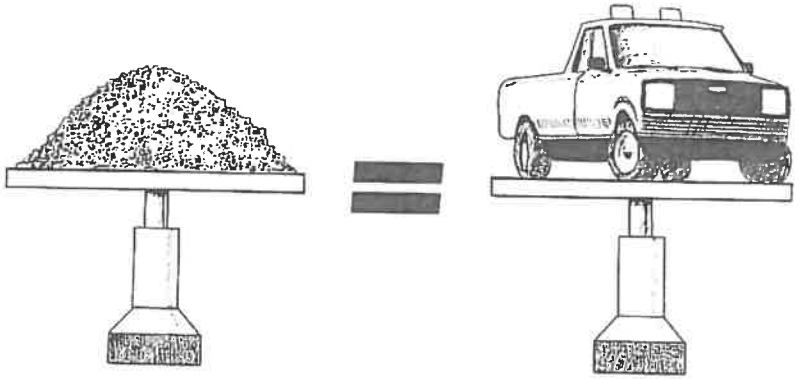
How Heavy is Soil?

Just a little bit of soil can carry a surprising amount of weight. A full bucket of dirt on a backhoe is just about one cubic yard and weighs approximately 2,800 pounds — about the same as a Ford Ranger pick-up truck.



When dirt piles up in a trench cave-in, it can weigh:

- 4,000
- 5,000
- As much as 10,000 pounds per cubic yard.

This means that a person can be trapped in certain types of soil by just being covered up to the knees.

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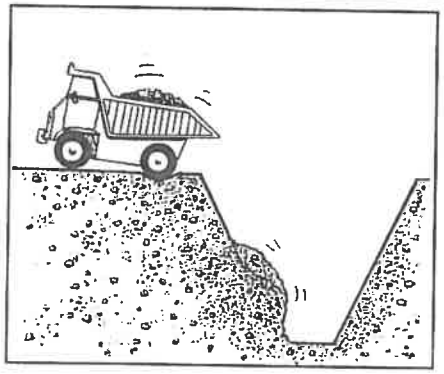
Trenches don't always cave-in from the top. Pressures can build on a trench wall and force the belly or middle of the wall to give out.



To stay safe on the job:

- Build trenches as safe as possible.
- Know what to do and what not to do if someone is trapped in a trench.

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If a Trench Collapses...

If a trench collapses you are in extreme danger. The ground is very unstable. The trench might:

- Cave-in again
- Begin flooding
- Contain dangerous utilities.

If a trench collapses and someone is trapped:

- **Do not stay in the trench.** The trench has proved unstable and you could easily become another victim. The best thing to do is to call 911 immediately.

- **Do not attempt a rescue.** Any attempt to help a trapped victim will likely result in another cave-in or further injure the trapped person.

- **Do not try to dig them out.** You can severely injure a trapped person by using a shovel to dig him or her out.

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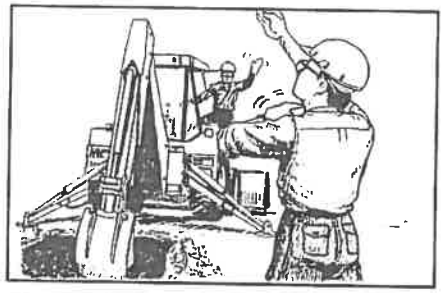
- **Do not remove any hand tools.** Hand tools can be used by the rescue team to locate a person who has been covered with dirt.

- **Do not use heavy equipment.** The vibration of operating heavy equipment can cause the trench to collapse again. Never try to dig a victim out or pull a victim out with machinery.

The best way to safely help someone who is trapped is to immediately:

- Get out of the trench.
- Call 911.
- Notify the Competent Person.
- Note the exact time.
- Note the location of trapped workers.
- Leave all the victim's hand tools in place.
- Shut down all heavy equipment.
- Stop any nearby traffic that might cause vibration.
- Keep everyone back at least 50 feet away from the edge of the trench.
- Gather information for the rescue team.



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The Rescue Team

The rescue team needs information to make quick decisions and get the trapped person out as fast as possible.

You can make sure the rescue team and competent person have the information they need. It takes a level head. There will be a lot confusion and some people won't be thinking clearly.

The rescue team will need to know:
- The depth of the trench
- The soil classification
- How much soil has collapsed
- The number of people trapped
- How much soil is covering victim(s)
- How long the victims have been trapped
- The types of utilities around the trench.

You can help the rescue team by answering the following questions:
- Are hazardous utilities damaged?
- Are conditions stable?
- Is there continued collapse or flooding?
- What is the condition of the surrounding soil?
- Is it cracking?
- Are chunks of soil still falling into the trench?

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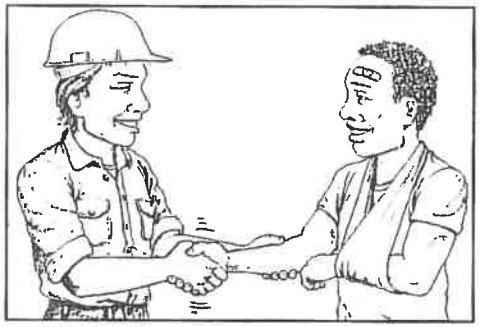
If you want to help someone trapped in a trench cave-in:

- Know the facts.
- Be able to pass on the information quickly.
- Always follow safe procedures in a trench collapse. You will save valuable time and, ultimately, save lives.
- Allow specially trained rescue team personnel to safely rescue someone trapped in a trench.

Summary

Do your part to help these professionals by practicing the skills we have reviewed in this handbook.

- Stay calm.
- Use your head.
- Stay out of the trench.
- Stabilize the area.
- Be sure to write down the important information required by the rescue team.



You can help your co-worker and stay alive when a trench collapses and someone is trapped.

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Quiz

1. True False A trench is an excavation that is less than 15 feet wide and longer and deeper than it is wide.
2. True False Less than half of all cave-in fatalities occur in trenches that are not safely protected.
3. True False Workers can be protected in trenches by sloping and benching or shoring and shielding.
4. True False There are four basic classifications of soil.
5. True False Type-C soil is the most stable.
6. True False Type-B soil should be sloped and benched with a ratio of 1:1.
7. True False When shielding is used with sloping, the shielding must extend 18 inches above the bottom of a sloped part.
8. True False Remove shores from the top down.
9. True False Only one person is allowed to work under loads lifted by heavy equipment.
10. True False Excavated material and other objects must be kept at least two feet from the trench opening or held in place by retaining devices.
11. True False One cubic yard of dirt weighs as much as a Ford Ranger pick-up truck.
12. True False Trenches only collapse from the top down.
13. True False Anyone can perform a trench rescue safely.

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14. True False When a trench collapses, stay in the trench to help any victims.

15. True False Do not remove any hand tools from a trench that has collapsed.

16. True False Use heavy equipment to rescue someone who has been trapped in a cave-in.

17. True False When a trench caves in, the best thing to do is to immediately call 911 and prepare for the rescue team.

18. True False The rescue team needs information so they can make quick decisions and get the trapped person out as quickly as possible.

19. True False The rescue team only needs to know how many people are trapped and approximately where they went under.

20. True False By practicing the skills we have reviewed in this handbook you can help your co-worker and stay alive when a trench collapses and someone is trapped.

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ACKNOWLEDGEMENT OF TRAINING

I have read and understand the training handbook, **Trench Emergency!** I have also completed and passed the comprehensive quiz at the conclusion of this handbook.

Employee's Signature _____ Date _____

Trainer's Name _____ Date _____

NOTE: This record may be included in the employee's personnel or training file.

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