By the Numbers: 12 Tips for Safe Trenching and Excavation



One cubic yard of soil can weigh as much as a car. The pressure on a victim's chest can make it impossible for him or her to breathe, even if his or her head is above the level of the collapsed soil.

- A worker in Westmount, Quebec was buried in a trench next to a house when the wood retaining wall collapsed on him, as did soil and paving stone.
- Colleagues got him out in 90 seconds, but he succumbed to his injuries shortly afterwards. https://www.ohscanada.com/features/going-underground-2/

Paul Villeneuve was 20, he was buried up to his waist in soil after heavy machinery nearby caused the trench in which he was working to collapse. Fortunately, he got out alive after his brothers, who were working on the job, dug him out with shovels.

- "**When you're buried up to your chest, you're dead**. There's too much pressure," Villeneuve says. https://www.ohscanada.com/features/going-underground-2/

These are just two of the hundreds of examples of excavation deaths and near deaths that occur every year in Canada and the United States.

Here are 12 tips to keep your crews safe during excavation work.

1. **No Exceptions – No Excuses**

- Use protective systems for every excavation deeper than 1.2 meters (4 feet).
    - Sloping
    - Shoring
    - Trench boxes

2. **Inspect Protective Systems**

- Hydraulic shoring – check hose and cylinder leaks, bent bases, cracks, other damage.
- Time shoring – check pre-install and remove damaged lumber; post-install for signs of crushing.
- Trench boxes – inspect for structural damage and cracks in welds.

3. **Safe Egress – Safe Access**
    - Ladders must be placed inside protected area – never more than 7.5 meters/25 feet away.
    - Ladders must be tied off at top and extend over the shoring or box by at least 1 meter/3 feet.
4. **Soil Type**
    - Competent person must assess soil type.
    - Soil conditions change quickly and must be checked regularly – especially after weather change.
5. **Vibration**
    - Machine vibration, even 500 feet away, can impact trench integrity.
    - Type 4/Type C soils – especially sensitive.
6. **Lone Worker**
    - Don't allow a lone worker in a trench– even with protective system.
    - Chances of rescue are already low – chance of rescue when alone are zero.
7. **STF**
    - Keep only necessary equipment and materials in excavation.
    - Set up barricades and warnings to keep workers and the public away from trench and excavation edges.
8. **Falling Objects**
    - Enforce safe distance requirements and safe parking procedures for inclines and edges (or prohibiting this practice where possible).
    - Instruct workers to report materials or equipment and rocks or other debris that are too close to excavation.
9. **Overhead and Underground Hazards**
    - Locate underground utilities prior to start of work – hand dig when possible.
    - Follow and enforce distance requirements for equipment near overhead power lines.
    - Powerline voltage ratings of:
        - 750 to 150,000 volts – equipment must be minimum distance of 3 meters (10 feet)
        - 150,000 to 250,000 volts – equipment must have minimum safe distance of 4.5 meters (15 feet)
        - 250,000 volts – minimum safe distance of 6 meters (20 feet)
10. **PPE and More**
    - Require standard PPE – hard hats, safety glasses, safety boots, rubber boots when wet/muddy.
    - Extra protection when hazards require – safety harness and lifeline.
11. **Have a Plan**
    - Preplan excavation work – determine hazards, equipment needed, training required, permits needed.
    - An emergency plan is a must. The odds of rescuing a victim of a collapse

are slim and time is very short.
    - Weight of soil collapse is several thousand pounds –only takes about 18 kg/40 pounds of pressure on the chest to prevent someone from breathing.
    - The weight of the soil pushes the air out of the lungs and with each attempt to inhale the soil tightens around the victim – making it impossible to push air out and take air in.
    - The weight of collapse can also cause massive internal injuries.

12. **Training**

- Train all workers involved in excavations activities.
- Train them on their rights to refuse work they feel or know is dangerous.
- Train supervisors on excavation procedures and educate them on the consequences of not following safety procedures; putting lives in jeopardy; retaliating against workers who refuse to work in dangerous conditions.