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EXCAVATIONS

What your site and employer should do for you
1. Assess the project, identify any work that will need workers to enter or work in an excavation, and tell you.
2. Make sure there are adequate resources and equipment to prevent collapse, and a safe system of work is in place where it is necessary to enter an excavation.
3. Make sure suitable training is provided for those installing excavation and trench support systems and anyone entering or working in excavations.
4. Make sure a safe means of getting into and out of excavations (access and egress) is provided.
5. Make sure there is suitable edge protection (such as barriers and stop blocks) in place to prevent people, materials and vehicles from falling into excavations.
6. Carry out safety inspections.

What you should do for your site and employer
1. Do not enter an excavation unless a safe system of work is in place and you are trained, competent and authorised to do so.
2. Do not enter any excavation that is unsupported or has not been inspected.
3. Do not install excavation supports unless you are trained, competent and authorised to do so.
4. Do not take any risks.
5. Do not leave any excavation open or unguarded.
6. Never climb on supports or use supports or exposed services as stepping points to get into or out of an excavation.
7. Report any safety concerns to your supervisor.
8. If you feel unwell, leave the area immediately and tell your supervisor.

Introduction

An excavation is any hole or trench dug into the ground as part of construction or utility work. Some excavations are knee deep, but many are deeper. They do not need to be deep before becoming a serious risk or a confined space.

Every year deaths and injuries occur due to excavations collapsing, or workers being overcome by poisonous gases or striking live services.

Many accidents happen when the excavation appears to be in good condition, with no obvious hazards.

Excavations are dangerous

A cubic metre of soil can weigh **over one tonne** (1,000 kg). **A human body cannot support that much weight.**

Even a shallow excavation can easily collapse onto you.

It can crush your legs, hips or chest and, within seconds, can prevent you from breathing.

Collapse is silent and without warning.

Dangers of excavations

The sides of a trench may look firm, but looks can be misleading. Excavations and trenches **collapse** for the following reasons.

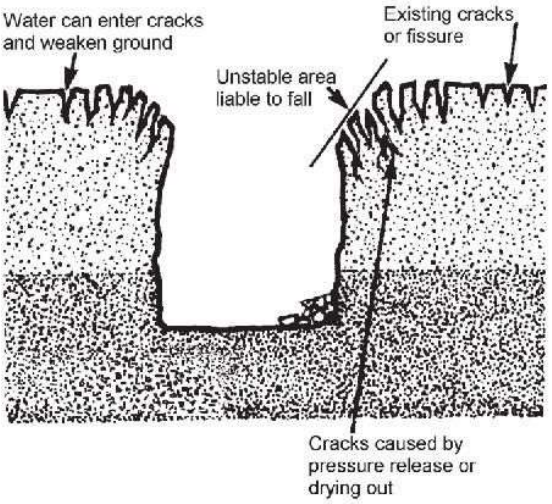
- The sides are not supported or supports are not installed properly.
- Vehicles operate too close to the edge (for example, dumpers, excavators or other large vehicles).
- Materials and spoil are stored too close to the edge.
- The ground dries out, shrinks and collapses.
- Heavy rain weakens the ground and the sides. Groundwater in an excavation also weakens the sides.
- The excavation is too close and undermines or weakens nearby walls and structures, causing them to collapse.

Keep vehicles a safe distance away from the edge of an excavation. A truck carrying 6 m³ of concrete weighs approximately 26 tonnes.

There are many dangers when working within excavations. To work safely the following hazards may need to be considered.

- Falls of materials, people, plant and vehicles into the excavation.

- Making foundations of nearby structures weak, including scaffolds and other temporary works structures.
- Accidental or deliberate contact with underground services.
- Water or other fluids entering the trench, standing water and pumping out.
- The presence of naturally occurring gases (such as hydrogen sulphide (H^2S)).
- The build up of gases that are heavier than air (such as H^2S and liquefied petroleum gas (LPG)).



Possible dangers of trenches

Examples of good practice

Examples of good practice for excavation work are listed below.

- Avoid the need for anyone to go into an excavation.
- Install excavation supports before anyone goes into an excavation.
- Use methods that protect the person installing the support system.
- Stop vehicles from coming too close (for example, use wheel stop blocks).
- Provide a safe way to get in and out (such as a tied ladder).
- Only work within the safety of the protected area in open excavations (for example, within the confines of a drag box or trench supports).
- Provide fall prevention around the excavation (for example, a handrail or extended trench sheets).
- Put up barriers around the excavation, particularly where the public have access.

Safe working in a deep excavation using trench boxes and a tied ladder

- Provide lighting; excavations and the guarding around them should be lit during the hours of darkness or other periods of reduced natural light, particularly if the excavation is in a place where the public have access.

Inspections

A competent person must inspect the excavation before the start of each shift (including after breaks), or after any event (such as heavy rainfall) that may have affected its strength or stability. Something may have happened to affect the excavation's stability or something may have fallen from or into it. All inspections must be recorded and defects put right immediately.

Poisonous or flammable gases and fumes

Poisonous gases and fumes (such as those listed below) can be heavier than air and can 'pour' over the edges and start filling up an excavation or a confined space.

- Exhaust fumes from petrol or diesel-powered plant.
- Naturally occurring gases (such as methane and hydrogen sulphide), which seep out of the ground.
- Fumes or vapours from solvents (such as welding plastic pipes, epoxy resins or sealants).
- Liquefied petroleum gas (LPG).
- Carbon dioxide (CO_2) and other pipe freezing gases.

Safe systems of work may include the following.

- Using a gas detector to test the air before entry and then monitoring continuously.
- Pumping in fresh air.
- Using a solvent-free product that does not give off fumes.
- Wearing breathing apparatus as a **last resort**.

Always be aware of gas hazards

You may not be able to see or smell gas in an excavation or a confined space.

If you are in an excavation or a confined space and feel light headed, dizzy or can smell gas: **warn others – get out – stay out – report it immediately**.

Excavation collapses after dangers are ignored – Director and excavator operator jailed

A 52-year-old director of a house building company (working as the site manager at the time of the accident) has been convicted of gross negligence manslaughter following the death of a workman on a construction project in 2014. The conviction followed a nine-week trial at Northampton Crown Court into the death of a 33-year-old father-of-five whilst he was employed as a ground worker at a building site in Collyweston, Northants.

The court heard evidence of how the workman had been standing next to a deep trench, which had been incorrectly excavated by the excavator driver, when a wall of the trench collapsed, burying the workman beneath the collapsed material. Despite the efforts of fellow workers he was pronounced dead at the scene after his body was recovered. Northamptonshire Police and HSE investigators found that the sides of the trench had not been properly or adequately secured and that the site manager (the company director) and excavator driver both ignored basic safety measures.

In June 2017 the court convicted the defendants, as follows.

- The site manager and director of the company was found guilty of gross negligence manslaughter and received a four-year sentence – two years in custody and two years on license. He was also ordered to pay costs of £90,500.
- The self-employed excavator driver, who traded as a demolition contractor, was found guilty of a failure as a self-employed person to discharge his duty to ensure the health and safety of persons not in his employment, contrary to Section 3(1a) of the Health and Safety at Work etc. Act 1974. He was also found guilty of failing to take all practicable steps to prevent danger, contrary to Regulation 31 of the Construction (Design and Management) Regulations 2007. He was given a 12-month sentence – six months in custody and six months on license. He was ordered to pay £20,000 towards costs.

Speaking after the verdict a detective superintendent from Northamptonshire Police said: 'This was a tragic loss of a young life that could so easily have been avoided. The defendants were both experienced in ground works and failed to show even the most basic safety measures to prevent harm to workers, such as the young father who lost his life. He leaves behind five young children who are now being cared for by his parents. They were in court throughout the trial and have shown true dignity and strength despite listening to harrowing evidence. This has been a very lengthy and complex investigation and I would like to thank the jurors for their dedication and attention to detail during this long trial'.