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## Excavation Safe Working Practices

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The Construction (Health, Safety and Welfare) Regulations 1996 under Excavations (Regulation 12) states that:-

All practicable steps shall be taken where necessary to prevent danger to any person, by ensuring that any new or existing excavation or any part of such excavation, which may be temporary state of weakness or instability due to the carrying out of construction work (including other excavation work), does not collapse accidentally.

Suitable and Sufficient steps shall be taken to prevent, so far as is reasonably practicable, any person from being buried or trapped by a fall or dislodgement of any material.

The excavation shall as early as practicable in the course of the work be sufficiently supported so as to prevent, so far as is reasonably practicable, the fall or dislodgement of such material.

Suitable and Sufficient equipment for supporting an excavation shall be provided to ensure that all requirements may be complied with.

The installation, alteration or dismantling of any support for an excavation shall be carried out under the supervision of a competent person.

Where necessary to prevent danger to any person, suitable and sufficient steps shall be taken to prevent any person, vehicle or plant and equipment, or any accumulation of earth or other material, from falling into any excavation.

Where a collapse of an excavation would endanger any person, no material, vehicle or plant and equipment shall be placed or moved near any excavation where it is likely to cause such collapse.

No excavation work shall be carried out unless suitable and sufficient steps have been taken to identify and , so far as is reasonably practicable, prevent any risk of injury arising from any underground cable or other underground service.

Every year, people are killed or seriously injured when working in excavations. Excavation work has to be properly planned, managed, supervised and carried out to prevent accidents.

Before digging any excavations, it is important to plan against the following:

### **Excavation collapse**

Never work in excavation 1.2m deep or over unless the sides have been suitably shored and braced, or have been benched to prevent collapse. The competent person on site must carry out a risk assessment to decide if shoring is required at depths less than 1.2m.

Before entering any excavation, inspect the walls for signs of collapse, particularly after heavy rain.

Do not go into unsupported excavations.

Never work ahead of the support.

Remember that even work in shallow trenches can be dangerous. You may need to provide support if work involves bending or kneeling in the trench.

### **Materials falling into excavations**

Do not store spoil or other materials close to the sides of excavations. The spoil may fall into the excavation and the extra loading will make the sides more prone to collapse. Spoil heaps should not be less than 1m from the edge of the excavation or 1.5m when the excavation depth exceeds 1.5m.

Make sure the edges of the excavation are protected against falling materials. Provide toe boards where necessary.

Keep working areas above and alongside trenches or excavations clear of objects or loose materials.

Wear a hard hat when working in excavations.

### **People and vehicles falling into the excavation**

Take steps to prevent people falling into excavations. If the excavation is 2m or more deep, provide substantial barriers, e.g. guard rails and toe boards.

Keep vehicles away from excavations wherever possible. Use brightly painted baulks or barriers where necessary.

Where vehicles have to tip materials into excavations, use stop blocks to prevent them from over-running and ensure that a banksman is present before discharging the load. Remember that the sides of the excavation may need extra support.

### **People being struck by plant**

Workers should be kept separate from moving plant such as excavators. Where this is not possible use safe systems of work to prevent people being struck.

Ensure only competent persons with the relevant training and licence operate plant.

Never work beyond the supported sides of an excavation. When an excavating machine is being used always face it.

**Undermining nearby structures**

Make sure excavations do not affect the footings of scaffolds or the foundations of nearby structures. Walls may have very shallow foundations that can be undermined by even small trenches.

Decide if the structure needs temporary support before digging starts. Surveys of the foundations and the advice of a structural engineer may be needed.

Do not drive any vehicle or operate equipment near the edge of an excavation.

**Avoiding underground services**

Look around for obvious signs of underground services, eg valve covers or patching of the road surface.

Use locators to trace any services. Once such services are established mark the ground accordingly and ensure that all those involved, including sub-contractors, are aware of their presence.

Make sure that the person supervising excavation work has service plans and knows how to use them. Everyone carrying out the work should know about safe digging practices and emergency procedures.

**Access and egress**

A safe means to enter and exit an excavation should be provided. If using a ladder ensure that it is serviceable and in date. Ladders should be positioned within the excavation at a height/base ratio not flatter than 4:1 and secured by tying at the upper end to prevent slipping. The upper end of the ladder should project at least 1m above ground level to ensure a sufficient handhold. Ladders should be positioned where they will not be damaged by plant or from materials – handling operations. Do not jump into or attempt to scale the sides of any excavation. Keep walkways and runways clear of excavated materials and obstructions. Use gangways provided for crossing excavations. Do not jump across excavations and never stand on struts.

**Fumes**

Exhaust fumes can be dangerous. Do not site petrol or diesel-engined equipment such as generators or compressors in, or near the edge of, an excavation unless fumes can be ducted away or the area can be ventilated.

**Protecting the public**

Fence off all excavations in public places to prevent pedestrians and vehicles falling into them. If pedestrian barriers, signs or lamps have been temporarily removed to necessitate work operations, replace them as soon as possible, and in all cases, at the end of each day. On sites where the public, in particular children, are to gain access, barriers to the excavations must be at least 1m high.

Do not interfere with, or alter, the positioning of barriers or supports in excavations or trenches, unless authorised to do so.

Where children might get onto site out of hours, take precautions (eg backfilling or securely covering excavations) to reduce the chance of them being injured.

Make sure the necessary equipment needed such as trench sheets, props, baulks, etc, is available onsite before work starts.

### **Excavator Operators**

You must only operate machines or a type of machine on which you have been trained and authorised to use.

Do not use a machine, such as a crane, without full authority.

See that your machine is serviceable and correctly maintained at all times.

Check ground conditions before starting work. Obtain a permit to dig from your supervisor.

Never carry passengers. It is illegal.

Always keep a sharp look-out for other persons and machines working nearby. Use a banksman where necessary.

Look out for obstructions, especially overhead cables. At all times, do not operate under overhead cables unless specific authority has been given to do so.

Before loading a vehicle, ensure the driver is out of the cab, unless it has special protection.

Before leaving the machine for any reason, always lower the bucket to the ground and make sure the brakes and safety locks are on.

On completion of work, ground the bucket and immobilise the machine.

Always ensure buckets, booms and jibs are supported when raised for maintenance.

Report all defects immediately.

### **Other Considerations**

Adequate advance signing and coning must be installed prior to any such work on the highway, and all personnel on such sites must wear high visibility vests/waistcoats.

All excavations must be suitably lighted during the hours of darkness.

All pneumatic tools must be equipped with silencers and ear protection must be worn by operators and other persons working in close proximity to excessively noisy machinery.

The work place must be kept tidy at all times and tools and machinery etc must be placed in a secure position and rendered inoperative overnight, during weekends and other times when the site is not being worked.

All practicable steps must be taken to prevent damage and prevent burying or trapping in any depth of excavation. In carrying out an excavation, the soil conditions can vary widely, often in short distances. No soil, whatever its nature, can be relied upon to support its own weight for any length of time – let alone any additional loads which may be imposed by plant and

materials. Even a small fall of earth is capable of inflicting serious injury, even if it does not kill.

Unless the excavation can be battered to a safe slope, the sides will need supporting to prevent possible collapse by means of shoring and thus: -

- Provide safe conditions for persons working in or adjacent to the excavation and, in some situations, the public as well;
- Enable the works to be carried out without interruption; and
- Protect adjacent property and/or public services.

The law requires that a safe place of work and safe means of access to and from it must be provided. The property of others must also be safeguarded. Whenever excavation has to be undertaken, therefore, adequate prior consideration needs to be given to the soil conditions that will be met, the method of excavation to be used and the manner in which any necessary support will be provided.

### **Inspection and Reporting**

Excavation and shoring should be inspected by a competent person (i.e someone with sufficient training and experience of excavation work) at the start of every shift, after any significant modification to the support system or fall of material and following any event likely to have affected ground stability. A written report should be made after each seven day period, unless there has been a collapse/fall of material or any other event likely to affect stability, in which case an inspection and report are required before work continues. The report should contain the following :-

- Name and address of person on whose behalf the inspection was carried out.
- Location of the workplace
- Description of the workplace
- Date and time of inspection
- Details of any factor identified that could pose a Health and Safety risk
- Details of any action taken
- Details of further action considered necessary
- Name and position of person making the report

### **Protective Clothing**

As well as the high visibility vest/waistcoat and ear protection stated earlier, the correct clothing should be worn at all times including protective boots. Protective helmets must be worn when working in conjunction with the extractor or in the excavation. Eye protectors should be worn when breaking hard material.

## **Backfilling and Compaction of Trenches**

### **You must always: -**

Use a safe method of work that does not endanger you or a work-mate.

If shuttering is used, discuss with your supervisor whether it is to be withdrawn and always follow the safe method of work.

Establish if a banksman is required to guide the machine driver and also the signals to be used. If a banksman is required they should stand where the machine operator can clearly see you and can be clearly directed. Other persons working close to the machine must not work on the blind side of the machine, where they could be at risk.

Compact your backfilling materials in even layers. If shuttering is used, backfill up to the level of wallings and props before removing them, at that compaction level only.

If shuttering is to be removed, do so in the opposite sequence used to install it as backfilling and compaction proceeds.

Ensure that the correct warning tape, identifying the relevant underground services, is replaced before backfilling commences.

### **You must never: -**

Stand in a trench whilst it is being backfilled or work too close to the machine bucket.

Jump, scramble or stand on the props or wallings at any time.

Throw tools or fittings out of the trench – lift them out.

Throw tools fittings or materials down into the trench, it could injure persons below who may be unseen, or upend planks and injure a person working some distance away – lower them in.

Remove shuttering, props or wallings before backfilling has reached the stage where it can support the part of the trench where the shuttering etc are to be removed or where persons have to work.

Leave a trench unattended, no matter how shallow, in a state of collapse or otherwise without adequate guards. Think about the blind and the disabled who could fall down into the trench. Also children may regard trenches as play places.

Work down a trench without a top man who can assist you and summon help in the event of accidents

Take great care that the shuttering you remove does not weaken or otherwise effect the stability of adjacent shuttering where persons are working or would make an unsafe place of work for you when you have to remove the adjacent shuttering.

Remember that removing shuttering is a hazardous operation requiring careful planning to provide a safe place of work. The hazards are the same that exist when first installing shuttering. Treat the operation in the same careful manner.

## Checks to be applied following completion of a comprehensive assessment of the work required

### Before work starts

	YES	N/A
Is the person directly supervising the work, fully experienced and competent in the support of excavations?	<input type="checkbox"/>	<input type="checkbox"/>
Have all the services been located and proved as to position?	<input type="checkbox"/>	<input type="checkbox"/>
Are the necessary drawings or sketches (where standard solutions are used) available?	<input type="checkbox"/>	<input type="checkbox"/>
Have the operatives been properly briefed and instructed as to what is required of them?	<input type="checkbox"/>	<input type="checkbox"/>
Are all materials necessary available on site and in accordance with the drawing/sketches?	<input type="checkbox"/>	<input type="checkbox"/>
Has the excavator to be used, a certificate of exemption for lifting material in connection with the excavation and is a copy available on site?	<input type="checkbox"/>	<input type="checkbox"/>
Is there adequate working space for plant to be used in addition to the requirements for spoil heaps? (Spoil heaps should not be less than 1m from the edge of the excavation or 1.5m when the excavation depth exceeds 1.5m)	<input type="checkbox"/>	<input type="checkbox"/>
Is material for barriers available and, where work on the highway, approved traffic signs? (i.e Signing for roadworks)	<input type="checkbox"/>	<input type="checkbox"/>
Will bridges or gangways be needed? If so, is the equipment available?	<input type="checkbox"/>	<input type="checkbox"/>
Are sufficient ladders on hand for access to and from the excavation and are they serviceable and in date?	<input type="checkbox"/>	<input type="checkbox"/>
Will lighting be required?	<input type="checkbox"/>	<input type="checkbox"/>
Is appropriate protective clothing and equipment available?	<input type="checkbox"/>	<input type="checkbox"/>
Are operatives experienced in the type of excavation, or will extra supervision be needed?	<input type="checkbox"/>	<input type="checkbox"/>

### Whilst work is in progress

The following list covers the main items which need to be checked in carrying out the inspections and examinations required by Construction (Health, Safety and Welfare) Regulations 1996

Is access to and from the work face sufficient and secure?	<input type="checkbox"/>	<input type="checkbox"/>
Are all working faces secure, wedges tight and support material free from damage?	<input type="checkbox"/>	<input type="checkbox"/>

	YES	N/A
Is there any sign of movement of deflection in the support system?	<input type="checkbox"/>	<input type="checkbox"/>
Is the soil condition as predicted? If not, what action should be taken?	<input type="checkbox"/>	<input type="checkbox"/>
Are spoil heaps the correct distance back from the trench edge?	<input type="checkbox"/>	<input type="checkbox"/>
Are pipes, bricks and other materials, plant etc, well clear of the edge so that there is no risk of falling into the trench or of vibration causing danger to the support?	<input type="checkbox"/>	<input type="checkbox"/>
Are the drawings/sketches being properly followed in installing the support? (This is particularly important in relation to the spacing of wallings and struts)	<input type="checkbox"/>	<input type="checkbox"/>
Are wallings and struts, or proprietary equipment, supported against falling downward by hangers, puncheons, lip blocks etc?	<input type="checkbox"/>	<input type="checkbox"/>
Is there any risk of gases or noxious fumes getting into the workings?	<input type="checkbox"/>	<input type="checkbox"/>
Are regular tests for gases or fumes being carried out? (This is particularly important in shafts and tunnels)	<input type="checkbox"/>	<input type="checkbox"/>
Is ventilation required?	<input type="checkbox"/>	<input type="checkbox"/>
Has any risk of flooding been properly assessed?	<input type="checkbox"/>	<input type="checkbox"/>
Is resuscitation equipment available and a nominated person trained to use it?	<input type="checkbox"/>	<input type="checkbox"/>
Have all persons been instructed in excavation procedure and the correct rescue procedure to follow if someone is overcome by gases or fumes in the trench?	<input type="checkbox"/>	<input type="checkbox"/>
Have all support materials been checked before installation in the excavation? In particular, are the correct pins provided in the trench struts?	<input type="checkbox"/>	<input type="checkbox"/>
Is the work adequately protected and marked during the day? Is it fenced or covered and lit at night? Are watchmen required?	<input type="checkbox"/>	<input type="checkbox"/>
Are operatives wearing safety helmets? Is any other protective equipment needed?	<input type="checkbox"/>	<input type="checkbox"/>
In shafts and tunnels, in particular, is adequate lighting provided. Is the temporary lighting system safe?	<input type="checkbox"/>	<input type="checkbox"/>
Do gangways or bridges comply with the requirements of the Construction Health, Safety and Welfare Regulations 1996 in relation to width, guardrails and toeboards?	<input type="checkbox"/>	<input type="checkbox"/>
Have access bridges for plant and vehicles crossing the excavation been designed by competent persons?	<input type="checkbox"/>	<input type="checkbox"/>
Where backfilling is required are stop blocks in position?	<input type="checkbox"/>	<input type="checkbox"/>

Is there an agreed system of support withdrawal and have those carrying it out been properly instructed?

YES N/A

Where pumping is necessary, is a proper watch being kept to make sure that fine material is not being drawn out from behind the support system?