National Operational Guidance

Hazard

Unstable or collapsed excavations

NFCC National Fire Chiefs Council

Developed and maintained by the NFCC

Contents

Hazard - Unstable or collapsed excavations 3
Control measure - Safe system of work: Unstable or collapsed excavations 4
Control measure - Shoring 5

Hazard - Unstable or collapsed excavations

Hazard Knowledge

Excavations may become unstable or collapse; some may be defined as, or become, confined spaces. Excavations may include trenches, pits and tunnels.

Excavations should be adequately supported, or be sloped or battered back to a safe angle. Excavation support systems (also referred to as shoring systems) are designed to stop the collapse of an excavation wall. The type and strength of the support system will be influenced by factors such as the type of material being excavated and the height and angle of the excavated face.

Support systems used for excavations need to meet and maintain various standards, as defined in guidance and regulations such as:

- The Construction (Design and Management) Regulations
- The Construction (Design and Management) Regulations (Northern Ireland)
- The Health and Safety Executive – Health and Safety in Construction
- The Health and Safety Executive - Structural stability during excavations
- The Health and Safety Executive for Northern Ireland - Construction

Excavations may become unstable or collapse due to:

- Vibration from vehicles or machinery
- Weather conditions and surface water
- Severe impact
- Loads, such as vehicles, machinery or building materials, being positioned close to an edge
- Failure of supports

Signs of collapse may include distortion or deflection of supports, tension cracks or soil movement.

The incident may involve:

- Collapse of the sides or roof
- People or objects falling into the excavation
- Materials falling onto people working in the excavation
- The undermining of nearby structures
- Damage to utilities
- Water ingress

An unstable or collapsed excavation may involve many tonnes of material, such as soil, leading to risks including entrapment under the material, or physical injuries.

Control measure - Safe system of work: Unstable or collapsed excavations

Control measure knowledge

An incident involving an unstable or collapsed excavation may require:

- Shoring
- Removal of fallen or collapsed materials
- Isolation of machinery or vehicles
- Relocation of loads, such as vehicles, machinery or building materials
- Reducing movement in the hazard area
- Appropriate location of fire and rescue service vehicles, equipment and personnel

An unstable or collapsed excavation should be assessed at the earliest opportunity. Although the initial assessment can be carried out by first responders, it may be necessary to seek specialist advice.

Specialist advice may be available from a competent person, structural engineer or tactical adviser and should be sought prior to committing personnel to the hazard area.

If personnel need to enter an unstable or collapsed excavation where the excavation support system has been compromised, it will be essential to consult with the responsible person or competent person to determine a safe system of work. This could be the contractor or a civil engineer.

The minimum number of personnel should be committed to the hazard area, especially if the assessment or monitoring indicates the potential for further collapse. There should also be emergency procedures in place, which can be initiated if required.

Strategic actions

Fire and rescue services should:

- Establish arrangements with appropriate agencies to provide specialist advice, assessment and monitoring of excavations
- Ensure personnel are aware of local or national arrangements and the specialist advice available for excavations

Tactical actions

Incident commanders should:

- Avoid applying additional loads to the excavation, such as fire and rescue service vehicles, equipment and personnel
- Consider requesting specialist advice regarding unstable and collapsed excavations
- Identify the type of material being excavated and the height and angle of the excavated face
- Have emergency procedures in place for unstable or collapsed excavations
- Ensure that minimum numbers of personnel work in the hazard area
- Assess and continuously monitor the excavation for indications of further collapse
- Liaise with the responsible person or competent person if required

Control measure - Shoring

Control measure knowledge

Shoring can be described as temporary support to elements of a structure using metal or timber shoring systems and can be provided by urban search and rescue (USAR) teams.

Shoring provides:

- Temporary stability of structures, objects or debris
- Protection from falling debris, secondary collapse to enable search or rescue operations to proceed
- Support to vertical, horizontal or sloping surfaces

Any shoring operation should be carried out by personnel with the appropriate level of knowledge and training, using suitable equipment. The shoring should be assessed and monitored.

It may be necessary to use temporary shoring to save life or prevent an incident escalating. However, the equipment immediately available to fire and rescue services, or to urban search and rescue (USAR) teams, may not be of sufficient strength to substitute for excavation support systems.

On-site machinery, vehicles or equipment, such as excavation support systems or materials suitable for use as trench or pit supports, may be available. However, the available equipment may have already failed, requiring a detailed risk assessment prior to further use.

If an excavation support system has been compromised, personnel should seek the advice or assistance of the responsible person or competent person, such as the contractor or a civil engineer.

Strategic actions

Fire and rescue services should:

- Be aware of how to request National Resilience capabilities and mutual aid resources
- Consider providing shoring equipment and materials

Tactical actions

Incident commanders should:

- Consider requesting specialist tactical advice and resources for shoring
- Assess and monitor the effectiveness shoring
- Liaise with the responsible person or competent person if required