



National
Operational
Guidance

Hazard

Deep excavations



NFCC
National Fire
Chiefs Council

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Hazard - Deep excavations

Hazard Knowledge

Fire and rescue personnel need to understand and consider the additional hazards presented within deep excavation workings. These include:

- Height-related risks
- Potential collapse of excavated sections and shoring equipment

A deep excavation in soil or rock is defined by the Health and Safety Executive (HSE) as being 4.5m deep (15ft).



Control measure - Establish appropriate cordon controls

Control measure knowledge

Incident commanders must consider the safety of firefighters, members of other agencies and the public. They have a duty, so far as reasonably practicable in the context of operational requirements, to ensure that people are not put at risk by fire and rescue service activities and that anybody exposed to serious and imminent danger is informed of the hazards and the control measures necessary to protect them.

The fire service has the power to restrict the access of persons to premises or a place in an emergency and establishing cordons is an effective way of maintaining safety and controlling resources.

Where practical, the police will establish and maintain cordons at appropriate distances to allow the emergency services and other responding agencies to save life, protect the public and property, and care for survivors.

In some areas the police will have agreements enabling the fire and rescue services to manage gateways into the inner cordon, establish who should be granted access and keep a record of people entering and exiting.

Cordons can be divided into distinct areas:

Outer cordon

An outer cordon may be established around the vicinity of the incident to control access to a wide area. This will allow the emergency services and other agencies to work unhindered and in privacy. Access through the outer cordon for essential non-emergency service personnel should be by way of an access control point.

The police will usually control outer cordons, and may also establish traffic cordons to prevent unauthorised vehicular access. The police will identify safe routes in and out of the cordon for emergency vehicles and other agencies. Rendezvous points and marshalling areas will usually be located within the outer cordon.



Figure 4: Where practical the outer cordon should be identified by using blue and white barrier tape.

Inner cordon

The inner cordon controls access to the immediate scene of operations and provides an increased measure of protection for personnel working in that area. Incident commanders should restrict access to the lowest numbers needed for safe and effective operational activity. At small incidents this could be an existing physical barrier or a safety officer briefed to restrict access.

At incidents where a higher degree of control is required, those entering the inner cordon should report to a designated scene access control point and register their arrival. This ensures that they can be safely accounted for should there be any escalation of the incident, and affords an opportunity for briefing about the hazards, control measures, emergency arrangements and other issues. Nobody should be permitted to enter the inner cordon without an appropriate level of personal protective equipment (PPE). It is necessary to ensure that those leaving the inner cordon register their departure.

The fire and rescue service will be responsible for safety management within the inner cordon until responsibility for the scene is transferred to another body. Overall responsibility for the health and safety of personnel working within the inner cordon remains with individual agencies. Such agencies should ensure that personnel arrive at the scene with appropriate PPE and are adequately trained and briefed for the work they are to undertake within the cordon.

At certain incident types, for example hazardous materials, working near water and Marauding Terrorist Firearms Attack (MTFA), there may be a need to divide cordons into hot, warm and cold zones. This will depend on the level of risk faced by emergency service responders and the range of corresponding control measures identified and implemented.



Figure 5: Where practical the inner cordon should be identified with the use of red and white barrier tape

Exclusion zone

Some hazards may present such a significant danger to the safety to firefighters, other agencies and the public that no control measures will adequately reduce the risk. Incident commanders should consider establishing an exclusion zone within the inner cordon to which access is denied to all personnel, including emergency services.



Figure 6: Where practical exclusion zones should be identified with the use of black and yellow barrier tape

Further information on cordons can be found in the Cabinet Office document Emergency Response and Recovery.

Strategic actions

Fire and rescue services should:

- Have a policy for limiting access of personnel to the highest risk areas of an incident ground and for briefing and identification of those involved. This policy should include any procedural guidance and such equipment/resources necessary to implement it safely



- Agree roles and responsibilities for establishing and controlling access to cordons with partner agencies
- Agree with partner organisations appropriate procedures for briefing other agencies working within inner cordons under the safety management of the fire service

Tactical actions

Incident commanders may:

- Restrict the access of persons to premises or a place if they reasonably believe an emergency to have occurred

Incident commanders should:

- Ensure that appropriate inner and outer cordons are established, identified and communicated following an assessment of risk to crews, other agencies and the public
- Control access to the inner cordon using methods proportionate to the size and complexity of the incident
- Establish a scene access control point to log all persons operating within the inner cordon when appropriate
- Brief all responders working in the inner cordon regarding hazards and control measures in place
- Implement exclusion zones where intolerable risks to safety are identified
- Request the police to establish a traffic cordon where necessary
- Request an air exclusion zone through the appropriate authority if required
- Review cordon distances as the incident progresses considering changes in wind and weather conditions



Control measure - Supervision

Control measure knowledge

Applying fire and rescue service cordon, sector and safety officer controls will ensure the correct levels of supervision during an incident. As operations are complex, the incident commander may wish to review the rank/role and specialist qualifications of those undertaking designated supervision tasks, to ensure appropriate management controls.

Safety officer supervision below ground should involve more than one person to ensure that hazardous activities are closely scrutinised and controlled. Communications between safety officers, the technical rescue team tactical advisor and the sector commander are of paramount importance

See National Operational Guidance: [Incident command](#) for further information.

Strategic actions

Fire and rescue services should:

- Ensure that information obtained from the contractor is shared with partner agencies

Tactical actions

Incident commanders should:

- Liaise with the responsible person, other responders and witnesses to gain an understanding of the incident
- Liaise with civil engineering specialists on-site and the tactical adviser from the fire and rescue service
- Ensure that all personnel are fully briefed on the current hazards, risks, control measures and tactical mode
- Ensure joint working with fire and rescue response crews, the technical rescue team and contractor specialists



Control measure - Consider shoring

Control measure knowledge

Shoring used during the construction of underground structures is of extremely high-grade concrete, steel interlocking sheeting or timber to meet the exacting standards set out in the Construction Design and Management (CDM) Regulations and Health and Safety Executive (HSE) guidance. The design and type of shoring will have been decided following engineering calculations that take into account geological conditions, stability of the ground, soil movement predictions and the depth of the excavation or workings. An inspection of the shoring will be conducted daily before work commences. When the factors mentioned above are adhered to, it is extremely unlikely that failure and collapse will occur. Once the shoring is in place, the area within the shored footprint will be excavated by mechanical means to prevent unnecessary hazard exposure to contractor staff.

If a structural failure does occur, resulting in a non-entrapment situation, the duty of care should be handed back to the responsible person on-site because the temporary emergency shoring used by the fire and rescue service to facilitate a rescue would not be suitable to replace the substantive structure.

In a structural failure involving an entrapment, the technical rescue team tactical advisor must consult with the contractor or civil engineer to determine the rescue strategy and the safe system of work that needs to be implemented. It should be noted that the equipment available to fire and rescue service personnel, even when national urban search and rescue (USAR) teams are in attendance, will have limited impact on larger structural failures and therefore co-operation with contractors and other external partners may be required.

Strategic actions

Fire and rescue services should:

- Liaise with the contractor and determine the rescue strategy for a collapse of the structure; this may include arrangements with third-party contractors, for example, providers of cranes
- Develop and issue tactical guidance and clearly identify the limitations of technical rescue team resources used to provide temporary emergency shoring

Tactical actions

Incident commanders should:



- Assess the structural stability of the working environment before committing fire and rescue service personnel
- Liaise with on-site specialist and rescue teams regarding structural stability and shoring capabilities