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Introduction

This 'context guidance' provides details of common hazards found in industry. Other hazards found in specialist industries may need to be considered when fire and rescue services develop their local policies and procedures.

This guidance does not contain information for activities associated with operational incidents which are covered by other pieces of National Operational Guidance.

This guidance is supported by supplementary information that provides further detail on individual subject areas.

Sharing this guidance

Fire and rescue services may wish to share this guidance with industries in their area, especially if they feel it would assist with pre-planning, on-site training or developing Site-Specific Risk Information (SSRI) or emergency response plans.

Terminology in this guidance

Due to the wide range of contexts that fall under the term 'industry', various terms are used in this guidance to describe those contexts. This list shows examples of the types of industry that are covered by them.

<table>
<thead>
<tr>
<th>Context</th>
<th>Examples of industry</th>
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</table>
| Manufacturing, processing and engineering | Factories  
Production sites  
Processing sites  
Engineering workshops  
Mines and quarries  
Laboratories and research centres  
Abattoirs |
Commercial and business
- Offices
- Banks
- Wholesale and retail sites
- Warehouses
- Service industry

Places of assembly and entertainment
- Restaurants, public houses, bars and clubs
- Cinemas and theatres
- Libraries, museums and art galleries
- Heritage buildings
- Theme parks and fairgrounds
- Places of worship
- Places of education
- Conference and exhibition centres
- Arenas and stadiums
- Festival sites
- Leisure facilities
- Zoos, wildlife parks, aquariums and circuses

Commercial accommodation
- Accommodation for paying guests, typically on a temporary basis. Accommodation may be self-contained (with its own kitchen, bathroom and laundry facilities) or may include meals and a laundry service.
- Hotels, hostels and boarding houses
- Holiday villages, caravan and camping sites
- Residential schools
- University halls of residence

Medical facilities
- Hospitals and clinics
- Care homes and nursing homes
- Morgues and funeral directors
- Blood banks and donor facilities
### Animal facilities
- Veterinary clinics
- Kennels and catteries
- Equine facilities
- Livestock farms
- Beehives
- Zoos, wildlife parks, aquariums and circuses
- Laboratories and research centres

### Agricultural sites
- Arable farms
- Forestry
- Crop storage
- Fishing (marine and freshwater)
- Hunting

### Waste sites
- Recycling sites
- Anaerobic digestion sites
- Landfill
- Public amenity sites

### Construction sites
- Construction sites
- Demolition sites
- Nuclear decommissioning sites

### Military and defence establishments and shooting clubs
- Military establishments
- Defence establishments
- Munitions storage
- Shooting clubs
- Firing ranges

### Lawful detention facilities
- Prisons
- Police cells
- Detention centres
- High security medical facilities
- Courts

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**Approach of this guidance**
As most of the hazards are found in more than one of the contexts, where appropriate the hazard will be covered by:

a) Generic information for the hazard

b) Information for the hazard in a specific context

Risk management plan

Each fire and rescue authority must develop their strategic direction through their risk management plan. To determine the extent of their firefighting capability, strategic managers will consider their statutory duties and the foreseeable risk within their area.

Work to identify risk and prepare operational plans should consider all stakeholders, including local emergency planning groups and the fire and rescue service risk management plan.

Responsibility of fire and rescue services

Fire and rescue services are responsible, under legislation and regulations, for developing policies and procedures and to provide information, instruction, training and supervision to their personnel about foreseeable hazards and the control measures used to reduce the risks arising from those hazards.

This guidance sets out to provide fire and rescue services with sufficient knowledge about the potential hazards their personnel could encounter when attending incidents. Fire and rescue services should ensure their policies, procedures and training cover all of the hazards and control measures contained within this guidance.

Hazard - Incidents in industry
Hazard Knowledge

This section contains generic control measures that should be applied when dealing with any incident in an industrial site, whatever the context, size or complexity.

There are many types of working environments in industry, some of which will present the hazards associated with utilities and fuel, working at height or in enclosed spaces. A variety of different physical, health and environmental hazards may pose significant risks to fire and rescue service personnel, other responders and members of the public, regardless of the incident type.

Hazards that are common at incidents in industry that are covered in other areas of National Operational Guidance include:

- Noise
- Hazardous materials
- People
- Combustible dust
- Confined spaces
- Unstable or collapsed structures
- Working at height
- High fire loading
- Restricted access and egress
- Pipelines
- Renewable energy supplies
- Unstable surfaces

The guidance presumes that businesses and organisations are complying with relevant regulations. Breaches in health and safety legislation or regulations at an industrial site may make fire and rescue service attendance more hazardous.

Illegal activities can present significant hazards to fire and rescue service personnel. Such activities include:

- Setting malicious (booby) traps
- Cultivating and producing illegal drugs
- Illegal activity involving electricity (see National Operational Guidance: Utilities and fuel)
- Illegal storage of hazardous materials, such as fireworks or fuel
- Unregulated building alterations affecting layout, stability and fire protection
- Unapproved change of use

Business continuity

There may be business interruption as a result of some incidents, resulting in significant impact
(including financial losses) to businesses, or disruption to infrastructure and communities.

In such an event, the incident commander may be put under pressure by businesses, other organisations or the wider community. It may be necessary to assist with business resumption to minimise the impact of the incident.

There is the potential for litigation and for the reputation of the fire and rescue service to be damaged, if they do not consider business continuity plans.

**Presence of hazardous substances**

Personnel need to be aware of the potential presence of hazardous substances and the possibility they may need to be managed and controlled. There may be limited or no information available about the hazardous substances.

When gathering information for Site-Specific Risk Information (SSRI) and emergency response plans, a record of the type and quantities of hazardous substances should be made.

Hazardous substances within industry include:

- Chemicals and pharmaceuticals
- Fuel and lubricants
- Gases, including landfill gas - see supplementary information
- Asbestos
- Paint
- Pyrotechnics, munitions and explosives
- Biohazards
- Radioactive materials

Personnel should be aware that hazardous substances may not be stored in accordance with regulations. This could include fuels being stored in tanks without bunds, or substances in unsuitable or unlabelled containers. Radioactive materials, discarded fireworks or munitions may also be present.

At illegal waste sites, there may be a higher risk of finding hazardous substances with little or no information about the contents.

For more information about hazardous materials refer to Foundation for hazardous materials and National Operational Guidance: Hazardous materials.

**Unstable ground**

Unstable ground may commonly be encountered at industries such as:
• Mines
• Quarries
• Waste sites
• Agricultural sites

• Wildlife parks
• Festivals
• Construction sites
• Caravan and camping sites
• Military and defence establishments
• Shooting clubs

**Combustible dust**

Many materials produce dust that is combustible; in the form of a cloud such dust can explode if ignited. Anything that can burn, and that exists in a fine powder form, presents a hazard, for example:

- Sugar
- Coal
- Wood
- Grain
- Certain metals
- Synthetic organic chemicals

Refer to Combustible dust and the Health and Safety Executive (HSE) publication, Safe handling of combustible dusts: Precautions against explosions for further information.

**Respirable dust, fibres and fumes**

Many manufacturing processes will produce dust, fibres and fumes either as part of production or as a waste product. If contained and managed, they should not pose a significant risk to attending personnel. However, any respirable dust, fibres or fumes can be hazardous to health; they may affect the eyes and skin, as well as the lungs and respiratory system.

The dust, fibres or fumes produced may be combustible or a hazardous material.

For more information about machine-made mineral fibres (MMMF) refer to the Health and Safety executive: Man-made mineral fibres (MMMF).
Control measure knowledge

Information gathering

It may be difficult for fire and rescue service personnel to appreciate the wide range of working environments and hazards that they may be exposed to in different types of industry and to understand how they are managed and controlled. Pre-planning visits, especially for complex or hazardous sites, will enhance operational intelligence.

Liaison with on-site staff should be a priority, to assist in information gathering, assessing the situation and making informed decisions. If on-site staff are not available, warning signs, site information or instructions may assist with information gathering.

Site-Specific Risk Information

Site-Specific Risk Information (SSRI) should contain information about the hazards present on the site including:

- Processes used
- On-site machinery
- On-site vehicles
- Equipment and heavy machinery
- Hazardous materials used

Accessing up-to-date SSRI is particularly important at industrial premises.

Due to the large number of risks in a fire and rescue service's area it may not be possible to visit all sites, and information may change between visits. Whenever possible information should be confirmed with a responsible person and risk assessments based on available risk information, scene survey and visual indicators.

For more information refer to Site-Specific Risk Information.

Emergency response plans

Emergency response plans for a site may contain important information such as the size of hazard areas for industrial sites or temporary evacuation strategies for large public gatherings, such as
music festivals.

For more information refer to [Emergency response plans](#).

**Hazardous materials**

Hazardous materials may be stored, used or be a by-product of the processes at a site. It is important to identify if hazardous materials are involved and implement the appropriate control measures for any substances identified.

For more information refer to [Scene survey: Hazardous materials](#).

**Strategic actions**

Fire and rescue services should:

- Carry out pre-planning site visits and inspections to gain risk information regarding industrial sites which can be made available to responding personnel
- Record information regarding hazards of industry and any existing hazard mitigation in SSRI

**Tactical actions**

Incident commanders should:

- Confirm the size, type and use of the site
- Confirm site occupancy and involvement of people within the hazard area
- Access emergency response plans and SSRI for sites and venues
- Obtain information from fixed systems such as closed circuit television (CCTV) or monitoring systems
- Identify if any hazardous materials are stored, used or produced on site

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Control measure - Identify and control hazard areas
Control measure knowledge

Potential hazard areas should be identified as soon as possible and appropriate control measures considered, even before entering the site. Hazards may be encountered when accessing the scene of operations, such as moving vehicles or machinery.

Site-Specific Risk Information (SSRI) Warning signs and site safety instructions may assist in identifying hazards and associated risks. However, it should be a priority to liaise with on-site staff for information regarding hazards to select the appropriate control measures.

Appropriate cordon distances should be carefully considered, as requirements may vary considerably depending on the incident type and nature of hazards. See National Operational Guidance: Incident command for generic information about cordons.

Some sites may be very large and therefore it may only be practical to control hazards that will immediately affect fire and rescue service operations. Most large industries should have approved and effective control measures in place.

Sites may be multi-use and neighbouring sites may be affected by the incident or may impact the response to the incident. It may be necessary to consider the hazards present at neighbouring sites or the impact of the incident on those sites. Accessing available risk information, contacting the responsible person and visual inspections may assist personnel when considering the impact of the incident.

Strategic actions

Fire and rescue services should:

- Ensure relevant information captured in Site-Specific Risk Information (SSRI) is made available to responding personnel

Tactical actions

Incident commanders should:

- Consider the size, type and use of the site and the associated hazards that may be encountered
- Establish appropriate cordons
- Consider SSRI, site warning signs, alarms and safety instructions
- Obtain hazard information from all possible sources, including the responsible person (or
appointed competent person) to assist with selecting and implementing appropriate control measures

Control measure - Specialist advice: Industry

Control measure knowledge

It is unlikely personnel will have an in-depth knowledge of all types of industry they could encounter. To deal with an incident safely and effectively, it may be necessary to seek specialist advice from the responsible person or their representative or on-site staff, about the site and any process in operation. If no site representative is available, their attendance should be requested as soon as possible.

To make a judgment on the effective deployment of resources, fire and rescue services should be aware of the capabilities of the resources at the scene, specialist knowledge available and specialist equipment on-site and off-site.

Other sources of specialist advice include tactical advisers (TacAds), subject matter experts (SMEs) or other external agencies.

The extent and urgency of specialist advice or assistance required will be dictated by the size, complexity and type of the incident.

Strategic actions

Fire and rescue services should:

- Develop arrangements and protocols with identified responsible persons and other sources of specialist advice or assistance
- Maintain details of tactical advisers (TacAds), subject matter experts (SMEs) or other external agencies for specific industries and know how to request their attendance

Tactical actions

Incident commanders should:

- Request specialist advice or assistance based on the extent and urgency of the incident
Control measure knowledge

Industries, organisations and businesses may have business continuity plans to ensure the safety of their staff and that 'business as usual' is maintained whenever possible.

These plans may include information and guidance regarding damage control and recovery following an incident or event. It is important that such plans are discussed with the responsible person (or their representative) and, wherever possible, fire and rescue services should aim to support those arrangements.

Strategic actions

Fire and rescue services should:

- Understand the significance of the industry within their area and support business continuity arrangements during incidents and into the recovery phase where appropriate

Tactical actions

Incident commanders should:

- Ensure the safety of emergency services personnel and members of the public is maintained when considering business continuity arrangements
- Liaise with the responsible person (or nominated competent person) to understand their business continuity arrangements
- Consider developing a joint plan, with the responsible person, which will assist in supporting business continuity arrangements

Hazard - On-site machinery
Hazard Knowledge

Some industries use the word 'plant' to indicate specialist equipment, machinery or industrial premises. For the purposes of this guidance, the word 'plant' has purposely been avoided and is referred to as 'on-site machinery'.

Types of on-site machinery include:

- **Generic**
  - Automated equipment
  - Robotics - refer to [supplementary information](#)
  - Lifts
  - Hoists - refer to [supplementary information](#)
  - Cranes - refer to [supplementary information](#)
  - Conveyor belt systems - refer to [supplementary information](#)
  - Electric motors
  - Mixing machinery
  - Drilling machinery
  - Welding equipment
- **Commercial and business**
  - Escalators and moving walkways - refer to [supplementary information](#)
- **Places of assembly and entertainment**
  - Theme park and fairground rides - refer to [supplementary information](#)
  - Moving platforms and stages
  - Retractable roofs
- **Medical facilities**
  - Motorised wheelchairs
  - Motorised trolleys
  - Static or movable medical equipment
  - Beds that use electric motors to manoeuvre patients
- **Agriculture**
  - Machinery for feeding livestock
  - Automated (robotic) milking systems
- **Waste sites**
  - Compactors
  - Shredders
- **Construction sites**
  - Small equipment, such as handheld tools up to large-scale machinery

Machinery can present many types of hazards including:

- Drawing in
• Entanglement
• Friction and abrasion
• Cutting or shearing
• Stabbing or puncturing
• Impact or crush injuries
• Hazardous substances and emissions
• Noise and vibration
• Pressure or vacuum
• Extreme temperatures
• Electrocution
• Damage to eyes by intense ultraviolet light from welding equipment
• Damage to skin from ultraviolet (UV) radiation present in welding equipment
• Epidermal injection (hydraulic fluid)

Some machinery is highly automated and may be operated by remote control systems. Machinery may be time controlled and could start up automatically. Similarly, the robotic system may be in an inert phase, but reactivate on a timed or activity-triggered basis.

Machinery may be old or poorly maintained, resulting in the absence of safety equipment; this may increase the risk of entrapment or injury. Machinery may present hazards if not correctly secured, controlled, earthed or isolated. Some machinery, for example, the jibs of cranes, may be purposefully unsecured to prevent damage to them in high winds.

Machinery may contain moving parts, such as exposed shafts or fan bearings. Some types of machinery have machine guards to offer some protection from moving parts. Safety devices may have been removed or compromised prior to the arrival of personnel.

Machine guards should not be removed until power to the machine has been isolated and confirmed. Where safety devices, such as brakes and interlocks have activated, they should not be overridden before the effect of doing so has been carefully considered. Releasing such devices could result in the uncontrolled movement of machinery.

If a machine is stopped suddenly, for example by a blockage, there may be residual stored energy within the system. When the blockage is removed, the energy released can cause the machinery to move.

On-site machinery may be located in confined or restricted areas, making access and egress difficult and potentially arduous.
Control measure knowledge

If on-site machinery has the potential to cause harm to personnel or other responders, it may be necessary to restrict or prohibit its movement.

On-site machinery operators should be made aware of the presence of personnel or other responders, and the extent of restriction or prohibition in place.

It may not be possible to restrict or prohibit movement of on-site machinery. If this is the case, all responders should be made aware of any on-site machinery that continues to operate and exclusion zones set up where necessary.

Strategic actions

Fire and rescue services should:

- Ensure that information about on-site machinery and its use is included in Site-Specific Risk Information (SSRI)

Tactical actions

Incident commanders should:

- Consider requesting that on-site machinery movements are restricted or prohibited

- Ensure on-site machinery operators are made aware of the presence of personnel and other responders

- Alert all responders to any on-site machinery that continues to operate and set up exclusion zones where necessary

Control measure - Isolate power supplies for on-
site machinery

Control measure knowledge

On-site machinery may still be operating when the fire and rescue service arrives. Personnel should liaise with on-site staff to identify where and how to isolate the on-site machinery, and to consider the implications of isolating power supplies to it. Keeping processes going may support fire and rescue service operations, for example, by reducing the volume of material that could be affected by the incident.

Power supplies to on-site machinery may include:

- Electricity
- Gas
- Pneumatics
- Hydraulics
- Kinetic, for example, windmills and watermills

Industries will use various methods for isolating power supplies. Some types of machinery may take a considerable time to isolate and in some circumstances it may not be possible to prevent reactivation. Isolating power supplies to machinery may have an impact on the business – some on-site machinery may be damaged by emergency isolation.

Isolating power supplies to machinery may have an impact on the business; some on-site machinery may be damaged by emergency isolation.

The power supply for the machinery may be remote from the equipment. Instructions may be displayed for isolating the power supply or using manual controls.

Isolating power supplies may involve using:

- A tag out system - where a warning tag is attached to the power controls once in a safe position (off or closed), but reactivation may be possible
- A lock out system - where a padlock or bolt is used to prevent reactivation

When on-site machinery has been isolated, a robust system should be implemented to ensure it is not restarted until agreed by the incident commander.
Strategic actions

Fire and rescue services should:

- Ensure details about power supplies are included in Site-Specific Risk Information (SSRI)
- Ensure that information about emergency isolation of on-site machinery is included in Site-Specific Risk Information (SSRI)

Tactical actions

Incident commanders should:

- Liaise with the responsible person (or nominated competent person) to assist with the isolation of on-site machinery
- Consider isolating power supplies to on-site machinery
- Identify on-site machinery that will require a period of time to be isolated
- Seek specialist advice if there is any doubt about the isolation of machinery
- Implement a robust system to ensure on-site machinery that has been isolated is not inadvertently restarted

Control measure - Use competent people to operate on-site machinery

Control measure knowledge

On-site machinery may prove useful to move or separate materials during an incident, such as waste or items of stock; however, this should be done under the supervision of the fire and rescue service.

Any suitable on-site machinery would need to be identified and should be operated by a competent person. The responsible person may be able to identify appropriate machinery and operators. This activity could create additional hazards, as other people may not be used to working with fire and rescue service personnel. Detailed briefings should therefore take place and any actions should be closely monitored.
If a competent person will be working within the inner cordon, communication methods, including evacuation signals, should be implemented and understood before commencing operations.

If the incident may benefit from the use of additional or specialist machinery, this should be proposed to the site owner, who would need to arrange for its hire.

**Strategic actions**

Fire and rescue services should:

- Ensure that personnel are aware that on-site machinery should only be operated by competent people.
- Consider identifying suitable on-site machinery in pre-planning and site inspection visits.
- Consider establishing contingency arrangements about additional or specialist machinery with the site owner; this may need to be hired in the event of an incident.

**Tactical actions**

Incident commanders should:

- Liaise with the responsible person (or nominated competent person) about on-site machinery, how it is used and who can use it.
- Identify suitable on-site machinery that will achieve the objectives required.
- Carry out a risk assessment before using on-site machinery.
- Ensure appropriate personal protective equipment (PPE) and high-visibility clothing is worn in the area where on-site machinery is being operated.
- Provide a full safety brief to fire and rescue service personnel and others.
- Develop agreed communication methods between fire and rescue service personnel and others.
- Consider arranging for a competent person to move any on-site machinery not being used in the incident to an agreed location.
Control measure knowledge

When using on-site machinery, on-site staff should be closely supervised to ensure they are not taking unnecessary risks, they have the appropriate personal protective equipment (PPE) and they are aware of the presence of fire and rescue service personnel.

If the incident is fire-related, the incident commander has the final decision on what is used, how it is used and by whom.

On-site staff, who do not understand incident command protocols may require a high level of supervision when operating in the hazard area.

Strategic actions

Fire and rescue services should:

- Ensure that all fire and rescue service personnel understand that on-site machinery should only be operated under the supervision of the fire and rescue service

Tactical actions

Incident commanders should:

- Ensure on-site staff are closely supervised when operating on-site machinery in the hazard area
- Ensure detailed briefings and constant monitoring take place

Hazard - Moving vehicles: Industry
Hazard Knowledge

Fire and rescue service personnel, or other responders, could be struck by on-site vehicles, or traffic entering or leaving an industrial site.

Vehicle operators may be unaware of the presence of personnel and may expect people to only use designated walkways. However, in an emergency situation this may not be possible.

Types of on-site vehicles include:

- Forklift trucks
- Buggies
- Bulldozers
- Grabbers
- HGVs, cars, vans, motorbikes or bicycles
- Rolling stock on narrow gauge railways
- Access vehicles, such as scissor lifts or cherry pickers
- Remotely or computer-operated vehicles

Control measure - Control vehicle movements

Control measure knowledge

It may be necessary to control, restrict or isolate vehicle movements. However, the impact of taking this action should be considered, as it may affect business continuity and the community.

If vehicles are isolated, a robust system should be implemented to ensure the vehicles are not brought back into operation, unless agreed by the incident commander.

It may be necessary to arrange for a competent person to remove any on-site vehicles that are not being used in the incident to an agreed location, where they will not have an impact on, or become involved in, the incident.

Strategic actions

Fire and rescue services should:

- Ensure that information about on-site vehicles and their use is included in Site-Specific Risk
Information (SSRI)
- Consider recording possible traffic management solutions for an incident in Site-Specific Risk Information (SSRI)

**Tactical actions**

Incident commanders should:

- Ensure personnel wear high visibility clothing if feasible when on-site vehicles are in use
- Ensure vehicle operators are made aware of the presence of personnel
- Consider requesting that on-site vehicle movements are controlled, restricted or stopped
- Implement a robust system to ensure isolated vehicles are not brought back into operation until agreement
- Arrange for a competent person to remove on-site vehicles if appropriate

**Control measure - Use competent people to operate on-site vehicles**

**Control measure knowledge**

The controlled use of on-site vehicles may be beneficial, either to maintain business continuity or assist with operational activity. For example, they could be used to move or separate materials during an incident at a waste site or to lift debris. However, this should be done under the supervision of the fire and rescue service and the incident commander has the final decision as to what is used, how it is used and by whom.

This activity could create additional hazards, as other people may not be used to working with fire and rescue service personnel, and will not understand the incident command protocols. Therefore, they will require a high level of supervision when operating in the hazard area.
If a competent person will be working within the inner cordon, communication methods, including evacuation signals, should be implemented and understood before starting operations.

When using on-site vehicles for operational activity, the competent person operating the vehicle should be closely supervised to ensure they are not taking unnecessary risks, they have the appropriate personal protective equipment (PPE) and they are aware of the presence of personnel.

If the incident may benefit from the use of additional or specialist vehicles, this should be proposed to the site owner, who would need to arrange for their hire.

**Strategic actions**

Fire and rescue services should:

- Ensure that all personnel are aware that on-site vehicles should be only be operated by competent people
- Consider identifying on-site vehicles in pre-planning and site inspection visits
- Consider establishing contingency arrangements about additional or specialist vehicles with the site owner; these may need to be hired in the event of an incident

**Tactical actions**

Incident commanders should:

- Liaise with the responsible person (or nominated competent person) about on-site vehicles, how they are used and who can use them
- Identify and consider using on-site vehicles, operated by a competent person, to achieve operational objectives
- Carry out a risk assessment before using on-site machinery
- Implement a safe system of work and communication methods for using on-site vehicles
- Ensure the competent person receives a full safety brief prior to operating on-site vehicles
- Ensure appropriate personal protective equipment (PPE) and high visibility clothing is worn in
the area where vehicles are being operated

- Ensure the competent person is closely supervised when operating on-site vehicles

Hazard - Design, layout, fixtures and fittings

Hazard Knowledge

Industrial sites vary in size, type and complexity, which may impact on dealing with an incident. Features that should be considered include:

- Design and method of construction - refer to the Building Research Establishment supplementary information for further information
- Building alterations
- Complex internal layouts
- Fixtures and fittings

Some features may pose a significant hazard, especially if visibility is poor. The size, construction and internal layout of the industrial site may also affect incident ground communications.

There may also have been changes in use of an industrial site, presenting unexpected internal hazards. Some site owners sublet rooms, buildings or areas within a site; consideration should be given to their use, which may be completely different to the main industry.

Manufacturing, processing and engineering

Large manufacturing sites may cover many acres, making it essential to gather information about which area or building the incident is located in.

There may be inspection pits, pipework, machinery, tanks and unprotected edges.

Commercial and business

Sites such as shopping centres and warehouses can cover a considerable area, resulting in extended travel distances to reach an incident.

Very high shelving or racking systems, often found in warehouses, may become unstable. These fixtures may restrict access to the incident or present the need to work at height. Refer to
supplementary information about racking systems and pallets.

Clad-rack warehouses, or self-supporting warehouses, are major works of engineering in which the racking itself makes up the building's structure, together with side and roof cladding.

Warehouses may also contain complex robotic systems. For further information refer to the hazard for On-site machinery, and the supplementary information.

Places of assembly and entertainment

In permanent sites there may be fittings such as fire curtains, stage trapdoors and lighting rigs.

Venues may be multi-purpose, sometimes separated internally and sometimes with joint access, shared alarm systems, escape routes and firefighting facilities. They may allow the flow of people from one venue to another, or be separated for members of the public but with corridors allowing access to other venues for on-site staff.

Event organisers may not stop an event if an incident is identified, delaying response and evacuation. People attending may not behave as expected due to:

- Reduced visibility
- Disorientation
- Crowd behaviour
- Impairment due to alcohol or drugs

For further information refer to the hazard of People.

For shorter-term use, there may be temporary structures, fixtures and fittings - refer to the hazard for temporary structures.

Medical facilities

Medical facilities often have a complex layout, especially where they have been extended. There may be numerous corridors, rooms within rooms and large quantities of fixed and mobile equipment.

Agricultural sites

Many buildings have relatively lightweight, combustible or fragile materials used in their construction, such as corrugated metal or asbestos cement roofs. They may also be of timber or steel construction, or use more traditional materials such as stone and thatch.

Construction sites
Fire and rescue services may be unaware of small construction sites or buildings undergoing building work, making pre-planning difficult. Sites known to fire and rescue services may alter significantly throughout the life of the project. Refer to supplementary information.

Control measure - Identify and maintain appropriate access and egress routes for industrial sites

Control measure knowledge

Safe routes for accessing the scene of operations should be identified, taking account of compartmentation and other engineered solutions. These routes should be monitored and maintained. It may be necessary to isolate power supplies prior to gaining access. Scene lighting may be required to illuminate access and egress routes and identify hazard areas.

Alternative access and egress routes may need to be established and maintained, as the normal entrances and exits may be compromised by an incident or features of the site including its design, layout, fixtures and fittings. The responsible person or site plans may assist with identifying appropriate points and routes for access and egress.

It may also be necessary for personnel to use vertical ladders, gantries and hatches to access areas such as machine rooms, basements and mezzanine levels.

If radio communications are compromised, alternative means of communication may be required, such as fixed communication systems, runners, or mobile phones.

Strategic actions

Fire and rescue services should:

- Ensure that information about design, layout, access and egress, fixed installations, water supplies, fixtures and fittings is included in Site-Specific Risk Information (SSRI)

Tactical actions

Incident commanders should:

- Liaise with the responsible person (or nominated competent person) for information about
design, layout, fixtures and fittings

- Obtain and refer to site plans if available
- Identify, use or create appropriate access and egress routes
- Consider isolating power supplies
- Consider appropriate means of communication

- Consider the use of scene lighting

- Consider the use of work at height procedures

Hazard - Security features

Hazard Knowledge

Gaining, securing and maintaining access to industrial sites may be affected by security measures.

Generic security measures include:

- Security doors and glazing
- Barriers
- Roller shutters
- Reinforced walls
- Security glass
- One-way access doors
- Control lobbies or holding areas under electronic door control
- Remote control locking devices
- Time delay locks
- Air locks
- Security guards
- Guard dogs

Commercial and business

- Security smoke
- Safety vault doors

Medical facilities
• Doors secured, often with electronic locks and combination keypads, for:
  • Secure patient areas
  • Laboratories
  • Pharmacies

Animal facilities
  • Electrified fences
  • Raised thresholds, to prevent rodents entering or leaving an area

Construction sites
  • Fences and hoarding
  • Boarding up

Lawful detention facilities
  • Complex and multiple doors
  • Self-locking doors
  • Razor wire on roofs, walls and other structures

Sensitive sites, for example, military and defence establishments, nuclear sites and munitions manufacturing or storage
  • Armed guards

Security features may cause a delay in response if access to the site is restricted and may affect emergency arrangements after access has been gained.

Security features may restrict fire hose, reducing flow or preventing personnel from advancing.

Self-locking doors and one-way access doors may prevent egress and cause personnel to become isolated; this may affect emergency arrangements. Security features may be activated part way through the incident, which could close off alternative egress routes.

Features such as security smoke or alarms may affect the senses of personnel and reduce their situational awareness.

Electrocution or physical hazards may be present as a result of the design of the security feature or be created by gaining access or entry by force.

Personnel gaining access or entry to sites by force, or carrying hose, may prevent security features from functioning properly. Functions such as air locks or self-locking doors may be present to prevent the release of animals, detainees or other hazards. If security features are compromised, it
may affect ventilation or other systems that are designed to mitigate the hazards present.

### Control measure - Gain access or entry: Sites with security features

#### Control measure knowledge

The fire and rescue service may be able to gain access via codes or keys for sites with security features. The responsible person, or a security company, should be contacted to assist with gaining access. Where possible there should be liaison with the responsible person and a review of risk information to establish if access or egress may be affected by security features.

If it is not possible to deactivate the security feature, it may be necessary to gain access or entry by force (sometimes referred to as forced entry or forcible entry). Before doing so the impact of this entry on any hazards present should be considered.

The type of building construction, possible entry points and the security features present should be assessed. This will assist with selecting the most appropriate equipment and techniques for the situation, which can save time and prevent unnecessary damage.

Having gained access to sites that have security features, it may be necessary to disable security features, or position personnel to ensure access and egress routes are not compromised.

Security smoke (sometimes called security fog or smoke screen) is thermally generated white smoke used as a security measure. Security smoke machines may use glycol or glycerine mixed with distilled water to produce a dense white fog that obscures vision.

Where there are armed guards, fire and rescue service activity should always be carried out under escort and in accordance with pre-determined arrangements.

Personnel should follow any agreed method for maintaining access and egress at sites such as places of lawful detention to prevent becoming isolated. If personnel are not familiar with the security systems, it may be necessary to test overriding security features before gaining access.

Methods of maintaining egress may include:

- Keeping doors open by using dead bolts or specialist equipment
- Not allowing lone working
- Posting personnel to manage doors or security features
• Overriding security features

**Strategic actions**

Fire and rescue services should:

• Ensure that information about security features, and who to contact for information or assistance, is included in Site-Specific Risk Information (SSRI)

• Agree safe systems of work to maintain safe egress at sites with security features

**Tactical actions**

Incident commanders should:

• Identify security features that may compromise safe access to and egress from the scene of operations

• Be aware of security systems and devices which could potentially isolate personnel in hazard areas

• Follow agreed procedures for maintaining egress where security features are present

• Attempt to contact the responsible person or security company to obtain information about security features and gain access

• Obtain keys or key codes to gain access to secure areas, if appropriate

• Consider overriding security features, using equipment or positioning personnel to maintain access and egress

• Consider alternative access and egress points using ladders or aerial appliances

• Consider gaining access or entry by force if security features cannot be disabled

• Consider the effects of making entry or breaching security features of a site

• Consider cutting roller shutters to gain access, remembering that some shutters may retract once cut

• Consider seeking assistance for dealing with guard dogs from specialist animal handlers
Ensure personnel are aware of escorting arrangements where armed guards are present.
Consider using ventilation and wearing respiratory protective equipment (RPE) if the building is fitted with a security smoke system.

Hazard - Temporary structures and temporary accommodation unit

Hazard Knowledge

Temporary structures

There are various types of temporary structures that may present hazards due to their construction, instability or internal layout. They may be constructed from untraditional materials. Refer to the Building Research Establishment knowledge sheets for further information about the construction of demountable structures.

Types of temporary structures include:

- Seating stands
- Stages
- Lighting and audio rigs
- Temporary accommodation units (TAUs), including portable cabins and shipping (ISO) containers
- Tents and marquees
- Air-filled structures
- Fairgrounds

The nature of temporary structures means that their use is difficult to regulate or monitor. They are frequently used for more than their intended purpose and are often adapted. This can result in additional hazards for personnel, especially if information about their use, layout and what is stored within them is lacking. It is likely that information regarding temporary structures will not be included in Site-Specific Risk Information (SSRI).

Some lightweight structures, such as marquees and inflatable structures, may become unstable and move across significant distances in high winds if not anchored appropriately.

Temporary accommodation units
Temporary accommodation units (TAUs) can be used to provide

- Offices
- Canteens
- Welfare facilities
- Storage solutions
- Temporary residences
- Sleeping accommodation for on-site staff

TAUs can vary from very simple single mobile units to complex multi-storey composite units. TAUs are usually situated in the open air, but can be located inside buildings or other structures. They may be left in one location, or relocated when required.

TAUs typically comprise modular units, whether constructed as portable cabins, ISO containers, mobile homes or other purpose-built structures. Each TAU is likely to have independent power and heating which may need to be isolated. Liquid petroleum gas may be used for cooking and heating water; this could include large bullets or storage tanks or smaller canisters.

Due to the temporary nature of the structures they may not be subject to the requirements of building regulations. Normal fire safety provisions, as found in typical offices and associated accommodation, may not be provided by the structure itself.

Further information about some types of temporary structures can be found in the Building Research Establishment supplementary information.

Control measure - Identify the type, use and contents of temporary structures and temporary accommodation units

Control measure knowledge

Temporary structures

Risk information and site plans may provide information regarding temporary structures but, due to the nature of these structures, this is less likely and significant changes may have been made since the plans were last reviewed. The use of the temporary structure may also be in breach of the original plans; there is also a risk of it being inappropriately used, for example as unauthorised accommodation.
Information may be available from other sources including:

- Site office
- Responsible person
- Residents
- Signage
- Licensing information available on-site; this is sometimes posted on site boundaries
- Scene survey

Information that should be gathered about a temporary structure includes:

- Structure and construction
- Occupation
- Power supplies and isolation points
- Storage and housekeeping
- Any hazardous materials present
- Any incomplete or unsecured parts of the structure
- Any inappropriate use, such as unauthorised accommodation

Further information about temporary structures can be found in the Building Research Establishment supplementary information.

**Temporary accommodation units**

Temporary accommodation units (TAUs) may be identified by signage such as 'Site office' or 'Canteen'. However, their general appearance may not be easily identifiable; for example, a converted ISO shipping container or a part of a building could be fitted out with temporary partitions. Areas of the building not normally used for accommodation may be temporarily converted during construction or renovation.

Any sources of power, such as LPG canisters or storage tanks, and isolation points should be identified. Power may be supplied by a separate intake or be supplied by a generator.

**Strategic actions**

Fire and rescue services should:

- Gather information about the location, type, use and contents of temporary structures or temporary accommodation units, where feasible

- Visit temporary structures or temporary accommodation units, and develop tactical plans
where necessary

- Provide risk information and emergency plans for temporary structures or temporary accommodation units if necessary

**Tactical actions**

Incident commanders should:

- Look for signage on temporary structures or temporary accommodation units

- Liaise with the responsible person on site to identify the type, use and contents of the temporary structure or temporary accommodation unit

- Consider the possibility of inappropriate use, for example, as accommodation or for storing hazardous materials

- Consider isolating utilities for temporary structures or temporary accommodation units

**Control measure - Monitor for signs of collapse or instability of temporary structures**

**Control measure knowledge**

Temporary structures may collapse suddenly, with little or no warning. It is important to understand the type of construction involved and the method and sequence of construction or erection. This information should assist in assessing the likelihood of partial or structural collapse.

Partial collapse of a temporary structure may lead to instability and further collapse, especially if it is subjected to strong winds or other loads.

For further information about signs of collapse due to fire, see National Operational Guidance: Fires in buildings - Assess and monitor structural integrity: Unstable structure
Strategic actions

Fire and rescue services should:

- Gather information about the location and type of temporary structures where feasible

Tactical actions

Incident commanders should:

- Liaise with the responsible person; in the case of temporary structures this may be a hire company
- Identify the type of structure, its method of construction and what it is being used for
- Look for signs and assess the likelihood of instability or collapse
- Look for signs of structural support that has been compromised or is missing
- Look for and assess the suitability of temporary supports, ground anchors and propping
- Consider the impact of current and forecast weather conditions on temporary structures

Hazard - Scaffolding

Hazard Knowledge

Scaffolding is used to provide a means of access, working platforms or support to structures.

There are two generic types of scaffolding systems:

- Tower scaffold – this is an independent scaffold, which is standalone and is often moveable with provision of outriggers for stability
- Fixed scaffold – this is formed of tube and fittings or modular systems that lock together and is normally tied or anchored to the structure

See Building Research Establishment supplementary information for further information about scaffolding.

Different materials and methods are used in scaffolding, depending on the requirement. Not all scaffolding structures are load-bearing; this is considered during the design stage and scaffolding constructed accordingly.

Heat from fire, high winds or structural failure of the building may affect the anchor bolts, fixings or tubing, leading to weakening of failure of the scaffolding. Localised collapse may leave other
sections of the scaffolding and structures vulnerable, particularly in wind or where affected by heat from fire. Unstable structures of failure of anchoring can result in progressive collapse.

Scaffolding may also be covered in sheeting or netting to:

- Prevent falls from height
- Prevent tools, materials and debris falling
- Provide a more aesthetic appearance
- Provide fire protection

Evaluating the integrity of scaffolding may be difficult, particularly where it is covered in sheeting or netting. Sheetimg is rated to prevent firespread, but printing on the sheeting may affect the fire-retardant qualities of the material.

Scaffolding may be fitted with lighting and cables, presenting a hazard of entanglement or exposure to electricity. Netting also presents an entanglement hazard.

There may be external lifts (also known as a hoists); some are used for transporting site staff, while others are used only for transporting building materials and equipment.
Control measure - Assess and monitor stability: Scaffolding

Control measure knowledge

As scaffolding can collapse suddenly, with little or no warning, it is important to understand the purpose and type of the scaffolding, and the method and sequence of construction or erection. This information should assist in assessing the likelihood of localised or progressive collapse.

The assessment of the scaffolding should include observing whether there are signs of compromised or missing structural support, or there are temporary supports such as shoring and propping.

Specialist advice or assistance regarding the collapse or potential collapse of scaffolding may be required from:

- The scaffolding provider
- Local authority building control teams
- Structural engineering
- Urban search and rescue tactical advisers

Strategic actions

Fire and rescue services should:

- Make arrangements with appropriate agencies for the provision of advice or assistance regarding the collapse or potential collapse of scaffolding

Tactical actions

Incident commanders should:

- Identify the purpose and type of the scaffolding
• Assess the stability of any scaffolding and monitor it throughout the incident

• Assess the scaffolding for signs of structural support that has been compromised or is missing

• Exercise caution when operating near scaffolding

• Consider the likely footprint of a scaffolding collapse when establishing cordons

• Consider the impact of current and forecast weather conditions on scaffolding

• Consider requesting specialist advice or assistance on the stability of scaffolding

Control measure - Access and egress: Scaffolding

Control measure knowledge

Fire and rescue services may attend incidents involving scaffolding when there is no one on site or the security staff present have no information. Scaffolding is generally used to provide work platforms for the outside of the structure; where information on using scaffolding cannot be obtained, alternative means of access and egress should be established. This could be by using staircases that have been built inside the building or by using fire and rescue service ladders or aerial appliances.

In some situations, there will be additional staircases, either on their own or as part of the scaffolding system, to provide sufficient means of escape for site staff. These may provide an option for gaining access or egress.

If fire and rescue service personnel need to use construction site lifts, this must be subject to an appropriate risk assessment. This should include the integrity of the three-phase power supply and whether it can be maintained during the incident. Power may be mains electricity or provided by a generator.

Specialist advice or assistance regarding the use of scaffolding staircases and lifts may be required
from:

- The scaffolding provider
- Local authority building control teams
- Structural engineers
- Urban search and rescue tactical advisers

Strategic actions

Fire and rescue services should:

- Make arrangements with appropriate agencies for the provision of advice or assistance regarding the use of scaffolding staircases and lifts

Tactical actions

Incident commanders should:

- Consider using fire and rescue service ladders or aerial appliances to provide access and egress without the use of scaffolding

- Determine whether there is a trained operator on-site and a manual procedure to safely lower trapped personnel in a timely manner – goods-only hoists should not be used for transporting personnel

- Identify access and egress routes from the internal staircases that may be inside a building with scaffolding

Control measure knowledge

Scaffolding tags, normally found near the primary access point, should provide information about the scaffolding provider and their contact details. The requirements for inspecting scaffolding can
be found in the Health and Safety Executive (HSE) - Scaffold checklist. Incomplete scaffolding should have a warning sign displayed.

The competent person or scaffolding provider should have knowledge of the scaffolding and its status, such as whether it has been handed over for use, is complete and physically tied to the building or is designed to be self-supporting, and whether it has been inspected as required.

Specialist advice or assistance regarding scaffolding may also be available from:

- Local authority building control teams
- Structural engineers
- Urban search and rescue tactical advisers

**Strategic actions**

Fire and rescue services should:

- Make arrangements with appropriate agencies for the provision of advice or assistance regarding scaffolding

**Tactical actions**

Incident commanders should:

- Look for scaffolding tags and check information, including the date of the last inspection
- Liaise with the competent person; in the case of scaffolding this may be the scaffolding provider

**Control measure - Assess the impact of sheeting or netting**

**Control measure knowledge**

Sheeting or netting on scaffolding may be used as either fall protection or to prevent debris falling
from height. Sheeting or netting should not be relied on as the sole means of preventing a fall from height.

The size of the netting should be evaluated, particularly when breathing apparatus (BA) is worn, as the BA set may become entangled. A risk assessment should consider the necessity of the task, the need for BA and the potential impact of removing the sheeting or netting.

Debris netting in place - photograph courtesy of Janet Guthrie

Specialist advice or assistance regarding scaffolding sheeting or netting may be required from:

- The scaffolding provider
- Local authority building control teams
- Structural engineers
- Urban search and rescue tactical advisers

**Strategic actions**

Fire and rescue services should:
• Make arrangements with appropriate agencies for the provision of advice or assistance regarding scaffolding sheeting or netting

**Tactical actions**

Incident commanders should:

- Identify presence, type and integrity of any netting in liaison with responsible person

- Consider the removal of sheeting or netting where it presents a risk to safe implementation of the incident plan

**Control measure knowledge**

Personnel should not use the scaffolding if there is any doubt about its integrity. Other means of access and egress should be evaluated.

If there are urgent circumstances where scaffolding could be used, an appropriate risk assessment must be carried out. If the decision is taken to proceed, it should be with the minimum numbers of personnel and equipment with regard to weight limitations and lateral loading. Consideration must also be given to working at height procedures.

Specialist advice or assistance regarding the appropriate use or scaffolding may be required from:

- The scaffolding provider
- Local authority building control teams
- Structural engineers
- Urban search and rescue tactical advisers

**Strategic actions**

Fire and rescue services should:
• Make arrangements with appropriate agencies for the provision of advice or assistance regarding the appropriate use of scaffolding

**Tactical actions**

Incident commanders should:

• Confirm with the scaffolding provider, or other specialist, that the scaffolding is safe to use

• Deploy the minimum numbers of personnel and equipment required for the task

• Ensure the appropriate work at height equipment and procedures are used when working on scaffold

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**Hazard - Stacked materials**

**Hazard Knowledge**

Stacked materials may present hazards including:

• Firespread
• Collapse of the stack
• Materials in the stack falling
• Falls from height
• Falls into the stacked materials

Stacked materials may be encountered at industries such as:

• Paper mills
• Timber yards
• Pallet manufacture and storage sites
• Warehouses and storage facilities
• Agricultural sites
• Waste sites

Waste sites store and stack materials in various ways:
Sometimes the waste is heaped into a pile, which may collapse into itself as the material underneath burns away

Other waste, such as scrap vehicles or baled products, may be stacked in such a way that it could fall over and create a hazard in the surrounding area

Further information published by the Waste Industry Safety and Health (WISH) Forum can be found in their publication, *Reducing fire risk at waste management sites*.

Stacked materials may be stored inside buildings. If the stacks become unstable or fall, they may affect the structural stability of the building.

The materials and packaging in stacks may be affected by fire or water, resulting in a loss of integrity of the stack. There may also be hidden voids, making the stack non-load-bearing.

**Control measure - Safe system of work: Stacked materials**

**Control measure knowledge**

A cordon should be set up around a stacked materials if there is a danger of collapse or of materials falling. The radius of the hazard area should be big enough so that debris from the collapse does not fall outside it.

Access into the cordon should be prevented altogether, or limited to essential tasks only. Anyone entering the cordon should be aware of the hazards and the signs of collapse so they can withdraw if necessary.

When establishing a safe system of work the following information will be needed, and any changes monitored:

- The size of the stack
- The materials included in the stack
- The density and stability of the stack
- The likely impact on the materials or the stability of the stack by:
  - The incident
  - Fire and rescue service activity
  - Current and forecast weather

Fire and rescue service personnel should exercise caution when working near stacked materials.
Unless unavoidable, they should not walk on or across stacked materials, or work on the stack.

**Strategic actions**

Fire and rescue services should:

- Make appropriate risk information available to personnel regarding the size, type and locations of stacked materials.

**Tactical actions**

Incident commanders should:

- Establish and communicate cordons and hazard areas around unstable stack and falling materials.
- Identify the quantity, type and density of stacked materials.
- Implement an appropriate safe system of work for crews working around stacked materials.
- Monitor the effects of operational activity on the stability of stacked materials.
- Monitor current and forecast weather conditions if they could affect the stability of stacked materials.

**Hazard - Places of lawful detention**

**Hazard Knowledge**

Lawful detention facilities are likely to contain detainees, visitors and staff. Detainees of lawful detention facilities may behave unpredictably and show verbal or physical hostility to personnel.

It is not the responsibility for fire and rescue services to deal with disturbances, but they may be required to control other hazards during disturbances. Any fire and rescue service activity during a
period of concerted indiscipline or unrest should be restricted to agreements or memorandum of understanding made with the place of lawful detention, and follow service procedure. For further information refer to Public disorder.

Potential hazards include:

- Attempts to ambush or take fire and rescue service personnel hostage
- Fire-setting
- Biological hazards, ‘dirty protests’ or drug paraphernalia
- Missiles being thrown at fire and rescue service personnel or vehicles
- Theft of fire and rescue service equipment or vehicles
- Concerted indiscipline, riots or sieges
- Whistle signals for the withdrawal or evacuation of fire and rescue service personnel may be confused with signals used by the place of lawful detention

The security features and special entry procedures at places of lawful detention may delay response times and could cause personnel to become isolated. For more information see Security features.

Control measure - Joint working at places of lawful detention

Control measure knowledge

Arrangements for places of lawful detention will vary depending upon the site, its ownership and its population. Fire and rescue services should establish joint working arrangements with places of lawful detention in their area. This may include developing response plans and memoranda of understanding (MoUs).

Some equipment is prohibited within places of lawful detention. Fire and rescue services should identify and comply with these restrictions.

Personnel should liaise with on-site staff to determine locations with potential hazards and to identify safe access and egress routes. Hostile detainees should be secured so that they cannot encounter personnel.

Personnel should remain vigilant, especially regarding security arrangements in places of lawful detention, to prevent them from being accidently locked in cells or other areas. Personnel should
be accompanied by on-site staff and there should be no lone working.

Fire and rescue service vehicles and equipment should be positioned in an area away from detainees and also secured. Throughout the incident, personnel should maintain control of all equipment and an inventory of equipment should be carried out before leaving the site.

On-site CCTV may support in monitoring and assessing any activity that could impact on personnel.

**Strategic actions**

Fire and rescue services should:

- Establish joint working arrangements with places of lawful detention
- Establish joint working arrangements for periods of concerted indiscipline or unrest
- Agree an appropriate evacuation and withdrawal signal, considering the signals used by each place of lawful detention
- Identify equipment that is prohibited within each place of lawful detention
- Provide familiarisation information for operational personnel for each place of lawful detention

**Tactical actions**

Incident commanders should:

- Implement joint working arrangements for the place of lawful detention
- Ensure prohibited equipment is not taken into the place of lawful detention
- Consider contingency arrangements, which can be quickly implemented if personnel become isolated in unsafe areas
- Ensure personnel are accompanied by on-site staff at the place of lawful detention
Ensure there is no lone working in the place of lawful detention

Monitor and assess activity in the place of lawful detention that could impact on fire and rescue service personnel, vehicles or equipment

Maintain control of all equipment throughout the incident

Carry out an inventory check before leaving the place of lawful detention

Hazard - Extreme heat

Hazard Knowledge

Personnel may encounter extreme heat when attending industrial sites. Any personnel who cannot avoid being exposed to extreme heat should do so for as short a period as possible with an appropriate egress route.

Sources of extreme heat include:

- Ovens and kilns
- Boiler rooms
- Incinerators
- Equipment used for cleaning and sterilising
- Manufacturing processes
- Molten metals and furnaces

For further information about the effects of working in extreme heat, refer to the hazard, Heat illness in personnel.

Control measure - Safe system of work: Extreme heat at industrial sites
Control measure knowledge

The initial method of controlling the hazard of extreme heat may be to isolate power or fuel supplies to the source of heat.

However, in many circumstances it is unlikely that doing this will reduce the temperature of surfaces, items of equipment or atmospheres in a short space of time. If possible the area should be avoided. It may be feasible to use tactical ventilation to reduce the temperature.

Personnel should wear appropriate personal protective equipment (PPE) when working in extreme heat. There should be appropriate crew rotation for personnel working in extreme heat, and they should be monitored for the effects of heat illness.

Strategic actions

Fire and rescue services should:

- Ensure that information about equipment that generates extreme heat and how to safely isolate it, is included in SSRI

Tactical actions

Incident commanders should:

- Liaise with the responsible person for information about equipment or processes that generate extreme heat and the isolation procedures
- Consider isolating the source of extreme heat
- Consider avoiding the area affected by extreme heat
- Ensure personnel wear PPE appropriate for working in extreme heat
- Closely supervise personnel and implement appropriate crew rotation for those working in extreme heat
- Monitor personnel for the effects of heat illness
- Consider tactical ventilation to reduce temperatures
Hazard - Extreme cold

Hazard Knowledge

Personnel may encounter extreme cold when attending industrial sites where there are refrigerators, freezers or cryogenic liquids. Refer to supplementary information about cryogenics, temperature-controlled storage and kitchens.

For further information on dealing with cryogenic hazards see National Operational Guidance: Hazardous materials.

For further information about the effects of working in extreme cold, refer to the hazard, Hypothermia in personnel.

Control measure - Safe system of work: Extreme cold at industrial sites

Control measure knowledge

The initial method of controlling the hazard of extreme cold may be to isolate power or fuel supplies to the source of the cold.

However, in many circumstances it is unlikely that doing this will increase the temperature of surfaces, items of equipment or atmospheres in a short space of time. If possible the area should be avoided. It may be feasible to use tactical ventilation to increase the temperature.

Although structural firefighting personal protective equipment (PPE) offers some thermal protection, the temperatures may not to be safe to work in immediately and it may be necessary to establish exclusion zones. The responsible person or on-site staff may be able to provide information about safe working temperatures.

There should be appropriate crew rotation for personnel working in extreme cold, and they should be monitored for the effects of hypothermia.
Strategic actions

Fire and rescue services should:

- Ensure that information about equipment that generates extreme cold and how to isolate it is included in SSRI

Tactical actions

Incident commanders should:

- Liaise with the responsible person for information about equipment that generates extreme cold and the isolation procedures
- Consider isolating the source of extreme cold
- Consider avoiding the area affected by extreme cold
- Ensure personnel wear PPE appropriate for working in extreme cold
- Closely supervise personnel and implement appropriate crew rotation for those working in affected areas
- Monitor personnel for the effects of hypothermia
- Consider tactical ventilation to increase the temperature

Control measure - Personal protective equipment (PPE): Cryogenic gloves

Control measure knowledge

There may be specialist personal protective equipment (PPE) available on site, such as cryogenic gloves. The compatibility of specialist PPE with fire and rescue service PPE should be assessed before use.
**Strategic actions**

Fire and rescue services should:

- Ensure that information about equipment that generates extreme cold, including availability of suitable PPE, is included in SSRI

**Tactical actions**

Incident commanders should:

- Liaise with the responsible person for information about the availability of on-site specialist PPE for extreme cold

- Consider the use of suitable specialist PPE that is compatible with fire and rescue service PPE

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**Hazard - Lasers**

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**Hazard Knowledge**

Lasers may be used for cutting, welding, sorting, counting, printing and measuring. They emit radiation as narrow concentrated beams of light, not necessarily visible to the human eye. Their most commonly-recognised hazard is their ability to damage eyesight or burn skin, which varies according to the wavelength and power of the output. However, in some cases, other associated risks from using the equipment may be more hazardous, such as heat, dust and fumes.

Refer to the supplementary information about [lasers](#). They have many uses including:

- Manufacturing, processing and engineering
  - Industrial processes
  - Laboratories

- Commercial and business
  - Creating a billboard effect to the outside of buildings
• Fibre optic installations for communications
• Laser printing

Places of assembly and entertainment

• Schools, colleges and universities for scientific purposes
• Nightclubs, outdoor events and concerts for display purposes
• Rangefinders on golf courses

Medical facilities and animal facilities

• For medical procedures

Construction sites

• Surveying tools

Military and defence establishments and shooting clubs

• Rangefinders for military purposes and shooting clubs

Control measure - Safe system of work laser equipment at industrial sites

Control measure knowledge

It may be necessary to switch off, contain or isolate the power supply to the laser equipment. Until the laser equipment is isolated, it may be necessary to avoid the affected area.

The responsible person should be able to provide information about the type and location of laser equipment and its isolation procedures.

If it is not possible to switch off, contain or isolate the power supply to the laser equipment, appropriate specialist personal protective equipment (PPE) such as protective eye wear or face shields may be available on-site.

Strategic actions

Fire and rescue services should:
• Ensure that information about laser equipment is included in Site-Specific Risk Information (SSRI)

• Enter into arrangements with any sites operating lasers to provide specialist personal protective equipment if required

**Tactical actions**

Incident commanders should:

• Liaise with the responsible person for information about the type and location of laser equipment and the isolation procedures
• Consider isolating laser equipment
• Consider avoiding the area affected by the laser equipment

• Consider using appropriate specialist personal protective equipment when working near lasers

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**Hazard - X-ray machines**

**Hazard Knowledge**

X-ray machines are used in many industries, including:

• Engineering workshops
• Medical facilities
• Animal facilities
• Food industry processes, to detect contaminants
• Lawful detention facilities
• Security facilities, such as at airports

X-rays can only be created through the application of a very high voltage, which may be hazardous in itself. However, as soon as the power supply is isolated, all X-ray emission ceases.

The level of radiation emitted from X-ray machines varies depending on their application; those used for detection purposes such as scanning baggage are less powerful than those used for medical purposes.
Control measure knowledge

Access to the room housing an X-ray machine should be restricted until the power supply has been confirmed as either switched off or isolated.

Strategic actions

Fire and rescue services should:

- Ensure that information about the type and location of X-ray machines is included in Site-Specific Risk Information (SSRI), along with procedures for isolating their power supply

Tactical actions

Incident commanders should:

- Consider requesting advice or assistance from the responsible person to isolate power supplies to X-ray machines, taking into account any consequences of this action
- If the responsible person is unavailable, consider requesting advice from another specialist, such as the manufacturer of the X-ray machine, and/or refer to instructions provided
- Ensure that personnel are made aware of the type and location of any X-ray machines
- If the X-ray machine has been compromised by a fire or other type of incident, implement hazardous materials procedures for radiation, until the source has been confirmed as safe

Hazard - MRI scanners

Hazard Knowledge

MRI (magnetic resonance imaging) scanners will most commonly be found in medical facilities, such as hospitals. However, they may also be found in animal facilities, such as veterinary clinics and hospitals. Refer to the supplementary information for further detail about MRI scanners.
The main hazards relating to MRI scanners are:

- Electricity
- Strong magnetic fields
- Super-conducting magnets
- Cryogenic materials
- Asphyxiation
- Impact on communications

Electricity

Fixed and mobile scanners require a three-phase 400V electricity supply. Mobile scanners may have power supplied by a generator or by cable from an adjacent building.

It is important to understand that isolating the electrical supply will not stop the magnetic field being generated for several hours.

Strong magnetic fields

MRI scanners produce strong magnetic fields; these are emitted in all directions around the equipment but the strongest fields are towards the centre of the scanner where the patient enters.

Any metallic material may be strongly attracted to the core of the scanner. Metallic objects can become projectile hazards. Even non-magnetic materials, such as aluminium, can be affected and may twist violently in the magnetic field.

The magnetic field may affect:

- Fire and rescue service equipment
- Communication equipment, such as mobile phones and radios
- Any metal implants or fragments, such as:
  - Surgical pins or plates
  - Cardiac pacemakers
  - Dental bridges or implants
  - Welding fragments
  - Metal splinters
- Jewellery including piercings and watches
- Metal fastenings on clothing

MRI magnetic fields can erase bank card encoding, and cause a malfunction in any battery-operated equipment such as watches.

Although the magnetic field cannot be shut down quickly, there are other emergency procedures
that will shut down the magnetic field within several minutes. During that time a high magnetic field will still exist.

Super-conducting magnets

The magnets within the scanner consist of a large number of tightly wound wires, through which a current passes to produce a magnetic field. MRI scanners have a helium liquid in the magnet, which usually vents through ducting. If it fails, helium gas will be released into the room, depleting oxygen levels.

Cryogenic liquids

The super-conducting magnets are kept at extremely low temperatures by being immersed in liquid helium (-269oC), which is sometimes surrounded by an insulating layer of liquid nitrogen (-196oC). For further information on dealing with cryogenic hazards see Cryogenic materials.

Asphyxiation

During an emergency shutdown (or quenching) of an MRI scanner the cryogenic liquids are allowed to ‘gas off’ and are rapidly vented outside the facility. However, it is possible that some of the gases could be released into the room containing the scanner. This may present an asphyxiation hazard as oxygen is displaced from the atmosphere.

Impact on communication

The scanner room is constructed as a 'Faraday cage' to ensure that the magnetic field remains confined within the room. It continues to work even after electrical power is isolated, and will also block all radio signals, incident ground radios, breathing apparatus (BA) telemetry systems and mobile phones.

Control measure knowledge

If the MRI (magnetic resonance imaging) scanner is still emitting a strong magnetic field, personnel should not enter the scanner room (beyond the demarcation line) with any metal or battery operated objects.
As the Faraday cage around an MRI scanner blocks normal communication equipment, it may be necessary to implement line of sight communications or to physically relay messages.

It may be necessary to use atmospheric monitoring to identify if cryogenic gases have leaked from the scanner into surrounding rooms. If gases are identified, respiratory protective equipment (RPE) should be worn and the safety of deploying personnel into a room containing cryogenic gases should be considered. For more information see Personal protective equipment (PPE): Cryogenic materials.

**Isolating an MRI scanner**

Isolating the power supply to an MRI scanner will not stop the strong magnetic field being generated. However, there may be some incidents, for example if the scanner is involved in fire, where isolating the power supply would be necessary.

Wherever possible this should be done by the scanner operator, but electricity can be isolated by fire and rescue service personnel if it is not safe for the operator.

Refer to the hazard of On-site machinery and the control measure Isolate power supplies for on-site machinery.

**MRI scanner emergency shutdown procedure**

In the event of fire or entrapment, for example if somebody becomes trapped in the magnetic field because they are holding or wearing a metallic item, the operators of the MRI scanner are trained to perform an emergency shutdown (quench) of the scanner.

To shut down the magnetic field, the scanner is quenched of cryogenic liquids. This task will take several minutes, during which time a high strong magnetic field will still exist.

Taking this course of action should only be done when there is a threat to life risk due to the high financial cost. Quenching has the potential to damage the scanner. Once quenched, the scanner cannot be restarted without specialist engineers replenishing the cryogenic liquids and resetting the equipment.

**Strategic actions**

Fire and rescue services should:

- Ensure information about MRI scanners, their location and their emergency shutdown procedures is recorded in Site-Specific Risk Information (SSRI)
- Maintain contact details for specialist advice for MRI scanners
• Inform their personnel about the hazard of exposure to strong magnetic fields if they have any metal implants or fragments

**Tactical actions**

Incident commanders should:

• Ensure fire and rescue service personnel are made aware of the strong magnetic field
• Not deploy any metallic equipment into the scanner room (beyond the demarcation line) unless the magnetic field has been shut down
• Liaise with the MRI operator to identify appropriate actions

• Consider requesting an emergency shutdown of the MRI scanner, if there is a threat to life, taking into account the consequences of this action

• Ensure personnel entering the hazard area do not have any metal implants or fragments that may be affected by the strong magnetic field

• Be aware of the impact of MRI scanners on communication equipment

• Implement alternative communication methods when MRI scanners affect radio transmission

• Ensure cryogenic gases have not leaked into the scanner room prior to committing fire and rescue service personnel

• Ensure any fire and rescue service personnel committed into the scanner room where there may be a hazard of asphyxiation wear appropriate respiratory protective equipment (RPE)

• Consider requesting the MRI operator to isolate the scanner

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**Hazard - CT scanners**
Hazard Knowledge

CT (computerised tomography) scanners will most commonly be found in medical facilities, such as hospitals. However, they may also be found in animal facilities, such as veterinary clinics and hospitals. Refer to the supplementary information for further detail about CT scanners.

The main hazards relating to CT scanners are:

- Electricity - CT scanners use a three-phase, 400V electrical supply
- Ionising X-ray radiation - the CT scanner takes many X-ray images which are then combined by computer to create a 3D image. The X-ray radiation is produced electrically and ceases to exist once power is isolated.

Control measure knowledge

Unlike MRI scanners, isolating the electrical supply does not have a time delay and there is no cost implication or risk of damage to the instrument by operating the electrical isolation switch.

Strategic actions

Fire and rescue services should:

- Ensure information about CT scanners, their location and how to isolate their power supplies is recorded in Site-Specific Risk Information (SSRI)

Tactical actions

Incident commanders should:

- Liaise with the MRI operator to identify appropriate actions
Hazard - Magnetic equipment

Hazard Knowledge

Magnetic equipment is widely used in industry for a number of different applications. Magnets can be used to lift and move heavy loads. Industrial magnets are often used in conveyor and chute systems to separate ferrous materials from non-ferrous materials.

They can also be used in recycling centres where plastic, glass, and other items need to be separated from any stray ferrous material. Magnetic sweepers can be used to pick up ferrous materials from the floors of industrial factories and construction sites.

The material being lifted or moved may fall from the equipment, especially if the magnet fails following loss of power to the lifting device or due to incorrect operation.

Any metallic material, regardless of whether it is attracted to magnetic fields, may strongly be attracted to magnetic equipment. These objects can become projectile hazards. Even non-magnetic materials such as aluminium can be affected and may twist violently in the magnetic field. This effect may impact on fire and rescue service equipment.

The magnetic field may severely affect some pacemakers and other metal implants or fragments including piercings, dental bridges or surgical pins.

Control measure knowledge

Information should be gathered about the strength of magnet and the size of the lifting zone; this may be available in Site-Specific Risk Information (SSRI), but personnel should liaise with the responsible person or operator to confirm the accuracy of information.

Personnel should not enter 'lifting zones' while magnetic equipment is in use. The extent of the 'lifting zone' will depend on the size and type of load, its height and speed. There should be warning notices at entrances to places where magnetic lifting is taking place.
Until it has been confirmed by the responsible person of the operator that it is safe to do so, no equipment that may be attracted by the magnet should be taken within the ‘lifting zone’.

Magnetic equipment may have an operator or be part of an automated process. In order to isolate the equipment, it may be necessary to isolate the electrical supply, which may have back-up batteries. However, if the electrical supply is isolated or interrupted, the material being lifted may fall from the magnetic equipment. Therefore isolation should only be carried out once there is nobody in the 'lifting zone'.

**Strategic actions**

Fire and rescue services should:

- Ensure that information about magnetic equipment is included in Site-Specific Risk Information (SSRI)
- Inform their personnel about the hazard of exposure to strong magnetic fields if they have metal implants

**Tactical actions**

Incident commanders should:

- Liaise with the responsible person for information about the magnetic equipment and isolation procedures
- Consider isolating magnetic equipment providing there is nobody in the lifting zone
- Consider avoiding the area affected by the magnetic equipment
- Ensure that fire and rescue service equipment that could be attracted to the magnetic equipment is not taken into the hazard area
- Ensure personnel entering the hazard area do not have any metal implants or fragments that may be affected by the strong magnetic field

**Hazard - Electromagnetic fields (EMFs)**
Hazard Knowledge

An electromagnetic field (EMF) is produced whenever a piece of electrical or electronic equipment is used. Electrical power supplies and appliances are the most common sources of low frequency EMFs.

Mobile telephone, television and radio masts, along with radars and microwave ovens, produce high frequency (also referred to as radiofrequency) EMFs.

There is no evidence to conclude that exposure to low level EMFs is harmful to health. However, the main effect of high frequency EMFs is the heating of body tissues; even short-term exposure to very high levels of EMFs can be harmful to health. Refer to the World Health Organization website for further information.

EMFs may interfere with:

- The operation of medical implants, such as heart pacemakers or insulin pumps
- Fire and rescue service communications including radios, mobile phones and telemetry systems
- Remotely operated equipment, such as aerial platforms operated by wireless controls

For more information see Mobile phone base stations and Radar

Control measure - Safe system of work: Electromagnetic fields

Control measure knowledge

Information regarding electromagnetic fields (EMFs) should be gathered from:

- Risk information
- The responsible person
- Warning signs and notices

Warning signs should be observed and the strength of the EMF should be confirmed by the responsible person.

If high intensity EMFs have not been isolated it may be necessary to establish exclusion zones around the hazard.
For further information refer to the Health and Safety Executive (HSE) publication, *A guide to the Control of Electromagnetic Fields at Work Regulations 2016*. This includes details about equipment with high frequency electromagnetic fields (EMFs) such as:

For further information refer to the Health and Safety Executive (HSE) publication, *A guide to the Control of Electromagnetic Fields at Work Regulations 2016* for further information. This includes details about equipment with high frequency EMFs such as:

- MRI scanners - see supplementary information
- Radars- see supplementary information
- Radio and mobile phone masts- see supplementary information

**Strategic actions**

Fire and rescue services should:

- Ensure that information about electrical or electronic equipment that generates high frequency EMFs is included in Site-Specific Risk Information (SSRI)

- Inform their fire and rescue service personnel about the hazard of exposure to high frequency EMFs, especially if they have medical implants that may be affected

**Tactical actions**

Incident commanders should:

- Ensure that fire and rescue service personnel are made aware of the presence of electromagnetic fields (EMFs)

- Ensure personnel entering the hazard area do not have any medical implants that may be affected by electromagnetic fields (EMFs)

- Liaise with the responsible person for information about electrical or electronic equipment that generates high frequency EMFs and its isolation procedures

- Consider isolating the source of electromagnetic fields (EMFs)
Consider avoiding the area affected by high frequency electromagnetic fields (EMFs)

Consider the impact of electromagnetic fields (EMFs) on fire and rescue service equipment and communications

Hazard - Pressure systems and equipment

Hazard Knowledge

Examples of pressure systems and equipment are:

- Boilers and steam heating systems
- Pressurised process machinery and piping
- Cylinders
- Compressed air systems (fixed and portable)
- Pressure cookers and autoclaves
- Heat exchangers and refrigeration equipment
- Valves, steam traps and filters
- Pipework and hoses
- Pressure gauges and level indicators
- Hydraulic equipment
- Slurry tankers

The potential hazards from pressure are:

- Impact from the blast of an explosion or release of compressed liquid or gas
- Impact from parts of equipment that fail or from flying debris
- Contact with the released liquid or gas - see National Operational Guidance: Hazardous materials, if appropriate
- Fire resulting from the escape of flammable liquids, gases or mists - see national Operational Guidance: Fires and firefighting

The hazards from pressurised systems increase if the equipment has not been installed or maintained correctly, is not suitable for its use, or has had safety features deactivated or removed.
Control measure - Safe system of work: Pressure systems and equipment

Control measure knowledge

Operators should be made aware of the presence of responders before personnel enter the hazard area.

Isolating power supplies

It may be necessary to isolate power supplies to pressure systems and equipment, especially if there is a potential hazard to personnel or other emergency responders. Where possible, advice or assistance should be requested from the responsible person; they may be able to isolate the power supplies for the pressure system.

Depressurising systems

Safety valves may be fitted to the equipment to relieve excess pressure; it may be necessary to use these to depressurise equipment to reduce the risk of a pressurised system bursting.

Where possible, advice or assistance should be requested from the responsible person; they may be able to depressurise the system.

Strategic actions

Fire and rescue services should:

- Ensure that information about the type, quantity and location of pressurised systems is included in Site-Specific Risk Information (SSRI) if appropriate, along with procedures for isolating power supplies

Tactical actions

Incident commanders should:

- Consider requesting advice or assistance from the responsible person to isolate power supplies or depressurise the system considering any consequences of this action
- Consider requesting that the use of pressurised systems is restricted or prohibited
• Consider isolating power supplies for the pressure system or equipment considering any consequences of isolation

• Ensure that operators are made aware of the presence of personnel and other responders

**Hazard - Silos and storage tanks**

**Hazard Knowledge**

Silos

Refer to the supplementary information about silos.

The main hazards to be considered when attending an incident with a silo are:

• The need for enclosed space working
• Oxygen-deficient atmosphere
• High concentrations of carbon dioxide
• Asphyxiation if trapped in contents
• Associated on-site machinery
• Explosive atmosphere
• Unstable contents
• Access and egress

The contents of a silo may act in a fluid manner and may not be load bearing. There is a phenomenon in silos known as bridging; this is where the material appears to be solid but has actually formed a bridge above a void in the contents. Fire and rescue service personnel should not trust that seemingly solid surfaces in silos will be able to bear their weight.

The nature of the goods stored within silos may create a toxic, flammable, oxygen deficient or explosive atmosphere. Opening up a hatch or door may create an explosive mixture.

Oxygen limiting silos or controlled atmosphere silos have a greater risk of backdraft or explosion when they are involved in a fire.

When involved in a fire or suspected fire, opening any doors or hatches could result in a heat blast.

For further information, see National Operational Guidance: [Fires and firefighting](#).
Applying water or foam into a silo may result in the contents swelling. Due to the increase in weight, volume and pressure on internal walls, this could lead to structural collapse of the silo.

Many of the contents stored within a silo produce dust. Refer to the hazard for combustible dust.

Gaining access to a silo may involve working at height, with a hazard of fire and rescue service personnel or their equipment falling inside or outside of the silo.

See National Operational Guidance: Subsurface, height, structures and confined spaces – Work at height

Silos usually have internal and external machinery including:

- Augers, which sweep the contents inside the silo
- Screw feeders
- Conveyer belts
- Paddles
- Suction piping
- Mixing blades

See National Operational Guidance: Industry: Machinery

The nature of construction limits access and egress to and from silos and storage tanks, and they will lack natural light and ventilation. See national Operational Guidance: Industry supplementary information: Silos.

Storage tanks

Storage tanks are used in many industries, mainly for the storage of liquids including:

- Fuels
- Water
- Chemicals
- Liquid foodstuffs

Storage tanks may be constructed of plastic, fibreglass or metal. Some tanks have covers that are not load bearing.

Working near tanks containing liquids presents similar hazards to working near water. Therefore, the guidance contained in National Operational Guidance: Water rescues and flooding may need to be applied.
Control measure - Cordons: Silos or storage tanks

Control measure knowledge

An appropriate hazard area around a silo or storage tank should be identified and controlled, especially if there is a danger of collapse.

Access into the hazard area should be prevented, or limited to essential tasks with only the minimum number of fire and rescue service personnel. Fire and rescue service personnel should not enter a silo unless there is an immediate threat of serious injury or loss of life.

Strategic actions

Fire and rescue services should:

- Identify the presence and contents of silos and storage tanks in their area that have control measures such as cordons as part of an organisation’s risk management plan and include these control measures in SSRI

- Ensure personnel are aware of high hazard silos and storage tanks in their area and where appropriate conduct risk visits to identify suitable cordon distances

Tactical actions

Incident commanders should:

- Identify the presence and contents of silos and storage tanks and the assess the risk to personnel

Control measure - Isolate a silo or storage tank
Control measure knowledge

Discharge control mechanisms should be isolated in the closed position. This mechanism may be manually, mechanically or electronically operated. This will prevent contents from being discharged, which may injure somebody in the silo.

The mechanism should be monitored at all times throughout the incident to prevent it from being opened or turned back on without authorisation from the incident commander.

Other on-site machinery that may have an impact on the incident should be isolated – refer to the hazard for on-site machinery. It may also be necessary to isolate power supplies. See National Operational Guidance: Utilities and fuel.

Strategic actions

Fire and rescue services should:

- Ensure that information about silos and storage tanks and their use is included in Site-Specific Risk Information (SSRI), along with procedures for controlling and accessing them.

Tactical actions

Incident commanders should:

- Consider requesting advice or assistance for controlling the silo or storage tank from the responsible person.
- Consider closing discharge control mechanisms to silos or storage tanks based on specialist advice.

Control measure - Access a silo or storage tank

Control measure knowledge

If it is essential for personnel to access the silo or storage tank, this could be by using fire and
rescue service ladders, or, subject to an assessment of their condition, ladders that are a fixed component of the silo or tank installation. Depending on the height of the silo or tank, it may be appropriate to use aerial appliances for access and egress.

Before opening any hatches, a risk assessment should be carried out. If hatches need to be opened, fire and rescue service personnel should have extinguishing media in place if appropriate, and should ensure that they are not positioned in front of hatches as they are opened.

**Strategic actions**

Fire and rescue services should:

- Ensure that information about silos and storage tanks is included in Site-Specific Risk Information (SSRI) if appropriate, along with procedures for accessing them

**Tactical actions**

Incident commanders should:

- Consider requesting advice or assistance for accessing the silo or storage tank from the responsible person
- Consider using fire and rescue service ladders, fixed ladders that form part of the installation, or aerial appliances for access and egress
- Avoid disturbing or dispersing dust in or around silos
- Consider requesting the attendance of specialist rescue teams and equipment

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**Hazard - Slurry pits and lagoons**

**Hazard Knowledge**

Slurry pits may be above or below ground and are constructed from different materials including earth, plastic, concrete, fibreglass or metal. Slurry is also stored in lagoons.

Slurry is broken down by bacterial action that produces gases, especially when agitated. Slurry gases include methane, carbon dioxide, ammonia and hydrogen sulphide, which could be toxic, flammable or an asphyxiant.
Slurry pits may form a crust and could be covered in organic material such as algae, grass and weeds. If their presence is not known, and especially in poor light, there could be a risk of fire and rescue service personnel falling into a slurry pit.

The slurry pit may be in a poor condition, or have been affected by the incident. If this is the case, there is the potential for structural collapse and release of the contents of the pit.

Slurry contains biohazards; people or equipment could become contaminated.

**Control measure - Identify and control the hazard area around a slurry pit or lagoon**

**Control measure knowledge**

An appropriate hazard area around a slurry pit or lagoon should be identified and controlled, especially if there is a risk that the contents will be released.

Access into the hazard area should be prevented, or limited to essential tasks with only the minimum number of personnel. Personnel should not enter a slurry pit or lagoon unless there is an threat to life.

Fire and rescue service personnel entering the hazard area should wear the appropriate level of personal protective equipment (PPE) and respiratory protective equipment (RPE).

Advice or assistance should be sought from a hazardous materials adviser if required. Specialist rescue teams and equipment may also be required.

As the atmosphere around slurry pits or lagoons may be toxic or irrespirable, it may be necessary to identify gases in the vicinity using regular atmospheric monitoring and to wear respiratory protective equipment (RPE).

Depending upon the materials involved it may be necessary to implement appropriate procedures for hazardous materials. For more information refer to the Foundation for hazardous materials and the National Operational Guidance: Hazardous materials.

**Strategic actions**

Fire and rescue services should:
• Ensure that information about slurry pits or lagoons is included in Site-Specific Risk Information (SSRI)

**Tactical actions**

Incident commanders should:

• Consider requesting advice or assistance from the responsible person before approaching the slurry pit or lagoon

• Consider requesting advice or assistance from a hazardous materials adviser when working near slurry pits or lagoons

• Ensure that personnel are wearing appropriate PPE and RPE

• Consider requesting the attendance of specialist rescue teams and equipment

• Prohibit eating, drinking, smoking or vaping to prevent ingesting contaminants

• Consider restricting the number of fire and rescue personnel and vehicles within the hazard area

• Carry out testing and monitoring of the atmosphere around the slurry pit or lagoon

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**Control measure - Carry out atmospheric testing and monitoring**

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**Control measure knowledge**

Atmospheric monitoring should be carried out whenever operations take place in a confined space.

Before entry, the atmosphere within a confined space should be tested to check oxygen concentration and to check for the presence of hazardous gases or vapours. Atmospheric testing should be carried out by competent personnel aware of the limitations of the equipment in use.

Testing should be carried out if the atmosphere might be toxic, asphyxiating or hypoxic. Testing should also be carried out if it is known that the atmosphere was previously contaminated and subsequently ventilated.
Regular monitoring is necessary to identify any changes in the atmosphere while work is being carried out. The results of testing and monitoring should be recorded. Testing and monitoring requirements should be defined by a competent confined space supervisor, within the safe system of work.

The atmosphere in a confined space may be regularly monitored to protect personnel by using on-site or fire and rescue service monitors in a fixed location. Personal or portable monitors carried by individuals can also be used.

**Strategic actions**

Fire and rescue services should:

- Enable access to suitable atmospheric monitoring equipment that is can be used in a confined space

**Tactical actions**

Incident commanders should:

- Carry out testing and monitoring of the atmosphere and use the results to inform the incident plan

- Consider requesting specialist advice or assistance for atmospheric monitoring

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**Control measure - Implement hazardous materials procedures**

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**Control measure knowledge**

See National Operational Guidance: [Hazardous materials](#) for guidance about dealing with any release of hazardous substances.
Strategic actions

Tactical actions

There are no tactical actions associated with this control measure.

Control measure - Implement confined space procedures

Control measure knowledge

See National Operational Guidance: Sub-surface, height, structures and confined spaces.

Strategic actions

Tactical actions

There are no tactical actions associated with this control measure.

Control measure - Decontaminate fire and rescue service personnel and equipment

Control measure knowledge

See National Operational Guidance: Hazardous materials
Strategic actions

Tactical actions

There are no tactical actions associated with this control measure.

Hazard - Molten materials

Hazard Knowledge

Molten materials such as metal and glass may be found in industry. Depending upon the substance, maintaining it in a molten state is likely to require extreme heat.

Although they may cool quickly, their liquid state will allow them to travel freely, causing damage and potentially starting fires.

Depending upon their temperature, molten materials will radiate extreme heat and will cause severe burns if contact with them is made.

Molten metals

The metals involved may react with water, releasing hazardous gases or more heat. Due to their extreme heat, contact with water may cause a violent reaction, quickly turning water into steam and the metal to be projected or to spit. For further information refer to the supplementary information for Molten metals.

Molten glass

Sudden cooling may present a risk of projectiles being formed, but there is no risk of chemical reaction with water.

Control measure - Safe system of work: Molten materials
Control measure knowledge

Molten metal

Molten metal should not be cooled using water unless it has solidified, and this action is approved by the responsible person or specialist advice. It should also not be allowed to come into contact with standing pools of water.

It may be possible to channel or block the path of molten metals using kiln dried sand or similar; this may be available on site. In most circumstances it is best to allow the material to cool and move objects out of its way. This may involve establishing exclusion zones around the metal and its projected path.

Molten glass

Molten glass can be channelled by cooling the edges of the flow using a fine water spray, causing it to harden and changing its path.

Strategic actions

Fire and rescue services should:

- Carry out pre-planning site visits and inspections to gain risk information regarding industrial sites which have molten materials

Tactical actions

Incident commanders should:

- Liaise with the responsible person or specialist adviser, for information about the molten materials involved

- Identify the projected path of molten materials and take precautions to limit damage if safe to do so

- Establish cordons and exclusion zones around molten materials

- Allow molten metal to cool naturally wherever possible
Consider the use of kiln dried sand or similar to channel molten metal

Use fine water sprays to cool molten glass to channel the flow

Hazard - Animal facilities

Hazard Knowledge

Captive animals may be encountered in animal facilities including:

- Farms
- Veterinary facilities
- Boarding kennels and catteries
- Equine facilities - see supplementary information
- Zoos, aquariums and wildlife parks - see supplementary information
- Circuses
- Laboratories
- Abattoirs

Captive animals should be contained so that they do not come into contact with personnel.

The security features installed can present hazards, such as entrapment, electrocution or falls from height. The security features for captive animals may include:

- Self-locking gates
- Electrified fences
- Moats or ditches
- Protected walkways over enclosures

Control measure - Joint working at animal facilities
Control measure knowledge

Where the facilities contain dangerous animals, personnel should liaise with on-site staff to determine locations with potential hazards and to identify safe access and egress routes. Personnel should be accompanied by on-site staff and there should not be any lone working.

Personnel should remain vigilant, especially regarding security arrangements in animal facilities, to prevent themselves from being accidentally locked in cages or other areas. On-site CCTV may be used to monitor and assess any activity that could impact on fire and rescue service personnel.

Strategic actions

Fire and rescue services should:

- Establish joint working arrangements with animal facilities in their area
- Provide operational personnel with information to assist with familiarisation

Tactical actions

Incident commanders should:

- Liaise with the responsible person for the animal facility
- Refer to joint working arrangements for the animal facility
- Ensure personnel are accompanied by on-site staff for the animal facility
- Ensure there is no lone working in animal facilities
- Consider using CCTV, if available, to monitor the location and behaviour of animals
- Monitor and assess activity in the animal facility that could affect personnel
- Consider contingency arrangements that could be implemented quickly if personnel become...
isolated in unsafe areas of the animal facility

Hazard - Munitions

Hazard Knowledge

The term munitions includes:

- Firearms and other military weapons
- Ammunition, such as shells, cartridges or bullets

There is the potential for fire and rescue service personnel to encounter munitions. Although often associated with the military, munitions may be encountered in the form of guns, shells and cartridges at various locations, for example:

- Gun clubs
- Firing ranges
- Farms and rural environment
- Veterinary surgeons
- Military and defence establishments
- Police stations
- Zoos and wildlife parks
- Abattoirs
- Television and film production

The use and storage of firearms is regulated under the Firearms Rules, the Firearms (Scotland) Rules and the Firearms (Northern Ireland) Order. However, appropriate secure storage regulations may not always be adhered to. Munitions may be encountered in unexpected areas, as unspent cartridges, or where being stored in quantities that are above the allowed limit.

The use of munitions is normally within controlled environments such as a firing range; however they may also be used in the rural environment for hunting or gun sports. Exposure to live munitions may result in death or serious injury. Personnel could be exposed to loud noise if in the vicinity of live firing, particularly if the range is enclosed.

If involved in fire, munitions may pose a significant hazard to personnel and members of the public.
Control measure - Identify and control the hazard area around munitions

**Control measure knowledge**

The likelihood of the presence of and type of munitions will depend on the use of the site. An appropriate hazard area should be identified and controlled, in liaison with the responsible person; in the case of ranges or gun clubs this may be the range officer or chief range officer. Access into the hazard area should be prevented if live firing is taking place.

Firing ranges at military or defence establishments and gun clubs should be well-controlled, with clear signage and warning signals present. For example, at a Ministry of Defence range, red flags (during the day) and red lamps (during the night) are used when firing is taking place. Military ranges may be subject to bylaws; in the case of military and defence establishments a [Firing Notice](#) may be published online.

If fire and rescue service personnel are operating in the rural environment and suspect live firing is taking place, they should maintain situational awareness, try to make themselves known and withdraw to vehicles if necessary. Gather information about how to ensure the safety of fire and rescue service personnel before proceeding.

Unspent munitions should be avoided and not tampered with; report them immediately to the responsible person or range officer. Implement cordons and consider hazardous materials procedures for dealing with explosives.

**Strategic actions**

Fire and rescue services should:

- Ensure that information about sites with munitions and ranges is included in their Site-Specific Risk Information (SSRI)
- Carry out pre-planning and site inspections to identify and record the type, quantity and location of munitions that a site might hold
- Use site visits as an opportunity to discuss the likelihood of the presence of munitions

**Tactical actions**

Incident commanders should:
• Adhere to warning signs and signals - do not enter live ranges unless confirmation has been received from the range officer that firing has been stopped
• Liaise with the responsible person and identify the type, quantity and location of any munitions
• Liaise with the responsible person or range officer to cease firing if access to the range is required in an emergency
• Implement appropriate cordon distances, depending on type and size of the munitions
• Take action to protect or remove munitions at risk of fire
• Ensure fire and rescue personnel are wearing appropriate ear protection and high visibility clothing

Hazard - Explosives (including fireworks)

Hazard Knowledge

Explosives

Explosives may be found in bulk at factories, warehouses and other storage facilities. Explosives may be used at industrial sites including:

• Demolition sites
• Mines and quarries
• Military sites

The use and storage of explosives is strictly controlled, and they should be securely stored until the time of detonation.

With certain exceptions, an authorisation is required for the acquisition, keeping, transfer, storage and/or manufacture of explosives. See the Health and Safety Executive (HSE) website for further information on this topic.

Fireworks

Fireworks may be stored at and sold by wholesale or retail outlets. Fireworks are used by various industries including:

• Nightclubs
• Theatres
• Arenas and stadiums
• Festivals
• Theme parks and fairgrounds
• Circuses

For further information refer to the Health and Safety Executive (HSE) website about the storage and sale or fireworks, and the organising of firework displays.

Control measure - Identify and control the hazard area around fireworks

Control measure knowledge

The likelihood of the presence of and type of fireworks will depend on the use of the site. An appropriate hazard area should be identified and controlled, in liaison with the responsible person. It may be necessary to establish exclusion zones around fires involving fireworks.

Personnel should liaise with the responsible person to assess the safety of proceeding and request that any display or testing of fireworks is stopped.

Strategic actions

Fire and rescue services should:

• Ensure that information about sites that store, sell or develop fireworks are included in their SSRI

• Carry out pre-planning and site inspections to identify and record the type, quantity and location of fireworks that a site might hold

Tactical actions

Incident commanders should:

• Adhere to warning signs and signals during firework displays and at sites where fireworks are stored
• Liaise with the responsible person to identify the type, quantity and location of any fireworks present

• Liaise with the responsible person to stop any firework display or testing

• Implement appropriate cordon distances for fireworks in liaison with the responsible person

• Take action to protect or remove fireworks at risk from fire

• Ensure personnel wear appropriate hearing protection and high-visibility clothing when entering the hazard area