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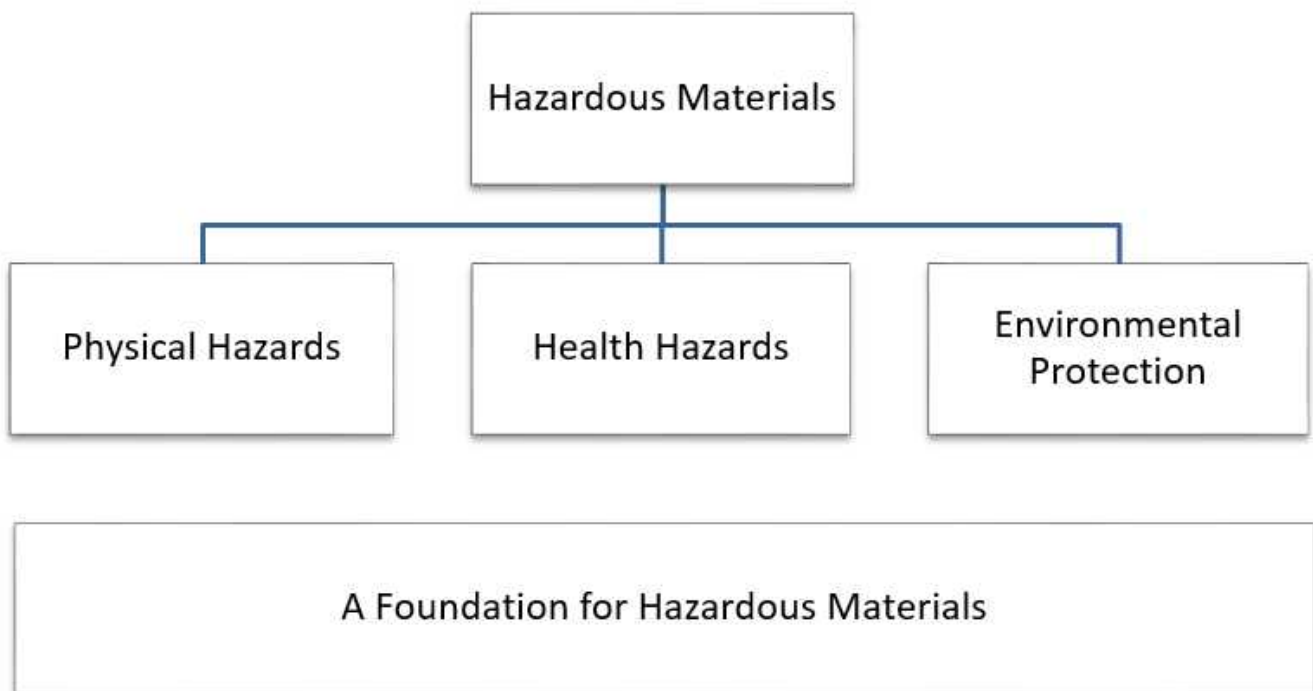


Introduction

This section of guidance examines the hazards encountered by fire and rescue service personnel, other responders and members of the public at hazardous materials incidents. It contains hazard and control measure knowledge relevant to generic hazardous materials incidents, rather than specific types of incident such as a spillage of a corrosive acid. Material specific guidance is covered in the National Operational Guidance for [Physical hazards](#) and for [Health hazards](#).

The fire and rescue service responds to a wide range of incidents involving hazardous materials that have the potential to cause harm to firefighters, other responding agencies, the surrounding community, animals and the environment. They may be called specifically to deal with emergency spillages or releases, or they may encounter hazardous materials at fires and other emergency incidents.

This guidance does not give information on the specific hazards and control measures relating to environmental protection. Although they are integral to any hazardous materials response, they are covered separately in National Operational Guidance: [Environmental protection](#).



The operational principles for resolving hazardous materials incidents are essentially the same for accidental, deliberate, malicious or terrorist events. However, terrorist or Chemical, Biological, Radiological, Nuclear (Explosive) events (CBRN(e)) require a more specific response because of:

- Increased security measures
- Increased risks to fire and rescue service personnel
- Complexity of multi-agency working
- Potential for multiple events caused by secondary devices
- Potential for perpetrators to use virulent agents that may be both persistent and difficult to identify
- Potential to change, remove or conceal safety signage and material information
- Potential to select locations that exploit the characteristics of the agent
- Need to exchange information with off-site intelligence and scientific advisers
- Potential for increased public exposure



Relevant knowledge

The term 'Hazardous materials' (also referred to as a HazMat or as dangerous/hazardous substances or goods) means solids, liquids, vapours or gases that can harm people, animals, other living organisms, property or the environment. They include materials that are:

- Toxic
- Radioactive
- Flammable
- Explosive
- Corrosive
- Oxidisers
- Asphyxiates
- Biohazards

It also includes materials with physical conditions or other characteristics that render them hazardous in specific circumstances, such as compressed gases and liquids, hot or cold materials. Other organisations and agencies may use more technical and specific definitions because of their own requirements, but the above definition is the most appropriate for fire and rescue services on which to base their risk assessments and planning assumptions.

A clear distinction relating to hazardous material operations that needs to be understood before using this guidance is the difference between 'contamination' and 'exposure':

Contamination occurs when a substance adheres to or is deposited on people, animals, equipment or the environment, creating a risk of exposure and possible injury or harm. Contamination does not automatically lead to exposure but may do so.

Exposure occurs when a harmful substance enters the body through a route, for example, inhalation, ingestion, absorption or injection, or when the body is irradiated.

Due to the technical nature of hazardous materials operations, fire and rescue services must ensure their responders have access to the appropriate advice, equipment, skills, knowledge and understanding to maintain safety.

Specific hazardous materials roles may also be required in fire and rescue services to support and manage their hazardous materials response. These may include a hazardous materials adviser (HMA), decontamination director, mass decontamination subject matter adviser (SMA) or tactical adviser (TacAd). The number, type and specification of these roles will vary according to the fire and rescue service's risk profile, risk management plan, equipment and appliances.

It should be noted that the term hazardous materials adviser (HMA) is a generic description for anybody with enhanced knowledge of emergency hazardous materials operations used by a fire and rescue service to provide independent specialist advice to the incident commander. It includes such roles as the hazardous materials officer, hazardous materials and environmental protection officer/adviser (HMEPO, HMEPA) and scientific adviser. Their primary functions are to:

- Gather, filter and interpret technical information on hazardous materials for the incident commander
- Assess the risks posed by emergency hazardous materials incidents
- Provide hazardous materials advice on the development of an incident plan which may be at a tactical or strategic level

Hazardous materials incidents are predominantly accidental, frequently involve human error, natural or technological causes. The fire and rescue service will usually lead on this type of incident.

The key difference between a hazardous materials incident and a CBRN(e) event involving deliberate, criminal, malicious or murderous intent is that the latter is declared by the police, who will co-ordinate the multi-agency response. Many possible scenarios could lead to an incident being identified as a suspected or confirmed CBRN(e) event.

If during an incident, the release or spill of hazardous materials is confirmed as accidental then the incident will be reclassified as one involving hazardous materials. Incidents involving biological infections that are not spontaneous are also classified as hazardous materials incidents. The challenges posed and the response requirement for deliberate CBRN(e) and accidental HazMat incidents differ, but are similar or the same in many respects. For that reason, some of the information contained within this document is equally applicable to both situations and can be implemented for all levels of incident. Similarities in response include:

- The requirement for a broad response process involving numerous organisations working together to bring the incident to conclusion
- Multi-agency decision making to enable the development and implementation of integrated response plans
- The need to protect the safety of emergency responders to enable them to carry out those plans



Initial operational response (IOR)

The guidance for initial operational response (IOR) is applicable to all hazardous materials incidents. CBRN(e) incidents are exceptional in their nature and so guidance has been created in the light of developments in scientific understanding and lessons learned from exercises and real incidents. It is based on initial operational response to a CBRN incident published by the Home Office.

The focus of the initial operational response to a suspected or confirmed CBRN(e) incident is to save as many lives as possible. To do this, the emergency services must be aware of their roles and responsibilities and what they can do to save lives in an effective and timely way.

The response to any incident begins with the very first call to the emergency services. However, the role of the call handler, supervisor or first responder is even more important when identifying a potential CBRN(e) incident as it will be crucial to provide correct and simple advice to the caller, while at the same time dispatching or mobilising the right resources, with sufficient information, to the right location as quickly and as safely as possible.

Advice given to the public by fire control room staff and first responders should take the form of three key actions:

- Remove yourself from the immediate area
- Remove outer or affected clothing
- Remove the substance

First responders arriving at the scene must then work together quickly and efficiently to save life. This will begin with the initial operational response (IOR).

The IOR is the start of a contamination incident response and is an extension of the 'Step 1-2-3 Plus -Safety Triggers for Emergency Personnel' process. The non-specialist first responder(s) are expected to begin life saving activities within 15 minutes of arrival at a scene and to manage the scene until further assistance arrives.

The first responders should work together quickly and efficiently to save lives, including conducting a joint understanding of risk (JUR) to inform multi-agency decision making, achieve a safe multi-agency response and deliver an effective resolution to the incident for the public and emergency responders.



Specialist operational response (SOR)

Under certain circumstances the initial operational response (IOR) may move to an advanced specialist operational response (SOR), passing over all current information from the scene. The IOR may be required to stay at the scene if requested.

The specialist operational response are CBRN(e) specialist responders who arrive at the scene later to instigate command, control, co-ordination and perform necessary tasks within the contaminated (hot or warm) zone.

Research has indicated that a rapid response is critical to save lives following a CBRN(e) incident. Specific actions, including removing casualties from an area of gross contamination and removing their outer clothing during the first 15 minutes can save life and can be achieved without putting emergency service responders at undue risk of exposure.

Further information on the transition from an initial operational response to a specialist operational response can be found in [Responding to a CBRN\(e\) event: Joint operating principles for the emergency services, JESIP, 2016](#).



Chemical, Biological, Radiological, Nuclear, and Explosive: CBRN(e)

CBRN(e) terrorism is defined as “the actual or threatened dispersal of CBRN materials (either on their own or in combination, or with explosives) with deliberate criminal, malicious or murderous intent”.

CBRN terrorist attacks may depend on an explosive device for dispersal. Much of the activity to control access to explosive materials complements the government’s work to control access to CBRN(e) materials.

Fire and rescue services do not engage directly with or undertake actions involving explosives in this context. The support mechanisms they provide and the expectations on them have led to the CBRN title being changed to CBRN(e): Chemical, Biological, Radiological, Nuclear (Explosives). Fire and rescue service crews are likely to be the first emergency resource deployed to a CBRN(e) incident. First (initial) responders are unlikely to be trained in specialist CBRN(e) response or have

access to CBRN(e) specific personal protective equipment (PPE).

There may be a significant number of casualties. The casualties may deteriorate rapidly or suffer life threatening effects if they are not evacuated from the contaminated environment quickly. Prompt actions and clinical interventions, however basic, provided as part of the initial operational response (IOR) by first responders or soon after can reasonably be expected to improve patient outcomes and reduce the number of fatalities.

Incident commanders should consider the potential for further scenes to be identified and that the specialist operational response (SOR) resources may be called on to support the police. Competing demands on the specialist resources means that their use may need to be prioritised until further support arrives.

There are distinct differences between the responses to a hazardous materials incident and a CBRN(e) attack, consideration should be given to the following when responding to a CBRN(e) incident:

- The potential for further attacks and the involvement of other devices
- The need for the early collection and effective exploitation of forensic data
- The potential opportunity to apprehend perpetrators at or close to the scene

Due to these differences, the response to a CBRN(e) will involve an immediate, co-ordinated, multi-agency response, which may require:

- Concurrent investigations
- Access to specialist advice
- A clear and consistent media and public reassurance strategy and customised procedures
- Plans, training and equipment to protect responders
- Help in detection or categorisation of the substance involved
- Evacuation of the public
- The decontamination of those contaminated and the management of fatalities

Emergency services CBRN(e) response framework

The emergency services and other responder organisations have an agreed framework in place on which to base robust, efficient and effective planning to respond to suspected or confirmed CBRN(e) incidents.

The specific aims of the framework are to ensure that responders can:

- Minimise loss of life and injury to the public (i.e. management of casualties at the scene) and the risk to other emergency responders
- Make the scene safe and secure (i.e. creation of an outer and inner cordon) to protect the population and preserve any evidence at the scene
- Support and enable the handover of wider investigation activities, including forensics
- Support and enable the handover to wider consequence management (e.g. off-site casualty management)
- Support and enable handover to wider recovery clean-up activities

Strategic objectives for a combined response to a CBRN(e) incident

Irrespective of the responsibilities of individual organisations and agencies responding to the incident, the strategic intention is to co-ordinate effective multi-agency activity to:

- Preserve and protect lives
- Mitigate and minimise the impact of an incident
- Inform the public and maintain public confidence
- Prevent, deter and detect crime

- Assist in the early return to normality (or as near to it as can reasonably be achieved)

Additional objectives from these principles are to:

- Ensure the health and safety of all those responding to a CBRN(e) incident
- Safeguard the environment
- Enable judicial, public, technical or other enquiries to take place
- Evaluate the response and identify lessons to be learned

There are seven key criteria for the development of an effective response and these should be considered by fire and rescue services when developing their plans:

- ROBUST – prepared for the worst
- PROPORTIONATE – informed by risk
- FLEXIBLE – will work or can be easily adapted to work in a wide range of circumstances
- SCALABLE – can cope with small, medium and large incidents
- INTEROPERABLE – response organisations working effectively together
- EFFECTIVE/TIMELY – the right activities, when needed
- REALISTIC – that it can be achieved

There may be a requirement for specialist resources to carry out scene assessment and hazard monitoring activities as part of an ongoing emergency services and wider community safety plan once life-saving activity has been completed. Where this is the case, any further deployments into hazard zones will be carefully planned and subject to deliberate allocation of tasks against specific objectives.

For future information see: [Defence Chemical Biological Radiological and Nuclear Centre](#)



Foundation material

Foundation material to enable fire and rescue service personnel to develop competence in

hazardous materials operations includes:

[A foundation for hazardous materials](#), 2018, NOGP

[The environmental protection handbook for the fire and rescue service](#), 2013, EA

[Initial operational response to a CBRN incident](#), 2015, Home Office

[Responding to A CBRN\(e\) Event: Joint Operating Principles for the Emergency Services](#), First Edition, September 2016

[The Dangerous Goods Emergency Action Code List](#), 2017, NCEC, TSO.

[The emergency response guidebook 2016 \(ERG\)](#), 2016, US Department of Transportation



Legislation

A hazardous materials response can be complicated by numerous pieces of legislation and regulation. In the main, these are the responsibility of those who produce, transport, use or store the substances. However, some do relate directly to the fire and rescue service:

[Fire and Rescue Services Act](#)

[Fire \(Scotland\) Act](#)

[Fire and Rescue Services \(Northern Ireland\) Order](#)

[Fire and Rescue Services \(Emergencies\) \(England\) Order](#)

[Fire and Rescue Services \(Emergencies\) \(Wales\) Order](#)

[Fire \(Additional Function\) Scotland Order](#)

[Fire and Rescue Services \(Emergencies\) \(Northern Ireland\) Order](#)

[The Civil Contingencies Act](#)

[The Civil Contingencies Act \(Contingency Planning\) Regulations](#)

[The Civil Contingencies Act \(Contingency Planning\) \(Scotland\) Regulations](#)

[The Civil Contingencies Act \(Contingency Planning\) \(Amendment\) Regulations](#)

[The Health and Safety at Work etc. Act](#)

[Health and Safety at Work \(Northern Ireland\) Order](#)

[Management of Health and Safety at Work Regulations](#)

[Management of Health and Safety at Work Regulations \(Northern Ireland\)](#)

[The Personal Protective Equipment at Work Regulations](#)

[Personal Protective Equipment at Work Regulations \(Northern Ireland\)](#)

[Personal Protective Equipment Regulations](#)

[The Dangerous Substances and Explosive Atmospheres Regulations](#)

[Dangerous Substances and Explosive Atmospheres Regulations \(Northern Ireland\)](#)

[Confined Spaces Regulations](#)

[Confined Spaces Regulations \(Northern Ireland\)](#)

[The Provision and Use of Work Equipment Regulations](#)

[Provision and Use of Work Equipment Regulations \(Northern Ireland\)](#)

[Control of Substances Hazardous to Health Regulations \(COSHH\)](#)

[The Control of Asbestos Regulations](#)

[The Control of Asbestos Regulations \(Northern Ireland\)](#)

[Control of Lead at Work Regulations](#)

[Control of Lead at Work Regulations \(Northern Ireland\)](#)

[The Ionising Radiation Regulations \(IRR\)](#)

[Ionising Radiations Regulations \(Northern Ireland\)](#)

[The Radiation \(Emergency Preparedness and Public Information\) Regulations](#)

[Radiation \(Emergency Preparedness and Public Information\) Regulations \(Northern Ireland\)](#)

[The Control of Major Accident Hazards Regulations \(COMAH\)](#)

[Control of Major Accident Hazard Regulations \(Northern Ireland\)](#)

[Notification and marking of sites regulations \(NAMOS\)](#)

[Water Industry Act](#)

[Water Resources Act](#)

[Water Act](#)

[Water Act \(Scotland\)](#)

[The Water and Sewerage Services \(Northern Ireland\) Order](#)

[The Groundwater Regulations](#)

[Environmental Protection Act](#)

[Special Waste Regulations](#)

[Hazardous Waste \(England and Wales\) Regulations](#)

[Environmental Permitting \(England and Wales\) \(Amendment\) \(No. 2\) Regulations](#)

[The Environmental Damage \(Prevention and Remediation\) \(England\) Regulations](#)

[The Environmental Damage \(Prevention and Remediation\) \(Wales\) Regulations](#)

[Environmental Liability \(Scotland\) Regulations](#)

[The Environmental Liability \(Prevention and Remediation\) Regulations \(Northern Ireland\)](#)

[The Groundwater Regulations \(Northern Ireland\)](#)

[The Environmental Information Regulations](#)

[The Environmental Information \(Scotland\) Regulations](#)

[The Pipelines Safety Regulations](#)

[Pipelines Safety Regulations \(Northern Ireland\)](#)

[The Air Navigation Order](#)

[The Air Navigation \(Dangerous Goods\) \(Amended\) Regulations](#)

The following legislation and regulation place duties and responsibilities on the hazardous materials industry:

[ADR \(European agreement concerning the International Carriage of Dangerous Goods by Road\)](#)

[RID \(European agreement concerning the International Carriage of Dangerous Goods by Rail\)](#)

[ADN \(European agreement concerning the International Carriage of Dangerous Goods by Inland Waterways\)](#)

[Dangerous Goods Regulations - International Air Transport Association \(IATA\)](#)

[International Maritime Dangerous Goods \(IMDG\) Code](#)

[Registration, Evaluation, Authorisation & restriction of Chemicals Regulations \(REACH\)](#)

[The Carriage of Dangerous Goods and Use of Transportable Pressure Equipment Regulations \(CDG\)](#)

[European Regulation \(EC\) No 1272/2008 on classification, labelling and packaging of substances and mixtures \(CLB\)](#)

[Radioactive Material \(Road Transport\) \(Great Britain\) Regulations \(RAM Road\)](#)

[Packaging Labelling and Carriage of Radioactive Materials by Rail Regulations](#)

[Explosive Regulations](#)

[The Dangerous Goods in Harbour Areas Regulations](#)

NOTE. It is important for fire and rescue services to have personnel with specialist knowledge about hazardous materials to ensure that legal provisions designed to keep the community and responders safe are recognised, understood and maintained.



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 mitigate 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 service should ensure their policies, procedure and training covers all of the hazards and controls contained within this guidance.



Risk management plan

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

emergencies occurring in their area.

Work to identify specific hazardous materials risks and prepare operational plans should be carried out with regard to all stakeholders, including local emergency planning groups and the fire and rescue service's risk management plan.

Personnel who may be exposed to hazardous materials must be provided with suitable and sufficient information, instruction and training on:

- Possible risks to their health
- Precautions that must be taken
- Proper use of control measures