



National
Operational
Guidance

Hazard

**Compromised investigations and
scene preservation: Fires**



NFCC

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Hazard - Compromised investigations and scene preservation: Fires

Hazard Knowledge

See National Operational Guidance: Operations- [Compromised investigations and scene preservation](#)

At any time during and after an operational incident there may be the need to carry out some form of investigation. This may be because of an adverse health and safety event, suspected criminal activity or a statutory body carrying out their duties. The need to preserve evidence and secure a scene when responding to a fire is a concern as operational activities and the fire's development may destroy evidence that is crucial to the effective investigation of an incident.

Evidence can take many forms, from broken glass at the point of entry to twisted or scrunched paper used as an initiating fuel papers and/or flammable material piled in the scene, petrol cans or other containers with strong odours or fingerprints left on items damaged at, or brought into, a fire scene.

In some instances, fire may be used specifically to destroy evidence; for example, forensic evidence, vehicles, machinery, documentation or stock in commercial premises. The way in which the fire was started or the presence of multiple seats of fire be potential evidence.

Fingerprints can withstand the effects of indirect heat and water contamination; fingerprints will remain on objects such as bottles, containers and papers even when covered with soot. Authorised personnel entering the fire scene should therefore avoid touching or moving items with bare hands. Items should not be moved or handled until a police crime scene investigator or fire investigator has assessed these items in situ.

Damping down operations can damage potential evidence at a fire scene. Damping down operations should therefore be managed and controlled to address hot spots using the least physically intrusive methods possible to cool specific areas. For example, a hose reel, with the branch set to spray, using the lowest pressure possible, should be used to gently cool the targeted hot spot.



Control measure - Secure the scene for



investigation

Control measure knowledge

Securing the scene and preserving evidence should commence immediately if doing so does not affect safety or the successful conclusion of an incident. Incident commanders should achieve scene security and evidence preservation by establishing and maintaining cordon controls.

Incident commanders should use cordons to keep the public out and maintain control within the inner cordon. A cordon should start as large as practicable until such a time as resources can be released from a scene and the size of the cordon reduced. The police crime scene investigators may search the inner cordon to ensure that any potential evidence is recovered. Other agencies may wish the cordon to be of a specific configuration; incident commanders should liaise with them and balance safety concerns with the needs of investigating agencies.

Only authorised personnel should enter the scene and a clear common approach path must be used for all authorised personnel to protect physical evidence and prevent cross-contamination. Keeping a record of any 'foreign objects' taken into the scene by personnel may help to eliminate such items from an investigation.

If there are any doubts about the cause, requests (after the operational phase of the incident has been concluded) to allow occupiers or others to enter a property or access a vehicle should be considered carefully. If allowed, the person must be accompanied and supervised and the actions/people/locations recorded.

Personnel need to be aware that scene preservation will be necessary to enable other organisations to investigate an incident fully. Fire and rescue services should ensure that only personnel required to deal with the incident access the site and that any necessary movement of casualties, objects and wreckage is minimised.

When fire and rescue service operations are complete, the responsibility for the security of an incident, property and contents will pass to the police or statutory investigation team.

Early liaison to establish the requirements of the statutory investigation team is required. However, the control of the scene should not interfere with any lifesaving activities or fire and rescue service statutory duties.

It is important to control the number of people allowed on the incident site so that evidence such as personal effects are not disturbed, or are disturbed as little as possible. When the situation permits, there should be a careful withdrawal of all non-essential personnel and equipment.



The police may be required to take control of cordons after they are established, and maintain scene logs.

Strategic actions

Fire and rescue services should:

- Procure equipment or other supplies that may assist with securing the scene
- Have a record of the equipment issued to personnel, so that it can be eliminated from an investigation

Tactical actions

Incident commanders should:

- Secure the scene to ensure evidence is preserved for internal and external investigations
- Inform all personnel of known or likely areas of interest for fire or criminal investigation, so that these can be avoided
- Minimise the number of personnel allowed into the scene
- Minimise the potential for 'foreign objects' to be taken into the scene
- Preserve the scene for future investigations
- Hand over responsibility for the security of premises and removed items to the responsible person or the police



Control measure - Preserve evidence for investigation



Control measure knowledge

Fires, floods or other emergencies can destroy or significantly alter structures, vehicles and objects; key evidence may be lost before the fire and rescue service arrives.

An ongoing incident and the actions of responders can affect evidence required for an investigation. The aim of personnel should be to ensure evidence is not destroyed or disturbed where possible. On arrival, consideration should be given to:

- How fire and rescue service activity may affect any subsequent investigation
- Identifying and prioritising the preservation of evidence that may deteriorate
- Minimising contamination of the scene

If the scene needs to be examined as part of a criminal investigation, it should be carefully preserved to protect evidence. The unintended consequence of simple actions such as washing down equipment after an incident may destroy or damage evidence.

Where evidence cannot be preserved physically, information to support investigations should be captured in other forms. For example, physical evidence noted on arrival, such as broken windows or suspected remains of incendiary devices, should be documented and photographed if feasible.

Once in attendance, the fire and rescue service can ensure that as much evidence as possible is preserved. Identify potential evidence and take steps to preserve or retrieve it where it may be lost during operations. It may be appropriate for the task of collecting physical evidence to be allocated to a police crime scene investigator or fire and rescue service investigator.

It may be necessary to cover windows, doorways or other apertures that allow people to see into the scene inside a building or other structure. For other types of incident scenes, the use of tarpaulins may help to preserve evidence from exposure to the elements.

The decision to leave identified physical evidence at the scene should be carefully considered. To assist with an investigation, if it is essential to move anything, a record of observations should be kept, including details of actions taken and the reason for doing so.

If evidence may be lost if left in place, the fire and rescue service should consider seizing it. There should be a secure storage area in which to keep it, and service procedures for its collection and handling.

Care is needed where insurance claims may be made, as ownership of the property may transfer to the insurance company.

Incident commanders should confirm:



- All information relating to the incident
- Age, gender, name and contact details of the deceased, casualties and witnesses
- Whether life has been confirmed extinct if there is a deceased casualty at the scene
- Details of any agencies in attendance, such as utility companies
- Information recorded by the entry control operative, if required
- Entry route and tactical methods used to effect entry
- Doors and windows open or broken at the time of the incident
- Emergency fire and rescue service vehicle call signs
- Whether personnel have recently attended similar incidents, in case of cross-contamination

Other sources of information, may include:

- CCTV footage from:
 - Emergency responder vehicles
 - Body worn cameras
 - Buildings
 - Control rooms
- Fire or intruder alarm systems at the scene, including any remote, offsite recording systems
- Photographs, videos or voice recordings of the incident, including those:
 - Captured by personnel
 - Captured by witnesses
 - Downloaded to local news sites or social media sites

Recovery of casualties and their personal property

If surviving or deceased casualties need to be moved or removed, care should be taken to ensure that their personal property is kept with them. If this is not possible, a record should be kept of the location of items; it may be useful to photograph the items before the casualty is recovered.

The positions of deceased casualties are extremely important for identification purposes and to help establish cause of death. The removal of bodies should only be carried out under the direction of the police or statutory investigation team.

However, removing the bodies before the arrival of investigation teams or medical teams may be necessary to rescue other casualties, or to prevent the bodies being destroyed by fire or other event. Where this is the case, the position of the body and its location should be noted, labelled if possible and reported to the investigation team.

Personnel who have moved bodies should be questioned and make a statement as soon as possible after the incident, to improve the accuracy of their recall. Whenever possible, an officer should be appointed to map out as accurately as possible the location and position of bodies, bearing in mind that some incidents, may result in them being distributed over a wide area.

Any personal property that fall from the casualty or body while they are being moved should be collected, recorded and kept with the casualty or body if possible, as it may prove to be a means of identification.

Bodies that have been badly burnt become brittle and require careful handling by trained personnel so as to avoid vital evidence of identification or cause of death being destroyed.

It may be useful for photographs or video to be taken of the scene of the incident and the position of the bodies. This can also assist in debriefing purposes.

Strategic actions

Fire and rescue services should:

- Develop a joint understanding with other emergency services and agencies regarding the actions required to preserve evidence at the scene of an incident
- Provide equipment or other supplies that may assist personnel in preserving evidence
- Have the ability to securely collect and store any seized evidence

Tactical actions

Incident commanders should:

- Consider preservation of evidence when planning, communicating and implementing tactics
- Consider requesting assistance from a police crime scene investigator or fire and rescue service investigator for collecting physical evidence
- Consider moving physical evidence to a safe place, away from the effects of the fire or firefighting
- Consider seizing evidence if it may be lost if left in place
- Avoid movement of dials, valves and controls or record original position for investigation purposes



- Gather and record information about physical evidence
- Note issues relating to cordons or physical evidence in the decision log
- Notify investigators if personnel have recently attended similar incidents, which could result in cross-contamination of an investigation scene



Control measure - Closed-circuit television

Control measure knowledge

Closed-circuit television (CCTV) systems can assist fire and rescue services at many stages of an incident including:

- Providing fire control rooms or personnel en route to an incident with additional information about its type, size and location
- Providing personnel with information about the area near to the incident, for example:
 - Traffic conditions
 - Presence of people
 - Presence of animals
 - Presence of other emergency responders
- Providing an incident commander with additional information to improve situational awareness, even if they are remote to the incident
- Assisting with post-incident investigation
- Improvement in operational learning

There are many types of CCTV systems, with various capabilities. They are mainly used to ensure the safety and security of premises, people and property, and may be found at locations including:

- Commercial and residential buildings
- Roadways and pedestrian walkways
- Public transport vehicles
- Emergency responder vehicles

CCTV cameras can also be worn by:

- Emergency responders
- Security guards

- Bailiffs
- Military personnel

Cameras may be linked to networks or recording facilities, and systems may be monitored by dedicated CCTV control rooms; these may be located in individual premises or at remote locations. The control room may be able to broadcast live or recorded imagery to other users, regardless of their location. CCTV control rooms are often able to adjust the views of individual cameras.

For larger incidents, or in areas with difficult or dangerous terrain such as wildfire incidents, it may be appropriate to use CCTV equipment attached to aerial vehicles such as helicopters, fixed-wing aircraft or drones (classified as a type of [unmanned aircraft](#) by the Civil Aviation Authority).

Some CCTV may be able to provide images in radiation spectrums, including infrared, which could provide helpful information in reduced visibility.

CCTV systems that are fitted to fire and rescue service vehicles, or body worn cameras, may act as a deterrent or be useful in capturing evidence; this could include instances of verbal abuse, physical attacks or road traffic collisions.

Arrangements should be made with local CCTV system operators during pre-incident planning, so that requests for their assistance during an incident can be handled efficiently.

Strategic actions

Fire and rescue services should:

- Make appropriate arrangements with CCTV system operators and know how to request their assistance
- Consider using vehicle and body worn cameras

Tactical actions

Fire control personnel should:

- Consider using CCTV to gather additional information about the incident or its location, and pass relevant information to the incident commander

Incident commanders should:

- Request access to CCTV footage or to the information gathered through use of CCTV systems
- Consider requesting the assistance of aerial CCTV resources
- Consider using CCTV to assist with mobilising to the incident
- Consider using CCTV to inform situational awareness
- Access and secure CCTV footage for investigations
- Consider using CCTV footage to help inform operational learning



Control measure - Powers of entry to investigate

Control measure knowledge

It is important that personnel are aware of the powers available to them to support their role in the investigative process.

UK legislation affords authorised firefighters the power to enter premises for investigating the cause and development of a fire and, where necessary, to seize and remove material.

Where fire and rescue services are requested to aid police investigating a fire scene, there should be clear local guidance and procedures for arrangements regarding powers of entry.

The police will investigate fires believed to be suspicious or deliberate. Identifying the cause of the fire will usually be a necessary and important part of their investigation but their primary aim is to identify those responsible for the offence(s).

Strategic actions

Fire and rescue services should:

- Provide policy, guidance, equipment and training to support the use of powers of entry to

investigate a fire

- Establish memorandums of understanding with external agencies to support joint working during investigation

Tactical actions

Incident commanders should:

- Provide appropriate notice to gain access to investigate a fire scene
- Consider the use powers of entry detailed in the Fire Service Act 2004 (England and Wales) Fire (Scotland) Act 2005, or The Fire and Rescue Services (Northern Ireland) order 2006 to investigate a fire scene



Control measure - Investigation: Fires and firefighting

Control measure knowledge

Scenes encountered by post-fire investigators range in their size and complexity and a 'one size fits all' approach will not be sufficient.

This requires a means for fire and rescue services to plan for, and respond to, a wide range of investigation scenes.

Levels of fire investigation

There are three levels of investigation:

- Level one: basic fire investigations
- Level two: intermediate fire and explosion (non-terrorist) investigations
- Level three: advanced fire and explosion (including terrorist) investigations

Level one: basic fire investigations



This category refers to what is considered typical fire investigation, generally carried out for completing the Incident Recording System (IRS). In the absence of any earlier indicators, it is also a chance to assess the fire for suspicious or unusual features that may be of interest to other agencies, or offer chances for future learning. This will usually be completed by the attending incident commander and not require the use of specialist fire investigation knowledge or equipment.

Level two: intermediate fire and explosion (non-terrorist) investigations

In general terms, this is an investigation that requires a greater degree of knowledge or control than level one, but that can be managed by use of internal resources. Typically, these investigations will be carried out by a specialist fire investigation team comprising experienced fire officers from the local fire and rescue service.

Level three: advanced fire and explosion (including terrorist) investigations.

In broad terms, due to its complexity or seriousness, this investigation requires the involvement of additional resources, either of a specialist nature (forensic scientist or product specialist) or of a neutral party to oversee or carry out the investigation (for example where there may be a claim or criticism of the host service). At level three, there will almost always be a multi-agency investigation, which will usually involve specialist fire investigation team members.

Most fire and rescue services have two types of investigators; operational crews and a specialist fire investigation team (either full-time or as a bolt-on role for officers in the flexible duty system). The latter work on both level two and level three scenes and will act in accordance with their organisational remit and personal competence.

Other considerations

As well as identifying the level, there will be other areas to consider in how to approach an investigation, including the interest, powers and role of other agencies.

When undertaking fire investigation, it is the responsibility of the fire investigator to ensure that the investigative process follows a logical framework and that all fire investigations are approached without presumption of the origin, cause or responsibility for the incident until the scientific method has yielded a provable hypothesis.

This is achieved by following a series of logical steps:

- Step one: recognises that a problem exists in the case of fire investigation where a fire or explosion has occurred
- Step two: defines the problem, which involves identifying the cause of the fire or explosion
- Step three: the scene is examined and facts are collected; this will require collecting data and



gathering information from witnesses

- Step four: the data is analysed; this analysis is based on the knowledge, training and experience of the investigator and if the investigating officer lacks the necessary skills or training they must seek assistance
- Step five: the investigator produces a hypothesis or hypotheses based on an analysis of the data
- Step six: the investigator tests the hypothesis to ensure it can withstand examination, possibly in a court of law
- Step seven: the investigator selects a final hypothesis

Strategic actions

Fire and rescue services should:

- Develop tactical guidance and support arrangements for the actions to take in carrying out fire investigation, in consultation with partner emergency services and agencies,
- Develop systems and processes to enable sharing relevant information related to the occurrence of fires of special interest

Tactical actions

Incident commanders should:

- Carry out fire investigations at a level appropriate to the scale of the incident



Control measure - Thermal imaging or scanning

Control measure knowledge

Thermal imaging cameras (TIC) and other thermal scanning equipment are devices that form an image using emitted infrared radiation as opposed to normal visible radiation. They gather information when normal observation may be inhibited due to smoke or lack of lighting. They also provide the option to search for specific points of interest such as casualties or seats of fire, which may not be obviously visible through the normal spectrum. In some situations, firespread may not be visible to the naked eye, but may be detected using TICs.



The range of thermal image cameras available is wide and they have varying specifications. However, many cameras have a numerical and colour gradient temperature scale, which may assist crews attempting to locate a fire and any causalities or for thermal scanning of a building.

The heat energy radiated from the objects in the form of infrared waves is picked up by the TIC, which is then able to identify the energy differences from the objects being scanned and convert the readings into visual images. The image displayed is therefore based on temperature differential.

Images may be displayed in black and white or in a colour range. The TIC manufacturer's information should be referred to for descriptions of how higher or hotter temperatures will be displayed on their equipment.

TICs are available in different sizes and as an integral part of a number of different resources:

- Hand-held
- Helmet-mounted
- Emergency fire vehicle-mounted
- Self-contained
- Remote-controlled
- Aircraft-mounted (helicopter, drone and aeroplane)

Thermal imaging equipment can offer considerable benefits to incident commanders during the information gathering stage of an incident, including:

- Establishing possible seats of fire
- Establishing the extent of firespread
- Establishing internal fire conditions and assessing the need for defensive or offensive action
- Searching for casualties inside a structure
- Wider search for casualties (during road traffic collisions, aircraft crashes, railway incidents, incidents in the open)
- Improved search capability during low light or low visibility
- Locating the seat of fire in large fuel supplies (for example in landfill or waste management centres)
- Locating hot spots, bullseyes, small areas of combustion or heating
- Establishing heat spread to adjacent hazards and fuel supplies
- Establishing sources of overheating in electrical or mechanical scenarios (for example lighting chokes, vehicle brakes)
- Establishing compromises or weaknesses in fire resistance
- Locating hot spots in cylinders, vessels or pipework
- Recording images and videos, which can assist subsequent investigations or debriefs
- Assisting the incident commander via video link to command and control units



Operators of thermal imaging cameras should be aware that:

- The equipment may not be intrinsically safe, limiting its use in some hazardous environments
- Some surfaces can reflect or absorb infrared radiation, causing images to be misleading to an operator. For example, the devices often depict areas of the same temperature in the same shade or colour. This can obscure some hazards such as pits, surface liquid or unsafe ground which may be dangerous for operators in that area
- Equipment using a different spectrum should not be relied on as a total replacement for normal vision. Standard service procedures for moving in smoke and darkness must be maintained and great care should be taken to ensure that personnel remain safe because battery power may be lost rapidly with little warning
- Images displayed on the devices are computerised images created from the sensor equipment. Allowances should therefore be made for alterations to the actual size and distances involved for the objects on display
- Images may be misleading as sensors may not differentiate between the heat of a fire versus the reflected heat from the sun on surfaces such as glass or polished metal. Well-insulated structures (e.g. sandwich panelled premises) do not readily allow for the passage of infrared radiation. Using a TIC may therefore indicate weaknesses in a structure but may not give any indication as to the conditions within it.

A [video](#) developed by Greater Manchester Fire and Rescue Service shows the use of thermal scanning as part of its future firefighting techniques programme.

Strategic actions

Fire and rescue services should:

- Develop tactical guidance and support arrangements for the actions to take, and hazards associated, with the use of thermal image cameras
- Consider using thermal image cameras with video link facilities
- Ensure all personnel receive information, instruction and training in the use and limitations of thermal imaging equipment

Tactical actions

Incident commanders should:

- Consider using a range of thermal imaging resources such as aerial appliances, drones and helicopters
- Consider using thermal imaging equipment for scanning when carrying out a scene survey



- Adopt a systematic approach when using thermal imaging cameras to scan and search an area



Control measure - Personal protective equipment

Control measure knowledge

Personal protective equipment (PPE) is used to protect personnel against health or safety risks. It includes items such as:

- Helmets
- Gloves
- Eye protection
- High-visibility clothing
- Safety footwear

Equipment such as chemical protective clothing (CPC), respiratory protective equipment (RPE) and safety harnesses are also types of PPE and are covered in more detail elsewhere in guidance. PPE should be regarded as a last resort if risks to health and safety cannot be adequately controlled in other ways. To avoid unsuitable selection, fire and rescue service risk assessments should define the specific PPE required for an activity.

If more than one item of PPE is to be worn, they must be compatible with each other and adequately control the risks when used together. PPE must be maintained in good working order and properly stored when not in use. Personnel should use PPE in accordance with the training they have received and report any loss, damage or faults.

During protracted incidents, or when making up equipment, personnel may be inclined to relax PPE; incident commanders should be vigilant and base any decision to downgrade the need for PPE on an assessment of residual risk.

If PPE has become dirty, contaminated or damaged it may not perform to the standard required by the appropriate specification. PPE should only be worn if it has been subject to appropriate cleaning, decontamination and testing processes.

For legislative requirements, refer to:

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

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

For further information on respiratory protective equipment refer to [Respiratory Protective Equipment](#).

Strategic actions

Fire and rescue services must:

- Provide employees with suitable personal protective equipment that fits the wearer correctly and adequately controls identified risks
- Ensure that personal protective equipment and respiratory protective equipment worn simultaneously is compatible and does not negatively impact other safety measures
- Provide appropriate accommodation (storage) for PPE when it is not being used

Fire and rescue services should:

- Specify the level of PPE for hazards identified through risk assessment and communicate to personnel
- Have suitable arrangements for the cleaning and maintenance of PPE in accordance with the manufacturer's instructions
- Ensure that there are suitable arrangements to support the replenishment of PPE

Tactical actions

Incident commanders should:

- Ensure that personnel have access to the appropriate PPE
- Ensure the appropriate PPE is maintained throughout the incident based on an assessment of risk
- Check the condition and serviceability of PPE when assessing operational readiness for

redeployment

-

Identify when dirt, contamination or damage may affect the performance of PPE



Control measure - Respiratory protective equipment

Control measure knowledge

Respiratory protective equipment (RPE) is a type of personal protective equipment designed to protect the wearer from breathing in harmful substances, or from oxygen-deficient atmospheres, when other controls are either not possible or are insufficient on their own.

The use of RPE allows efficient, effective and safe working practices to be adopted at incidents of all sizes and type where an irrespirable atmosphere presents a hazard to personnel. There are two main types of RPE; respirators and breathing apparatus (BA).

Further information about the use of RPE can be found in the British Standards Institution (BSI) publication, [ISO/TS 16975-1:2016 Respiratory protective devices – Selection, use and maintenance: Establishing and implementing a respiratory protective device programme](#).

Respirators

Respirators are filtering devices that remove contaminants from the air being breathed in; non-powered respirators rely on the wearer breathing to draw air through the filter. Respirators are not suitable for use in oxygen-deficient atmospheres.

Breathing apparatus

Breathing apparatus (BA) requires a supply of breathing-quality air from an independent source such as an air cylinder. Breathing apparatus (BA) enables firefighters to breathe safely in otherwise irrespirable atmospheres. The use of BA as a control measures is likely to be applied as part of the incident plan for any incident involving:



- Smoke and fire gases
- Working in confined spaces
- Hazardous materials including:
 - Asphyxiants
 - Dusts
 - Toxic, flammable or explosive substances

Airlines

Airline equipment supplies air to the wearer from a cylinder that is located remotely from them. The technical procedures for the specific airline equipment in use should be followed. Airline equipment should only be used by trained and competent personnel. It be appropriately used and maintained, to avoid the air supply to BA wearers being compromised.

Following an appropriate risk assessment, it may be decided to use airline equipment to provide breathing apparatus capability. Its use may be appropriate:

- If an extended air supply to self-contained BA wearers is required
- If use of self-contained BA is unsuitable
- At incidents in the open, where airlines are used to provide a breathable atmosphere without the weight of a self-contained BA set
- For specialist operations that involve restricted access

Although the use of airline equipment reduces the overall weight carried by a BA wearer and can provide a limitless supply of air, the physiological limitations of the BA wearer should be considered when airline equipment is used.

Face mask fit testing

If RPE is used, it must be able to provide adequate protection for individual wearers; RPE cannot protect the wearer if it leaks.

Face mask fit testing is a method of checking that a tight-fitting face piece matches the wearer's facial features and seals adequately to their face. A face mask fit test should be carried out as part of the initial selection of the RPE and it is good practice to ensure testing is repeated on a regular basis. Further detail on face mask fit testing is provided in the [Breathing apparatus foundation material](#).

Further information is contained in the Health and Safety Executive's publications:

- [Respiratory protective equipment at work: A practical guide \(HSG53\)](#)
- [Guidance on respiratory protective equipment \(RPE\) fit testing \(INDG479\)](#)



Maintenance

Maintenance is a requirement for all RPE, except for disposable (single use) RPE, and should be carried out by properly trained personnel. Thorough maintenance, examination and tests should be carried out at regular intervals in accordance with the manufacturer's instructions.

Breathing apparatus foundation material

The breathing apparatus foundation material provides the procedures underpinning the planning, use, and command and control of BA. It should also assist fire and rescue services with:

- Developing safe systems of work when deploying BA
- Managing BA operations
- Testing and maintenance of BA equipment
- Defining roles and responsibilities for BA
- Developing BA training
- Readiness of BA wearers
- Pre-planning for intraoperability and interoperability

For more information refer to [The Foundation for breathing apparatus](#).

Strategic actions

Fire and rescue services must:

- Provide personnel with suitable and appropriate RPE that fits and protects the wearer
- Ensure that personal RPE worn simultaneously is compatible and does not negatively impact other safety measures

Fire and rescue services should:

- Specify the type of RPE required for hazards identified through risk assessments and communicate this information to personnel
- Have suitable arrangements for the provision, testing and maintenance of respiratory protective equipment
- Ensure personnel regularly undertake face mask fit testing of RPE

Tactical actions

Incident commanders should:

- Carry out a risk assessment before deploying personnel wearing RPE
- Ensure personnel wear the appropriate type of RPE
- Consider the use of airline equipment



Control measure - Cutting away

Control measure knowledge

During firefighting and salvage operations, crews may need to cut away elements of a structure, removing surface coverings such as flooring, skirting, roofing members and partitions to ensure that all hot spots have been exposed and the fire has been fully extinguished.

Various techniques and methods of cutting away may be required to assist in locating a fire. For example, at chimney/hearth fires, in voids or between floors may require significant cutting away actions to locate the fire and enable adequate extinguishing media to be applied.

Crews involved in cutting away should be aware of the type of building involved and the construction methods likely to be encountered. Cutting away even small areas may have an impact on the entire structure and care should be taken to ensure that the wider structure remains safe at all times. This can be particularly relevant in timber-framed structures where one element weakened through fire or fire and rescue service intervention could have a detrimental effect on the entire building's strength. Incident commanders should ensure that nominated safety officers and/or specialist advice are used where appropriate.

Crews should try to ensure that, as far as practicable, cutting away any parts of a structure or property is done in the most effective manner, minimising property damage and allowing easy repair.



Strategic actions

Fire and rescue services should:

- Develop tactical guidance and support arrangements for the hazards that may be encountered and the actions to be taken when considering cutting away coverings and structures to locate fires and firespread
- Develop local arrangements to ensure that during operational incidents relevant building structural integrity is assessed by suitably qualified individuals

Tactical actions

Incident commanders should:

- Undertake cutting away to locate and extinguish fire, considering the risk of weakening structure



Control measure - Establish cause of fire

Control measure knowledge

Once a fire has been extinguished, identifying the cause will need to be considered. Ideally, it would be possible to reliably identify the exact cause for each fire attended. However, by its very nature, a fire scene is one in which valuable evidence can easily and quickly be lost to the effects of the fire or firefighting operations. As a result, there will be times when the cause can be confidently established, others where it is possible to identify a limited number of possible causes, and other situations where no reliable assessment can be made because of the degree of damage or the inability to enter unsafe premises.

The cause should be considered as a combination of circumstances that result in the fire. Establishing the cause will include looking for potential ignition sources, a means that would explain how the fire started and developed, and any acts or omissions that may have contributed to this. The evidence should demonstrate that all the ingredients were present and an explanation offered for how they relate to each other. For example, the presence of an ignition source such as matches is not proof they were responsible for a fire.

The fire investigator is most likely to encounter the HSE where they have an interest in a fire related to a potential breach of health and safety requirements in a workplace at a fire attended by fire and

rescue services.

Initial assessment

Before any activity begins, an early assessment is essential to consider the level of investigation required and the associated level of proof needed to establish the cause. In addition, thought should be given to who else may have an interest and who has primacy for the scene. Where there are indications that a fire is suspicious at the start of the investigation, or at any point during the investigation, this information should be passed to the police and the appropriate processes followed.

Scientific method

Using the scientific method is generally recommended as the approach to investigating the cause of a fire. With this method, the investigation findings can be presented logically and objectively, including stating any gaps or uncertainty in the evidence. This is described in various ways but the core elements are:

- Observing an event, for example, the fire scene
- Defining the problem - the cause of the fire
- Collecting data and evidence - physical and verbal
- Formulating a hypothesis - what does the evidence suggest to be the most likely cause of the fire, including ignition source, materials involved and any human factors?
- Testing the hypothesis and revising if necessary - is the evidence available all consistent with the hypothesis and does it allow other possible causes to be discounted?
- Selecting a final hypothesis - set out the believed cause and supporting evidence, and any limitations or inconsistencies

This is a scalable approach and the amount of time and resources committed to an individual incident will be in line with the expected purpose of the investigation of the cause.

Standard of proof

For most incidents where the only requirement is to complete the Incident Recording System (IRS), it is sufficient for the 'most likely' cause to be assessed. This will not usually require detailed notes or supporting evidence to be collated, although it may be good practice to do so. It should be noted that while the IRS does not explicitly require more than an assessment of the cause, there is benefit in achieving the greatest degree of confidence possible about the cause of all fires, as the subsequent data will directly inform service activity through analysis and intelligence work. As such, consideration should be given to ensuring clear guidance on the expectations of crews and the standard of origin and cause investigation required to support the ability of the fire and rescue service to target resources effectively.



Where the cause of a fire is being sought as part of a formal investigation or another agency's investigation, the standard of proof required should be confirmed at the outset. Most commonly, this is where the evidence must be beyond reasonable doubt, as employed in criminal cases and some coroners' inquests, or based on the balance of probability (more likely to be true than not) for civil cases and most coroners' inquests.

Locating the origin of the fire

The first requirement in establishing the cause will usually be to identify an area of interest (or radius of error as it is sometimes known) that is believed to contain the origin of the fire. The area of interest will be larger than the believed actual point of origin, to allow for the discovery of associated evidence and, as its name suggests, some scope for error in the initial assessment.

In most cases, the affected area of fire damage is relatively small and so the possible seat of the fire may be fairly obvious and localised. However, where the fire has affected a greater area, a logical method should be adopted to assist in narrowing down the scene to a specific area of interest. For example, the initial assessment might involve a walk around the scene to observe the damage.

This stage should not involve the disturbance of material. Generally, the process adopted will be to conduct an external and then internal viewing, noting the effects of the fire or other salient features such as signs of forced entry or possible evidence. This can also be a good opportunity to formulate a risk assessment.

Considerations for establishing an area of interest

There are a number of ways in which the investigator can identify the area of interest. These should be used to provide information that is consistent in identifying where the fire started and how it spread. If not, the evidence may have been moved at some point during the fire or firefighting, or it may have been misinterpreted. Either way, an explanation should be sought for any inconsistency or a different hypothesis considered.

'Post-fire indicators' is the general term used to describe the different clues or effects the fire leaves behind on a structure or contents within. This can relate to damage caused by direct burning (flame) heat, smoke or a combination of these. These clues can help the investigator identify the potential origin of the fire, its development and the location of items at the scene.

Another approach is to identify the lowest and most severe area of burning as this will typically indicate the point of origin. However, this will not always be the case and the context of the fire should be considered. For example, one area may have burnt for longer because crews were unable to reach and extinguish it, or there was a higher fuel loading in one location or liquid or dropping material/embers may have spread the fire to a lower level.

Witness evidence can also be helpful in confirming the origin (and cause) of a fire but the

investigator should always ensure that the physical evidence matches the verbal information as it is sometimes possible for witnesses to be deliberately or unintentionally misleading.

When assessing the post-fire indicators, time should be taken to ensure any activity that might have affected the scene before the investigation is known. This can include actions by members of the public, the fire and rescue service and other first responders. The choice and application of various firefighting techniques may also influence or alter the expected post-fire indicators.

Excavating the area of interest

Once the area of interest has been established, the next step is to try to identify the cause of the fire. This should include identifying any potential sources of ignition, the materials or means by which a fire took hold and developed, and the mechanism by which it happened.

Excavating an area can be a time-consuming process and the degree of care needed will need to be assessed regarding the level of proof required, the resources available and the type of evidence being sought. For example, retrieving small or fragile items intact will require greater care in excavation than a large, solid item. The way in which items are handled, retrieved and preserved will also be determined by the nature of the investigation.

It is important to be aware of items that are unusual or out of context (for example, a can of petrol may be expected in a shed but is less likely in a lounge). What is not present can also sometimes be of value and should be noted.

There are several readily available lists of typical causes of fire but the investigator must always follow the evidence and be mindful that new types of fire are regularly found and that knowledge of fire constantly changes and expands.

Checking the hypothesis

Once all the evidence has been identified and recorded (if appropriate), the investigator should review it to ensure it is consistent with the identified cause. If not, the information should be checked and further investigation undertaken or a new hypothesis developed, as necessary.

One way to check the physical evidence is by recreating the scene. This can be useful for larger fires. It allows the room to be cleared of all items, and then the major or important items put back in the location in which they were believed to have been during the fire. From this the investigator can check the post-fire indicators against the structure, that moveable items correlate, and that the fire development can be explained by the evidence.

Resources and tools

There are a number of resources and tools that the investigator may find of use. These include

using dogs or bespoke equipment that can help to indicate the presence of possible accelerants.

In addition, a range of small tools and personal protective equipment (PPE) will be required and, for larger incidents, specialist access, lighting and other equipment may also be necessary.

Reference sources

A range of good reference sources is available to those required to establish the cause of a fire. These include specialist fire investigation publications covering peer-reviewed books and articles, online sources and communities.

It is also useful to stay up-to-date with related areas such as new products, construction materials/designs and human behaviour, and to understand how these could lead to fires.

Strategic actions

Fire and rescue services should:

- Develop tactical guidance and support arrangements for the actions to take to establish the cause of fire, in consultation with partner emergency services and agencies
- Ensure that personnel have an understanding of relevant legal issues
- Ensure that investigators have a good knowledge of fire science and keep up-to-date with developments in buildings, products and human behaviour that may influence the ways in which fires are caused or develop
- Ensure that those responsible for carrying out investigations are familiar with the scientific method and with different standards of evidence, and are able to use them appropriately based on the nature of the investigation

Tactical actions

Incident commanders should:

- Use appropriate post-incident investigation techniques to establish the cause of the fire
- Identify the area of origin and investigate possible causes of the fire considering criminal acts



Control measure - Incident Handover

Control measure knowledge

The handover phase of an investigation may take place directly at the scene or at a later stage, once all the scene work has been completed. The nature of a handover will be influenced by the scene or the nature of the investigation and may range from a formal and documented handover to a verbal briefing.

Where a statutory body is taking over, an appropriate level of formality should be employed and all reasonable effort should be taken to avoid the compromise of any evidence recovered.

For non-statutory agencies, local protocols or an assessment of each incident on its own merits will determine the extent to which the fire and rescue service can assist with an on-site handover or maintenance of scene security. Most commonly, this category includes investigators employed by, or acting on behalf of, insurers.

When the party taking over the scene does not have a statutory role, the fire and rescue service should be able to satisfy itself that it is the appropriate body or person to take responsibility for the scene.

The physical transfer of the scene between agencies, notably after fire and rescue service operations, is an important stage. It is very easy for scene management practices to be reduced or lapse during the transition. The fire and rescue service may be keen to remove any equipment still deployed and have a last walk round the scene. The organisation taking over may want to view the scene, either escorted by the fire and rescue service or not. Good cordon and scene management will limit the potential for valuable evidence to be lost or compromised.

The handover should include:

- Incident history (the incident and actions of the fire and rescue service, members of the public or other first responders)
- Facts relevant to the investigation (methodology and actions taken so far)
- Safety issues (possibly including risk assessment findings)
- Other issues that may have had an impact on the scene or be of relevance to the investigation (e.g. witness details)

For formal handovers, it may be useful to record the names and signatures of the responsible individuals from each agency.

It is important to remember that, where a scene is handed back to the owner or occupier, some of this information may be provided.

Handing over the scene or investigation may not be the end of fire and rescue service involvement



and the fire and rescue service may continue to play a supporting role. In this case, fire and rescue service personnel should make themselves familiar with the working protocols of the lead agency.

Liaison

Scene-based liaison will often tie in to existing local protocols and incident management systems, particularly with statutory partners who will be familiar with this type of working.

Maintaining liaison away from the scene can be more difficult and the principle of providing single or named points of contact can ensure efficient and appropriate practices. This can be particularly important when managing the exchange or submission of documents, other evidence or where interviews may be requested. Too many informal contacts can compromise the organisations or evidence and result in no one having a full knowledge of the investigation.

Where the details of other parties are not known at the time, it can be useful to have a general contact point for initial enquires that can be readily accessed, for example, through the fire and rescue service website.

In all cases, a managed approach to liaison can ensure that the investigation is progressed effectively; each agency can track their involvement and actions, with decisions set out and explained at a later stage if required.

Having clear protocols for formal and informal liaison processes will assist management of the investigation. Informal processes are particularly open to misinterpretation, where one party may feel they had an 'off the record' conversation only for it to be used subsequently and attributed to them as evidential material.

Strategic actions

Fire and rescue services should:

- Develop tactical guidance and support arrangements for the actions to take to hand over responsibility for a fire scene and/or investigation, in consultation with partner emergency services and agencies
- Ensure appropriate arrangements are in place for handing over a scene

Tactical actions

Incident commanders should:

- Hand over responsibility for removed items and security of premises to the responsible person or the police
- Notify investigators if crews have recently attended other incidents where cross contamination may have happened
- Liaise with the police and local authority support teams at incidents involving serious injury and fatalities



Control measure - Identify failures in fire safety measures

Control measure knowledge

Fire safety measures are found in many buildings (either as a means to satisfy legal requirements or as a discretionary measure) and comprise both physical and management elements. Their ability to protect the occupants, building and contents relies on the correct selection, design, management and maintenance of the measures both individually and in combination.

When a fire occurs in a building with fire safety measures, the opportunity to assess the measures in place and the effectiveness of their performance is something that should be given early consideration.

Additionally, where the premises fall within the scope of the Regulatory Reform (Fire Safety) Order 2005, Fire Safety (Scotland) regulations 2006 and Fire Safety Regulations (Northern Ireland) 2010, fire and rescue services have a statutory role to consider whether the arrangements were appropriate and in line with the risk assessment, following which a prosecution may be initiated.

Fire and firefighting operations can destroy or significantly alter items to the extent that the original contents of the room are not immediately obvious. Fire investigation can aid this by collecting evidence that can help with understanding the pre-fire and during-fire conditions, fire development and the influence of fire safety measures from the physical evidence.

Where this is completed as part of a possible prosecution, specialist fire investigators should be considered, to comply with investigative practice and evidence collections standards. In this case, the fire investigation process will need to fall within the management of the wider investigation team from the earliest stage.

Specific areas of significance

The fire investigation can then help the wider assessment or investigation to understand whether the fire safety arrangements were appropriate, whether they worked and, if not, what defect act or omission would explain why the fire developed and provide evidence to support this. When assessing the performance of fire safety measures, note should be paid to features that have worked well or better than expected, as this will be of interest for future learning.

Identifying the origin of the fire will usually be an important part of an investigation to consider the fire safety measures. It will confirm where it started, without which it will be difficult to understand how the fire developed or spread and how this links to the relevant fire safety measures and the sequence in which active systems operated.

The cause of the fire may or may not be important when considering fire safety issues as, depending on the nature of the business, the risk of a small fire occurring may be inherent or accepted. Generally, fire safety measures will be designed to allow people to escape in a fire and not necessarily to prevent a fire occurring in the first place.

However, where possible it is good practice to establish the cause as this may inform future practice at the premises or more widely. It may also identify items that should not be present or are unusual (not consistent with stated business or building use) and in turn suggest further lines of enquiry.

Post-fire indicators will be of assistance in a number of other areas of specific relevance to fire safety measures:

- **Building structure:** identify the methods of construction and materials. This may be for the whole premises or in the fire-affected area/s. In heavily damaged properties, it may even be necessary to look for clues that help confirm the internal layout.
- **Compartmentation:** assess the type and rating of any fire safety compartmentation and any breaches or areas where the appropriate standard has been compromised. Poor maintenance or building work may have left compartments breached, and evidence of firespread (and direction) through these may be established by the fire investigation.
- **Fire doors:** fire investigation can help identify the type of door, markings or rating identifiers, its position during the fire and the location (height) and direction of any fire or smoke travel
- **Other fixed fire safety measures:** fire investigation techniques will usually enable the presence, location and condition (including switch and lever positions if relevant) of other fixed measures such as lighting, signage, etc. to be identified
- **Portable fire safety measures:** the location, make/model and condition of portable fire safety measures, such as fire extinguishers.

Other opportunities



- Document or specific item retrieval: fire investigation techniques may help to locate and safely retrieve important small or fragile items from the fire debris
- Intelligent systems: while retrieving or reading records from intelligent fire safety systems will normally be done by a specialist, it will be useful for these results to be provided to the fire investigator for cross-reference with the physical findings
- Witnesses: the fire investigation may include or require the need for witnesses. Where the fire investigation is being undertaken as part of a possible prosecution, this should only be at the direction of the investigation manager so that the necessary legal protocols (primarily the Police and Criminal Evidence Act) are complied with. Alternatively, the fire investigation report may simply need to reference further information or questions that should be raised as part of witness interviews by others.
- Insurance companies: as with any fire investigation, it is useful to confirm the interest and response of insurance companies as early as possible. Liaison with them will help ensure that any investigations are appropriately managed, recognising each party's legitimate role and interest. They may also be able to supply information of relevance to the fire investigation regarding policy conditions in relation to fire safety measures.
- Powers of entry: for fire investigations in relation to fire safety measures powers set out in UK legislation should be used

Strategic actions

Fire and rescue services should:

- Develop tactical guidance and support arrangements for the actions to take and associated hazards in identifying failures in fire safety measures
- Have appropriate policies and procedures for actions when failure in fire safety measures are identified

Tactical actions

Incident commanders should:

- Identify any potential failure or underperformance of fire safety measures and communicate to relevant person or agency



Control measure - Written reports

Control measure knowledge

Comprehensive report writing is a key aspect of gathering information and intelligence at an incident.

It is important that reports are accurate, clear and unbiased as they will support further research, formal investigation and/or statistical content.

In addition, witness statements including those of attending personnel should be made. Witness statements are often taken using an electronic template document developed by a fire and rescue service that should be based only on objective and personal recollection of events, not on opinions and unfounded conclusions.

Legislation, such as the [Criminal Procedures and Investigation Act 1996](#) and the [Criminal Justice Act 2003](#) should be referred to regarding the legal standpoint for official report writing and note taking. This includes the need to:

- Record the information as soon as practicable
- Retain the information in its original and complete format
- Reveal the information when requested
- Review the information for accuracy, procedural applications and assessment of corporate or operational risks and threats

Reports can consist of:

- Informal contemporaneous notes:
 - Made at the time of an incident or event, or as soon as practicable, whilst the facts of the situation are still fresh in the mind of the person making the record
 - Where operationally practicable, notes and records should be written in ink
 - Consider creating a permanent record of other notes - for example dry-wipe breathing apparatus (BA) entry control boards can be photographed
 - Notes have a legal significance in that they can capture more detail than a person may recall at a later date
- Formally structured data gathering documents
 - Notes made on unofficial materials or papers should be transcribed onto an official form of record as soon as practicable after the event. The original form of the note must be retained and disclosed if required.
- Contemporaneous note books, as issued to officers
- Sketch plans, diagrams and photographs
 - Can include the layout of a building or compartment, positions of people, vehicles or



sectors, and are considered to be equivalent to a written record or note

- The storage and movement of digital images and media is subject to legislation such as the [Data Protection Act 1998](#), the [Freedom of Information Act 2000](#) and the [Human Rights Act 1998](#)

All types of records should be signed and dated by the person creating them so as to enable their use within a formal legal context if required.

Strategic actions

Fire and rescue services should:

- Keep accurate records of the agencies and individuals involved in the investigation
- Have policies and procedures that comply with the relevant legislation for note taking, recording information and report writing, for all appropriate levels of investigation
- Provide appropriate means of recording information to be used in an investigation

Tactical actions

Incident commanders should:

- Record all relevant incident information in an appropriate format



Control measure - Attendance at coroner's court (or equivalent)

Control measure knowledge

Fire and rescue service personnel may be called to give evidence at an inquest into the death of an individual. The aim of an inquest is to establish the means, cause and circumstances of a person's death. The coroner is also lawfully charged to identify measures to prevent future deaths in similar circumstances.



The aim of the inquest is not to apportion blame or to attack the behaviours or actions of key personnel such as the emergency services, but to understand the situation leading up to the event the actions of first responders and the conditions in which the deceased may have been found.

Fire and rescue service personnel are seen as professional witnesses. Their role is to assist the inquest in understanding the situation that the fire and rescue service faced on arrival at an incident and to explain their professional observations, actions and outcomes.

The fire and rescue service witness could be presenting evidence as:

- An officer in charge or firefighter directly involved in the incident
- The fire investigation officer who has investigated the cause, spread and outcome of the incident

The coroner will take the fire and rescue service witness through their statement and/or report made in relation to the incident. An inquest is a fact-finding process and it is not necessary to remember exactly what was said at a specific time during a dynamic incident. The coroner will give the fire and rescue service witness the opportunity to add, confirm or change their statement. This may be followed with more specific questions or requests for clarification on key points of a technical or professional nature from the coroner or others in court, including family members of the deceased.

Fire and rescue service witnesses should avoid using technical or working jargon and seek to present evidence in an unambiguous and simple manner. If a witness is asked a question that they cannot give a full or factual answer to, the coroner may direct them not to answer the question and instead seek to resolve the issue through open discussion with the family members in court.

The aim of the fire and rescue service witness should always be to impart their knowledge and observations from the incident in a clear and informative manner and to add clarity to the inquest's understanding of the incident. The inquest is not necessarily concerned with the specific and individual technical aspects of the activities of any one firefighter during a dynamic incident. Prior to attending those called should:

- Ensure they have copies of their statement and/or any report previously provided to the coroner
- Review their statement to ensure the contents are accurate. They should check dates, times and key facts in the statement.
- Consider discussing the statement and/or report with an experienced fire investigation officer to gain an understanding of the types of questions that may be asked by the coroner and/or family members of the deceased

Personnel providing witness to a coroner's court are not on trial but are there to assist the court in understanding the circumstances of the incident and should:



- Be prepared to discuss their professional observations and immediate actions on arriving at the scene so that the coroner has a clear understanding of the physical condition of the incident
- Can explain how, as a fire investigation officer, they arrived at their stated hypothesis for the cause of the fire and spread
- Refrain from drifting from their relevant areas of professional knowledge
- Answer the questions in a factual manner; the coroner will oversee the inquest and manage the impact on the family members

N.B. For ease of publication the terms 'coroner', 'coroner's court' and 'inquest' have been used in this control measure. However, it is recognised that other terminology is used outside of England and Wales; the equivalent of these terms should be applied where appropriate (e.g. procurator fiscal)

Refer to the [Ministry of Justice, Guide to Coroners Services](#) for details on the inquest process in England and Wales.

Refer to information and booklets available on the [Crown Office & Procurator Fiscal Service](#) for details on the inquest process in Scotland.

Refer to the publication [Working with the Coroners Service for Northern Ireland](#)

Strategic actions

Fire and rescue services should:

- Develop guidance and support arrangements for the actions to take to enable personnel to provide evidence in a court of law, in compliance with relevant legislation and following consultation with partner emergency services and agencies

Tactical actions

Incident commanders should:

- Prepare evidence and records to a standard appropriate for scrutiny at any potential future inquest or inquiry



Control measure - Identify trends: Fires

Control measure knowledge

Trends may first be identified using analytical methods or software to interrogate the Incident Recording System (IRS). However, where desktop analysis identifies the presence of a trend, it may have insufficient information to provide a sufficient explanation or find a root cause.

The collection of additional information from the fire scene is one way in which this gap can be bridged. Once the key features of the trend have been identified, arrangements can be made to ensure that any future incidents matching it are appropriately investigated. Depending on the level of information, this may be suitable for operational crews or the specialist fire investigation team to collect. Consideration may be given to collecting information through a bespoke template where the nature of the information required is known (e.g. the make and model of a potentially faulty product).

An alternative means of identifying trends is through direct observations by an individual or crew at the scene of an incident. In this case, using analysis can help to supplement the initial information and identify the presence and size or scope of a wider trend. The key features can then be communicated and a fire investigation used to collect further data.

In either event, the role of a fire investigation will be to provide good quality and objective data from fires meeting the trend pattern. This may require the use of specialist fire investigation teams to attend fires outside their normal scope if the nature of the evidence required is difficult to collect or must comply with evidential standards.

The aim is, as far as possible, to establish the root cause; the fire investigation may help to explain not only the specific cause but to identify any contributory factors, including behavioural elements.

Trends can be identified through deviations in the expected patterns or frequency of existing events or by the emergence of new events. This includes the outcome of a fire, such as an unexplained increase in the number of injuries or size of fires.

For most incidents, the focus of the fire investigation is to identify the specific origin and cause of a fire. However, fire investigation techniques and knowledge are also ideal for collecting information to support wider future learning. These include using the scientific method, reading post-fire indicators, interviewing witnesses and knowledge of the fire behaviour of buildings, products and people, the interaction between these and how they may have contributed to the outcome (positively or negatively).



As an example, new methods of construction are continually being developed and will have undergone testing in accordance with the relevant standards. However, a difference in their expected performance in a fire may occur during the construction phase of building when not all the fire safety features are in place or due to their interaction with other products. Fire investigation can identify any deviation from expectations and seek to explain the reason.

Trends may first be identified using analytical methods or software to interrogate the Incident Recording System (IRS). However, where desktop analysis identifies the presence of a trend, it may have insufficient information to provide a sufficient explanation or find a root cause.

Once the opportunity for future learning has been identified, careful and early consideration should be given to the type and format of information required. This may include quantitative and qualitative data. Specific areas of interest or the standard to which they need to be collected should be agreed and stated. This needs to be communicated to the fire investigator. The use of audio, visual or written techniques may be employed at the scene for capturing raw evidence and later adapted for presentational or analytical purposes. Failure to collect the right type or quality of data can severely impair the ability to achieve a successful outcome.

Any changes to or flaws in the original data requirements should be communicated to the fire investigator with an explanation of the rationale. Equally, the fire investigator should communicate any significant findings at an early stage if it is possible they may affect the request. It should also be identified whether information from the scene will be sufficient on its own or require further research, including, in some cases, using partial or full-scale testing.

The collection of additional information from the fire scene is one way in which this gap can be bridged. Once the key features of the trend have been identified, arrangements can be made to ensure that any future incidents matching it are appropriately investigated. Depending on the level of information, this may be suitable for operational crews or the specialist fire investigation team to collect. Consideration may be given to collecting information through a bespoke template where the nature of the information required is known (e.g. the make and model of a potentially faulty product).

Away from the scene, the fire investigation community has a well-established network both in the UK and beyond. It also has links to other sectors or organisations and these can be employed to provide additional information on known issues or to see whether others have experienced anything similar.

It is also worth noting that the UK legislation provides powers of entry to support future learning. Consideration should also be given to having an appropriate policy relating to removing items from the fire scene in support of future learning. Failure to do so could compromise any insurance claim, leave the fire and rescue service open to challenge and compromise the evidential value of an item

Strategic actions

Fire and rescue services should:

- Provide training, support and guidance for all staff appropriate to the level of investigation required by their role
- Use all available systems to actively identify the potential for trends involving fires and share information with other agencies

Tactical actions

There are no tactical actions associated with this control measure.

Control measure - Operational learning

Control measure knowledge

Following an incident, fire and rescue services should perform debriefs, investigations and use the assurance process for operational incidents to identify learning, which can:

- Improve public safety
- Improve the safety of fire and rescue service personnel, and others involved during or after fire and rescue service activities
- Share previously unidentified hazards and risks
- Share previously unidentified safe systems of work and control measures

Fire and rescue services should put in place processes and support arrangements for operational learning. This should include the arrangements that would be appropriate for any multi-agency operational learning.

Collecting information

The recording and sharing of significant findings from incidents and investigations helps to inform future practice. This process should start at the incident ground with thorough recording of relevant operational activity, and include a robust incident debrief procedure.



Debriefs should be led in a structured manner and take place at the most practical time following the closure of an incident. They should allow all responders the opportunity to contribute, to highlight good practice or areas of development and to be able to do so in an open and constructive environment. The aim of debriefs is to assist in identifying individual, team or organisational learning.

An incident debrief procedure plays a vital part in both personal and organisational learning. It fulfils a critical or key need for effective learning and development by connecting a root cause with an associated effect. Once identified, this process will enable clear plans or programmes to be agreed, which can be used to address or improve any shortfalls in the fire and rescue service's policies, procedures or information.

Investigation can play an important part in supporting future learning by providing a structured and objective approach to identifying and capturing evidence. This approach should ensure that it withstands scrutiny in its future application and is fit for purpose. Operational learning from any incident type may provide information pertinent to public or responder safety.

Learning opportunities should be identified and shared locally and nationally as appropriate to improve intervention and safety, identify hazards and develop safe systems of work. Any learning should also be shared with [National Operational Learning](#). For further information refer to the [Good practice guide for fire and rescue services](#).

Once the opportunity for future learning has been identified, careful and early consideration should be given to the type and format of information required.

There should be careful consideration about the environment in which the information will be used, as any use of information is subject to legislation and regulations. Refer to Data and information strategy within [Data and information management](#).

Monitoring and highlighting trends

A trend consists of several events that exhibit one or more features in common. This may be geographical, physical or related to other circumstances under which they occur.

Failing to identify trends at the earliest possible stage can risk the possibility of the number or severity of events increasing, so early identification is important. This is particularly true of fire-setting, where a series of small fires may reflect someone's growing confidence before attempting a more serious attack.

Trends in fires or other types of incidents may relate to new products, or changes in the way existing products are used. Investigation can assist when identifying a trend, by establishing its cause, confirming common features and collecting the evidence required to influence a solution.



Identifying and researching a trend should provide a means by which targeted interventions can be taken. Once action has been taken, the impact on the trend should be monitored both remotely and through attendance at scenes. Care will also be required to ensure the problem has been addressed and not just displaced. Effective use of analysis, and fire investigation where appropriate, should help to confirm this.

External liaison and information

Liaison with other fire and rescue services and organisations may help to establish whether the trend is localised or being seen in other areas. This liaison can take place through existing groups and communication networks, or established specifically for the trend depending on the nature of the issue. For example, with fire-setting, close liaison with the police and other agencies that maintain relevant data will be important; they may have additional knowledge about individuals or activities.

Strategic actions

Fire and rescue services should:

- Have processes and support arrangements for operational learning
- Have processes for sharing appropriate learning with [National Operational Learning](#)
- Appoint a single point of contact (SPOC) for receiving and sharing National Operational Learning
- Have processes and support arrangements for identifying, monitoring and addressing trends
- Liaise with other fire and rescue services and agencies when identifying, monitoring and addressing trends

Tactical actions

There are no tactical actions associated with this control measure.