HISTORIC SCOTLAND
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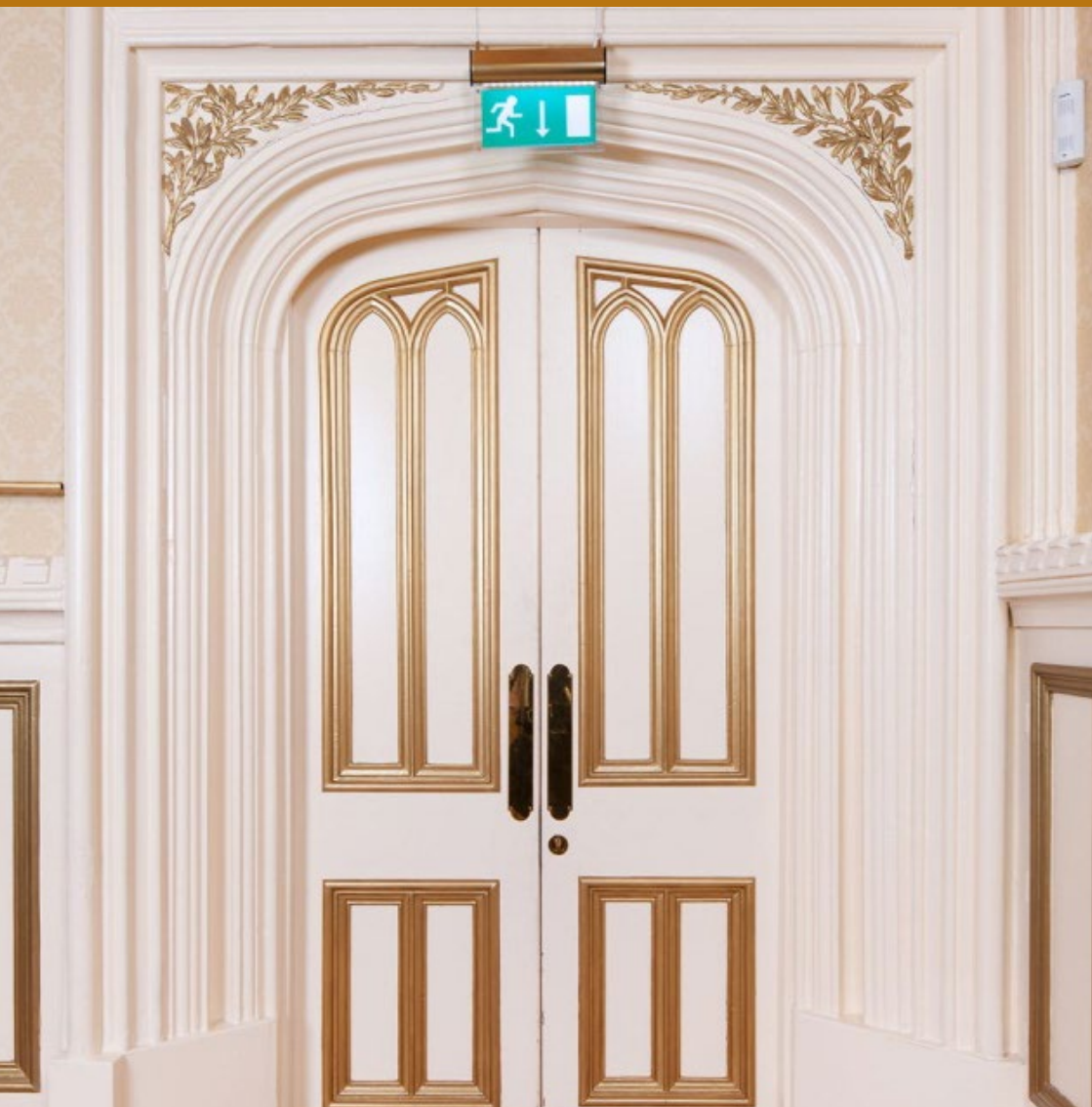
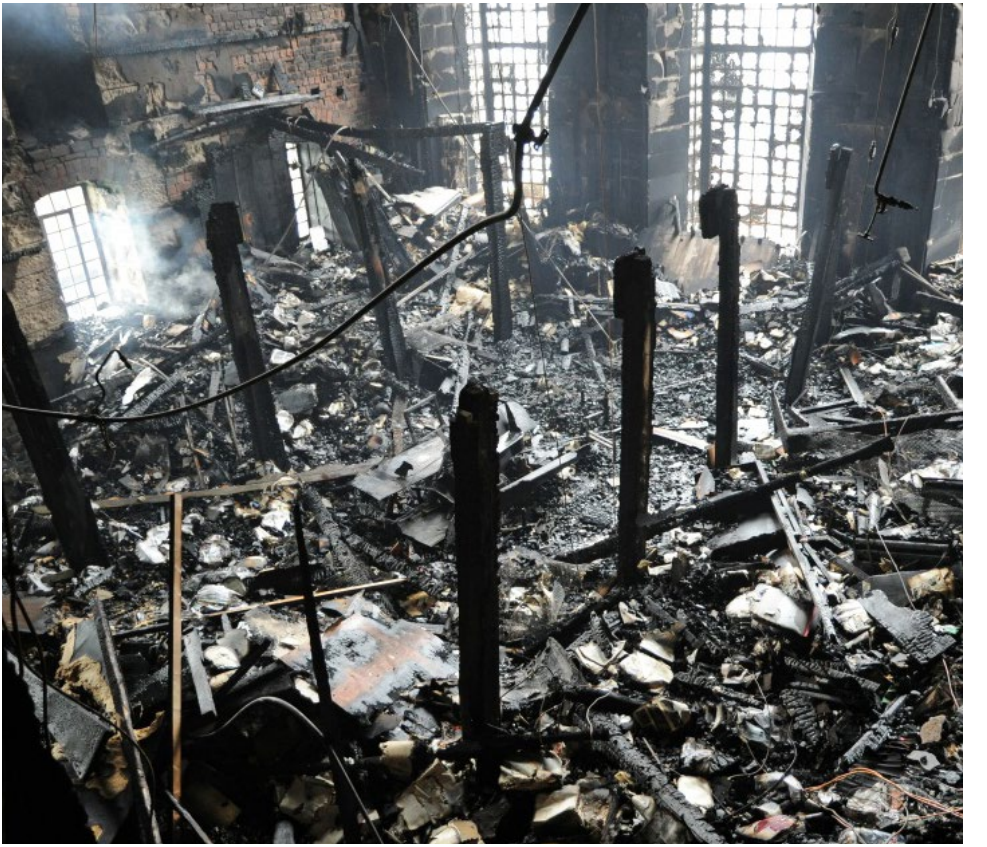
# Managing Change in the Historic Environment

## Fire Safety Management





Cover image: An example of emergency escape signage above the door in the opulent main hall of Renfrew Town Hall. The Hall opened in 1873, but had to be rebuilt after a fire ravaged the building only four years later. It is now A-listed and has recently undergone a substantial refurbishment programme which was part-funded by Historic Scotland. © Renfrew Town Hall

Above: Charles Rennie Mackintosh's masterpiece, the A-listed Glasgow School of Art, suffered a major fire on 23 May 2014 which destroyed its internationally renowned library interior. A Restoration Committee has been set up by the School of Art to oversee the building's restoration. © Crown Copyright Historic Scotland

# Managing Change[1] is a series of non-statutory guidance notes about managing change in the historic environment. They explain how to apply Government policies.

The aim of the series is to identify the main issues which can arise in different situations, to advise how best to deal with these, and to offer further sources of information. They are also intended to inform planning policies and the determination of applications relating to the historic environment.

1 http://www.historic-scotland.gov.uk/index/heritage/policy/managingchange.htm

# Introduction

This note sets out the principles that apply to fire safety management in historic buildings. Historic Scotland's *Guide for Practitioners 7: Fire Safety Management in Traditional Buildings* [2] (2010) is the primary source of guidance when applying the relevant fire legislation to historic buildings. When considering building warrant issues under the Building (Scotland) Act 2003, our *Guide for Practitioners 6: Conversion of Traditional Buildings*[3] will also be helpful.

Two overarching issues govern fire safety management in the historic environment:

- the identification and assessment of fire hazards and the associated risk of these causing harm to occupants, and the use of that information to identify where and what intervention is needed
- using an understanding of the building's character to consider how necessary measures can be implemented while causing least harm to the building's integrity – the very factors that lend it historic interest

2 http://conservation.historic-scotland.gov.uk/publication-detail.htm?pubid=7370

3 http://www.historic-scotland.gov.uk/guide-for-practitioners-6.pdf

# Key issues

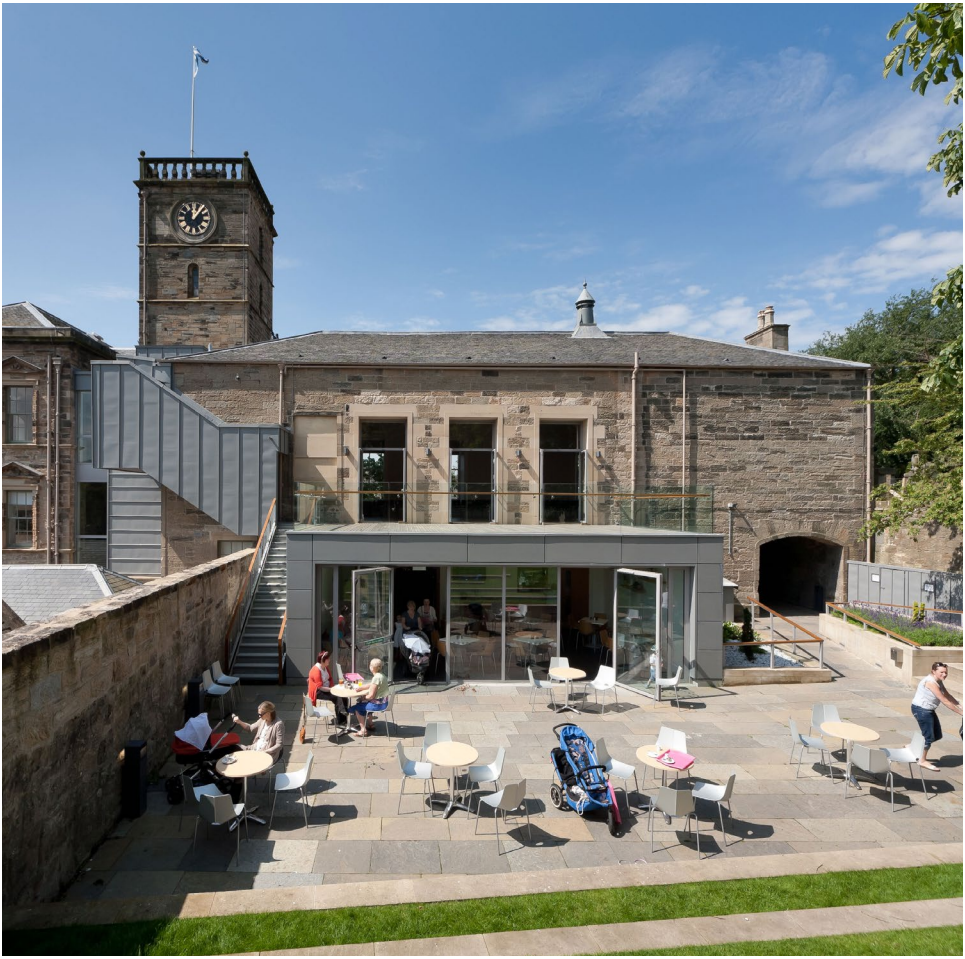
1. The paramount objective in fire safety is the protection of human life.

2. Historic buildings pre-date modern attitudes towards fire safety, meaning they can be vulnerable to fire. So, in order to safeguard people and historic fabric, physical intervention into a building's fabric may be required.

3. A key approach to fire safety management is risk assessment, a process of identifying risks and acting to mitigate or reduce these to manageable levels. This is a structured and holistic approach that identifies what interventions are required. In most cases these will involve a combination of management systems and physical protection measures.

4. In historic buildings, the aim is to achieve a balance between fire safety provision and the protection of a building's historic character. Where physical intervention is necessary, careful consideration should go into design and installation in order to respect and minimise impact on the building's character.

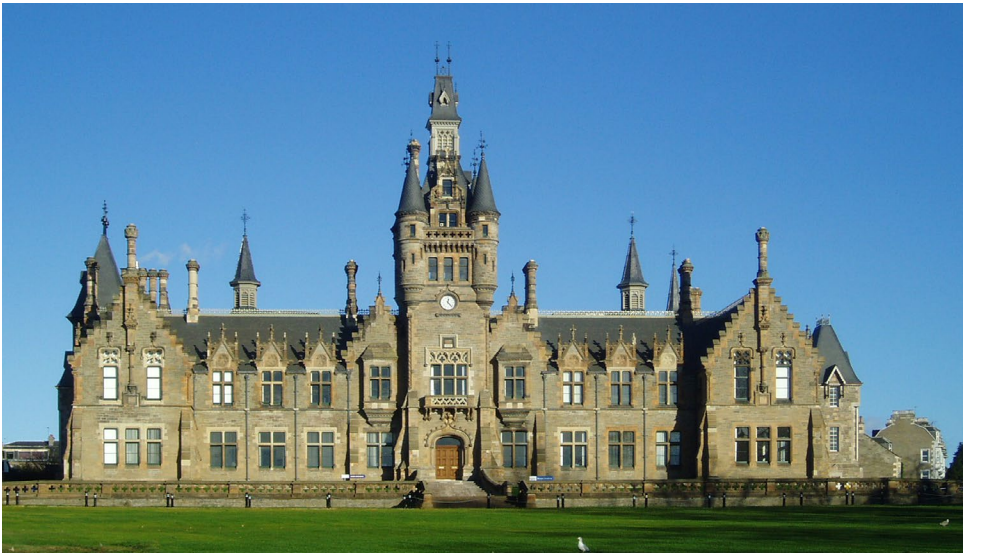
5. Listed building consent, which is administered through local authorities, is required for any works affecting the character of a listed building. Planning permission may also be required. Scheduled monument consent, which is determined by Historic Scotland, is always required for works to scheduled monuments. See Section 9 for more information.



↑ Linlithgow Burgh Halls, which dates from the seventeenth century, reopened in 2011 after a substantial redevelopment. The project included a requirement to provide a new fire escape for the A-listed building. The solution here was to provide an enclosed escape stair clad in zinc. © Dave Morris Photography

↑ Category A-listed Morgan Academy is an example where the owner of the building, Dundee City Council, took the unusual decision to restore the building rather than explore options around demolition, following a significant fire in 2001 which destroyed the interior and left an unstable external shell. You can find out more about the project in the case study produced by Architecture and Design Scotland. © Crown Copyright; RCAHMS

↓ The restored building. © Crown Copyright: RCAHMS



# 1. Understanding the character of a historic building

It is important to establish at the outset what a specific building's significance is, as well as the relative significance of its component parts. The character and significance of a historic building can derive from a number of factors, from how it is planned and designed to its materials and cultural associations. These factors will normally relate to both the exterior and interior of a building. (You may also find our *Interiors*[4] guidance note helpful when considering internal alterations for fire safety.)

Preparing a conservation statement or plan is a useful step in evaluating the character and significance of a historic building. A **conservation statement** identifies the cultural and historic significance of a property, while a **conservation plan** also includes a strategy for its management and conservation. Each approach aims to identify the building's significant elements or spaces, where intervention demands greatest sensitivity. Our *Guide to the Preparation of Conservation Plans*[5] explains more about these documents.

# 2. Fire safety management

Fire safety management divides into *prevention* and, should fire ignite, *protection*. As historic buildings vary in terms of their character, usage and anticipated fire performance, so fire safety management must vary in its approach.
A tailored strategy should be prepared following a careful study of the building. This strategy will usually involve a combination of management practices, structural interventions and protective systems. A professional fire engineer can advise in more complex situations.

A good understanding of a building's character and its specific fire risk(s) is necessary to assess the need for, and the impact of, proposed intervention measures. Interventions should be:

- Compliant with legislation
- Essential
- Commensurate with risk
- Sensitive
- Minimally invasive
- Reversible (where practicable)

Prevention and protection are two components of an overall integrated package of measures. Fire legislation can be applied in a flexible way to ensure sufficient protection is achieved. It is sometimes possible to accept weakness in one area if compensation can be found in other areas. In a historic building, this approach can enable inherent vulnerabilities to be addressed while minimising impact on the building's character. For example, it may be possible to compensate on the provision of escape routes by making improvements to management procedures, or to detection and alarm systems.

4 http://www.historic-scotland.gov.uk/interiors.pdf
5 http://www.historic-scotland.gov.uk/conservation-plans.pdf

# 3. Understanding the risk

Risk assessment is fundamental to fire legislation and fire safety management. The majority of our historic buildings pre-date 1914, and they were normally built with less regard for fire safety than would be expected today. As a result, many of them are inherently vulnerable to fire damage due to factors like combustible construction materials, internal linings, hidden voids, undivided spaces and a history of alterations.

Under the **Fire (Scotland) Act 2005**[6], fire risk assessments are statutorily required for all non-domestic properties, care homes and houses in multiple occupancy. Owners of private dwellings should be aware that if hosting any commercial element (weddings, for instance), they may also fall within the remit of the fire legislation.

A fire risk assessment aims first to identify and evaluate, and then to eliminate or reduce risks to an acceptable level. Its findings should include details of what interventions are necessary. For a historic building, it is particularly important to consider how best the required changes can be made in a way that protects the building's character.

From a statutory perspective, a fire risk assessment applies only to life safety, but where a historic building is involved, the assessment should be extended to address risks to property as well as to people. The five principal steps in a fire risk assessment of a historic property are listed below:

- **Identify hazards**: for instance, sources of possible ignition and fuel
- **Identify people and property at risk**: this requires a good understanding of how the building is used
- **Evaluate the risks to occupants and property**: assess existing safety measures with a view to carrying out improvements
- **Record-keeping**: a fire log book should be kept for each property, to record all fire-related events such as drills, training and maintenance checks
- **Periodically review**: it's important to review the risks and preventative measures in place, particularly when circumstances change

6 http://www.legislation.gov.uk/asp/2005/5/contents

# 4. Fire prevention

Fire prevention measures are the management steps taken to reduce the likelihood of a fire starting. Fire requires three basic ingredients to combust: oxygen, fuel and heat (or sources of ignition) – these elements are known as the 'fire triangle'. Remove any one of them, and the fire will extinguish. Preventative fire safety involves eliminating potential sources of heat and fuel.

Typical preventative measures include:

- Management of open fires and maintenance of flues
- Keeping combustibles away from heat sources
- Regular testing of electrical equipment
- Managed use of portable heaters
- Management of hazardous materials and processes
- Control of high-risk areas such as kitchens
- Enforcement of a non-smoking policy
- Permit system for hot works
- Strict control of contractors and sub-contractors
- Good housekeeping (for example, refuse management)
- Control of the threat of wilful fire-raising (particularly important in empty buildings or those periodically unoccupied)

In especially significant or high risk buildings, it can be valuable to consider undertaking training drills and developing an emergency plan.

# 5. Fire protection

Protection measures come into effect once a fire has ignited, to safeguard occupants and property by limiting the spread of the fire and aiding escape. Putting these measures in place may require physical intervention to the building. They can include compartmentation, detection, suppression, provision of first-aid firefighting equipment, emergency signage and lighting, and escape routes.

## Compartmentation

Compartmentation is the sub-division of spaces into smaller fire-tight cells. It is the most effective way to inhibit the spread of fire and smoke. However, introducing compartmentation can damage a historic building's character – so it is usually preferable to enhance any existing compartmentation by upgrading the fire resistance of existing walls and ceilings. Modern fire-resistant materials can be applied to surfaces or inserted into voids, such as under floors. In the less important areas of a building, such as attic voids, a higher degree of intervention may be possible without much impact upon a building's character.

Historic doors can be upgraded using intumescent paints and varnishes, intumescent strips and smoke seals – or even, where appropriate, by inserting non-combustible 'sandwich' panels. Whether to upgrade or replace a historic door will depend on factors such as:

- Door characteristics (wood type, thickness, condition)
- Location within the building (is it on the main escape route?)
- Required fire resistance (usually 30 or 60 minutes)

A qualified fire engineer may be able to predict the performance of historic doors in a real fire situation, taking into account how room geometry, fire load and ventilation will affect fire growth.

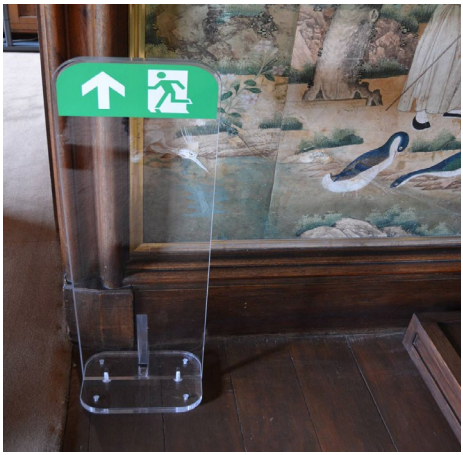
## Detection and alarm systems

Fire detection and alarm systems, which provide warning when a fire has ignited, can be triggered manually or automatically. Automatic systems are more effective at detecting fires in circumstances where people are not normally active – for instance, at night, or in empty or rarely used buildings or spaces. They can be configured to alert the fire service directly.

Technology continues to evolve, with an increasing selection of discreet options:

- **Beam detectors** only require a small transmitter and receiver unit, and are efficient in large spaces such as a church nave.
- **Aspirating systems** require small pipes accommodated within the fabric of the building, but the tiny holes in the ceiling through which air is sucked to a sampling unit are virtually invisible.
- **Wireless technology** can replace the need for hard wiring.

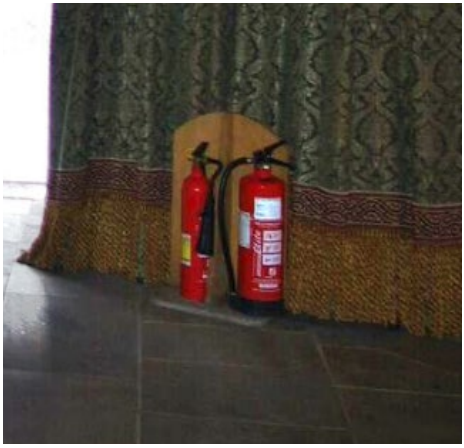
↑ An aspirating smoke-detection system was installed in the Laich Hall at Edinburgh Castle during restoration work. These systems draw air through small pipes to detect smoke. You can see the pipe here before it has been cut back to lie flush with the ceiling, forming a near-invisible detection system. © Rob Thomson



↑ Free standing signage can be designed in a variety of ways. This example is at the category A listed Abbotsford House. © Crown Copyright Historic Scotland

## First-aid firefighting

Manual first-aid firefighting equipment, such as extinguishers and fire blankets, can be used to extinguish a fire in its early stages. Equipment can be free-standing in places where fitting to a wall might damage historic fabric – or it can sometimes be enclosed in cupboards or recesses, providing they have adequate signage and staff are aware of their locations.

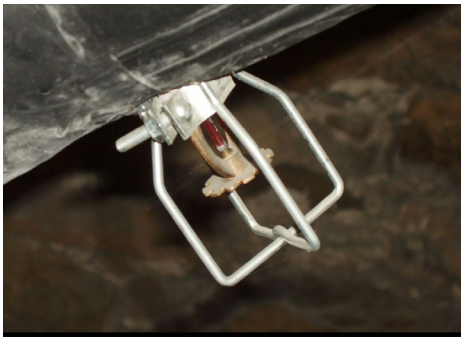


↑ Extinguisher stands in the Great Hall at Stirling Castle. By using free-standing extinguishers, any damage to the historic fabric has been minimised. © Rob Thomson

## Suppression systems

Automatic fire suppression systems use a variety of agents, including water, mist, foam and gas, to restrict the spread of fire and to confine it to a small area. They may also extinguish it. These systems require physical intervention into a building's fabric, so care must be taken in their design to consider factors such as:

- **Pipework**: this can be concealed under floors, in the beams of a coffered ceiling or along deep cornices. Where visible, pipes may (with the manufacturer's approval) be painted to reduce their visual impact.
- **Storage of the suppression agent**: water tanks, for example, can be housed discreetly underground, in basements or in outbuildings.
- **Location and type of discharge heads/ nozzles**: these can be exposed or fully recessed, with cover plates coloured to match their background(s).



↑ As this automatic fire suppression system head is located in the attic of the A-listed Duff House it does not require to be discretely located. These heads can, however, be fully recessed with cover plates to match their backgrounds in more sensitive historic areas. © Rob Thomson

## Means of escape

Escape routes enable safe evacuation. The local authority may be able to advise on the level of provision, taking into account such factors as the number and capabilities of occupants, the geometry of the building and the overall risk levels. It can be challenging to develop means of escape in existing buildings, but solutions can include:

- Converting an existing opening into an exit (where practicable, this should be on a subordinate façade in order to avoid affecting the main front of a building)
- Enclosing an existing internal stair
- Constructing a new external escape stair (again, preferably on a subordinate façade)
- Installing or upgrading an alarm and detection system
- Installing or upgrading a smoke extraction system

## Emergency escape lighting and signage

Standard emergency escape lighting and signage can look incongruous in a historic setting, but with careful consideration to design and positioning, its impact can be minimised. For instance, photoluminescent technology can be used to avoid the need for hard wiring; obsolete light fittings can be converted for re-use; or combined lighting and signage units can help to minimise hardware. Lighting and signage can be surface-mounted, recessed or suspended to suit the surroundings.

In certain building types, such as those not continuously open to the public, it can sometimes be acceptable to take a more flexible approach that makes use of free-standing exit signs and temporary lighting.

## Emergency fire action plan

An emergency fire action plan sets out the actions that occupants should take in the event of a fire. For occupants with disabilities, additional precautions – and possibly works to the building – are required to ensure safe evacuation, and a Personal Emergency Evacuation Plan is often advisable.

The Scottish Government provides advice on this in the document *The Evacuation of Disabled Persons from Buildings*.[7]

Historic Scotland's managing change guidance note on *Accessibility*[8], which considers how to improve physical access to and within buildings, may also be helpful.

7 http://www.gov.scot/Resource/0040/00402451.pdf
8 http://www.historic-scotland.gov.uk/accessibility.pdf

# 6. Insurance

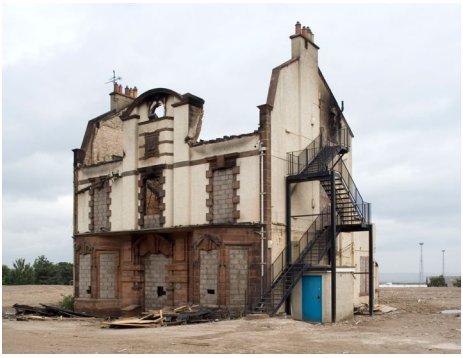
Building owners need to decide what insurance is appropriate to cover the possible risks and to protect the value of their asset. An up-to-date building valuation will help potential insurers to assess the risk more accurately. For information about insurance and listed buildings, see the **factsheet**[9] on our website.

# 7. Reconstruction and listed buildings

In some cases where listed buildings have been substantially destroyed by fire, they have been restored – examples include the Ca' d'Oro building in Glasgow and Morgan Academy in Dundee – but this is not generally required by legislation. Although it can happen in exceptional circumstances, it is far from typical for a building owner and their insurance company to opt for restoration.

Partial loss is much more common. For example, the loss of a single door that forms part of the character of a listed building is likely to require replication, as a non-matching re-instatement may not be acceptable. Where the listed building formed an integral part of an important architectural group such as a terrace, the exact reinstatement of at least the exterior may be required by the planning authority in some circumstances.

See our insurance **factsheet**[10] for more information.



← A fire at the B-listed central administration block of the former Eastern General Hospital, Edinburgh in 2007 resulted in the building being severely damaged and a risk to public safety. The extent of the damage resulted in the building being delisted in 2012 and subsequently demolished. Some of the stonework has been retained for reuse on the site. © Crown Copyright: RCAHMS

9 http://www.historic-scotland.gov.uk/listinginsurance.pdf

10 http://www.historic-scotland.gov.uk/listinginsurance.pdf

# 8. Salvage

If the worst happens, you may want to consider the salvage and reuse of architectural features and materials. In the case of a listed building this will often be a condition of consent for demolition. Some local authorities operate architectural salvage stores, and a commercial market exists for items such as roofing slate. See our guidance note on **Demolition**[11] for more information.

# 9. Consents

You may require planning permission, building warrant(s) and other permissions or consents for any proposed scheme. The granting of scheduled monument consent or listed building consent does not negate this requirement, and you should contact your planning authority for advice.

## Listed building consent

Listed building consent is required for any work to a listed building which will affect its character (see the **Planning (Listed Buildings and Conservation Areas) (Scotland) Act 1997**).[12] The planning authority is the main point of contact for all applications for listed building consent. They decide whether consent is required, and they can also offer advice on applications.

The planning authority will consider applications using guidance such as Historic Scotland's managing change guidance notes and other national policy documents including SHEP[13], SPP[14] and their own policies.

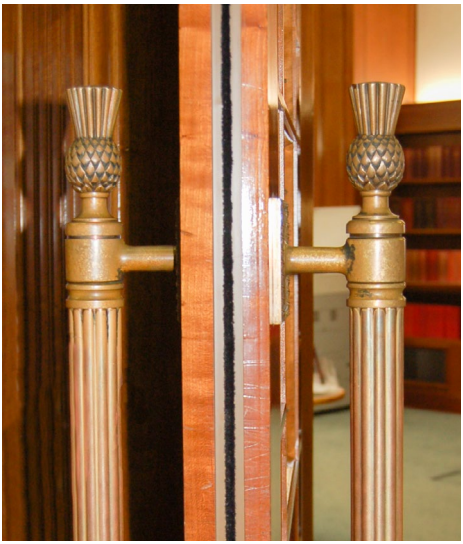
11 http://www.historic-scotland.gov.uk/demolition-2.pdf

12 http://www.legislation.gov.uk/ukpga/1997/9/contents
13 http://www.historic-scotland.gov.uk/shep-dec2011.pdf
14 http://www.gov.scot/Publications/2014/06/5823

## Scheduled monument consent

Scheduled monument consent is required for any works to a monument scheduled under the **Ancient Monuments and Archaeological Areas Act 1979**[15]. Scheduled monument consent is determined by Historic Scotland.

We offer a free pre-application discussion and checking service for scheduled monument consent applications. You can find out more about this on our **website**[16].



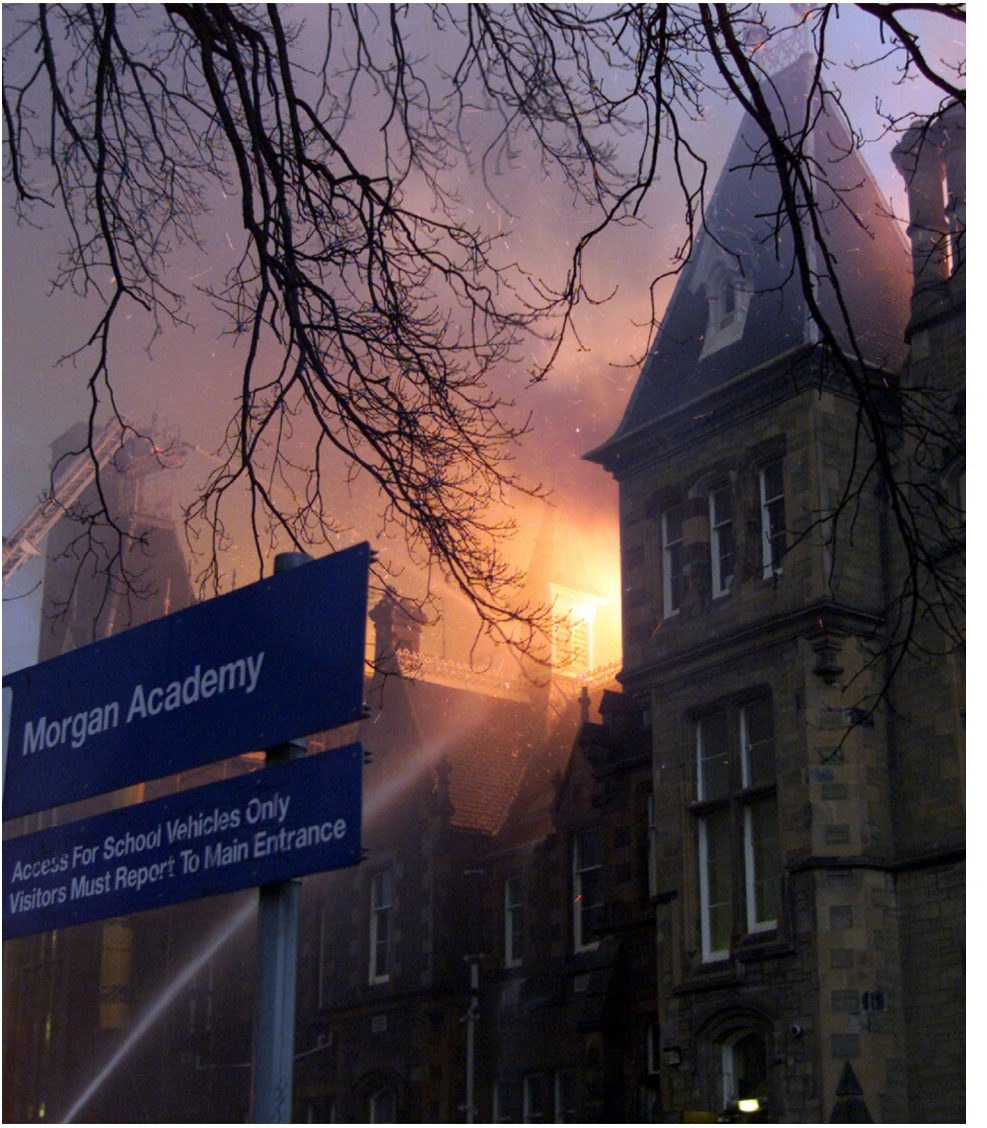
↑ Historic doors can be upgraded in a variety of ways. In this reading room at the category B listed National Library of Scotland cold smoke seals have been run along the stile. © Crown Copyright Historic Scotland

# 10. Searching for listed buildings and other designations

You can search for listed buildings, scheduled monuments, battlefields, gardens and designed landscapes on our **website**[17] (please read the guidelines on the search page). If you are still not sure whether you are designated, you can also email or telephone us for help.

For a map-based search and wider environmental information, including conservation area boundaries, see the **Scotland's Environment**[18] website. You can also ask your local authority to tell you whether you are listed and what is covered by the listing.

15 http://www.legislation.gov.uk/ukpga/1979/46
16 http://www.historic-scotland.gov.uk/index/heritage/searchmonuments/scheduledmonumentconsentprocess.htm
17 http://data.historic-scotland.gov.uk/pls/htmldb/f?p=2000:10:0:
18 http://www.environment.scotland.gov.uk/




↑ Above: Morgan Academy, Dundee, as fire swept through it in 2001
© PhotoShopScotland

# 11. Further information and advice

Historic Scotland is charged with ensuring that our historic environment provides a strong foundation in building a successful future for Scotland. One of our roles is to provide advice about **managing change** in the historic environment.

## Legislation and policy

Building (Scotland) Act 2003[19]
Fire (Scotland) Act 2005[20]
Planning (Listed Buildings and Conservation Areas) (Scotland) Act 1997[21]
Ancient Monuments and Archaeological Areas Act 1979[22]
Scottish Planning Policy (2014)[23]
Scottish Historic Environment Policy (2011)[24]

## Guidance

Historic Scotland Guide for Practitioners 7: Fire Safety Management in Traditional Buildings[25]
Historic Scotland Guide for Practitioners 6: Conversion of Traditional Buildings: Application of the Scottish Building Standards[26]
Historic Scotland Inform Guide: Fire Safety[27]
Historic Scotland Short Guide on Fire (due to be published in Autumn 2015)

Further information and guidance on fire legislation is available from the Scottish Government's FireLaw[28] website.

19 http://www.legislation.gov.uk/asp/2003/8/contents
20 http://www.legislation.gov.uk/asp/2005/5/contents
21 http://www.legislation.gov.uk/ukpga/1997/9/contents
22 http://www.legislation.gov.uk/ukpga/1979/46
23 http://www.gov.scot/Publications/2014/06/5823
24 http://www.historic-scotland.gov.uk/shep-dec2011.pdf
25 http://conservation.historic-scotland.gov.uk/publication-detail.htm?pubid=7370
26 http://www.historic-scotland.gov.uk/guide-for-practitioners-6.pdf
27 http://www.historic-scotland.gov.uk/informguide-fire.pdf
28 http://www.gov.scot/Topics/Justice/policies/police-fire-rescue/fire/FireLaw

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