

Fires in Historic Buildings

The dramatic fire at the iconic Notre Dame Cathedral in April 2019 highlighted the vulnerability of historic buildings and heritage sites. There have subsequently been calls for the full restoration and renewal programme for the UK Houses of Parliament to be urgently implemented, with the historic Grade 1 listed building facing many critical risks including its outdated electrical system. Fires in historic buildings continue to plague towns and cities across the UK such as the Bank building in Belfast, home to a high street retail outlet and the Mackintosh Building in Glasgow, home to the renowned School of Art.

Why are fires in historic buildings often so severe?

Lack of regulations and fire safety guidance means many historic buildings have unstopped voids from basement to roof level. Fires can take hold and spread rapidly in buildings constructed in this way. Typically, these old properties will have pipes traversing through floor voids and walls, with little or no fire compartmentation installed to reduce the horizontal or vertical rapid spread of flame or hot gases. To add to the difficulties the original records for many of these buildings are no longer available and so the location of these voids may not be known. It is the hidden voids in these type of buildings that allow unpredictable and uncontrollable fire spread and cause problems when trying to effectively protect the building from fire.



After effects of a fire believed to have spread through open voids having originated in a basement plantroom

The challenges

Owners, architects and conservationists will often block attempts to install 'unsightly' fire prevention and suppression measures for fear of ruining the character of the historic building. The cost of retrospectively fitting fire safety measures can also be seen as prohibitive. In some cases, a building's

listed status is stated as the reason for not being required to have work undertaken under the Regulatory Reform [Fire Safety] Order.

Fire safety measures

Fire safety measures fall into 2 main categories, passive (built into the building structure) and active (fire detection, sprinkler systems).

Some fires are the result of electrical anomalies which can be reduced by regular examination and testing of the installations. The use of thermal imaging permits the identification of poor connections, resistive heating and overloaded circuits. The occurrence of electrical fires can also be reduced by installing systems where the current flowing in the current carrying conductors is monitored and fitted with appropriate protective devices.

The routing of building services can compromise any compartments and separating walls creating opportunity for fire and smoke spread. Any openings should be properly fire stopped to maintain integrity and separation.

With historic buildings, to protect life and to preserve the building's fabric and contents, escape routes may be longer than the required maximum travel distances as stated in the current building regulations. Properly fitted and regularly maintained fire doors and intumescent seals are therefore essential.

Any high-risk areas (kitchens, boiler rooms) must be afforded the proper separation to reduce fire risk.

Sprinklers are an effective means for detecting and suppressing a fire during its early stages, before it destroys the entire building. Whilst there is understandable concern about accidental activation and the water damage that results; water damaged paintings and artefacts can be repaired, whilst those consumed in a fire are lost.

Automatic Fire Detection systems will inevitably be in view and whilst it may be felt that they are not in keeping with the building's appearance they can provide vital early warnings of a fire. Wireless technology can now remove the need for unsightly wiring.

Emergency planning – fire strategy

Many historic buildings can be located in rural areas, which may affect the response times for the attending Fire Services. Emergency planning is a key part of fire strategy and plans



Museum fire

can be put in place whereby training exercises with building staff and the Fire Service can be undertaken. Working together to combine building knowledge and fire-fighting expertise, emergency salvage measures can be organised so that in the event of a fire, artefacts may be saved and important areas of the building that are of major significance may be protected.

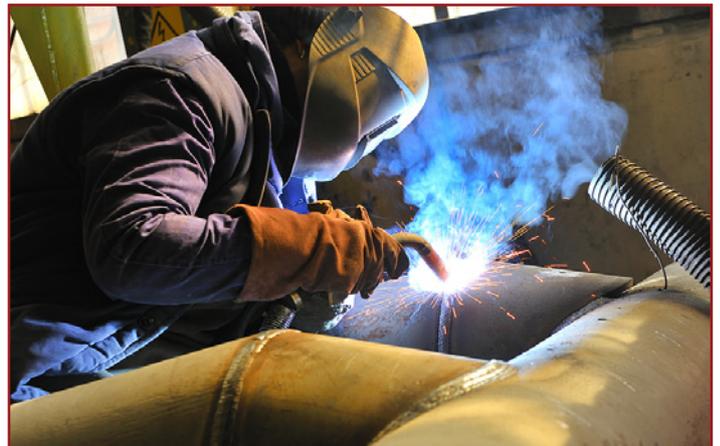
These exercises can also determine where water supplies in the surrounding area are inadequate or limited, highlighting in advance the need for additional water supplies if a fire was to occur.

Fire safety management and renovation works

Good fire safety management can reduce the need for physical fire protection measures by helping to mitigate the risk of a fire occurring, speeding up the discovery and controlling the spread of any subsequent fire. Staff at historic buildings can be given the opportunity to be nominated as a responsible person and trained to identify fire related issues.

The use of CCTV, with proper guarding and supervision is an effective means of monitoring the building and occupants.

Our historic buildings are potentially at their most vulnerable during renovation works, particularly those involving hot work. Hot work refers to methods of work, primarily in construction and refurbishment, which produce heat in the form of flame, hot surfaces or sparks. Those involved in hiring contractors for this type of work, particularly related to historic properties, are advised to check job quotations; method statements; risk assessments; to ensure they follow industry guidance. Where contractors are likely to be visiting and carrying out work of a potentially hazardous nature, a permit to work system should be introduced to supervise the contractor and control the risks. Hot work permits should be produced for every period of work. They last a maximum of one day and cover only the area detailed in the permit. The permit should be signed at the start of the task and at the conclusion of the task by those completing the work and those authorising the work. When hot work is being undertaken there should be a continual fire watch and firefighting arrangements in place to mitigate fire risks.



Hot work - welding sparks

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