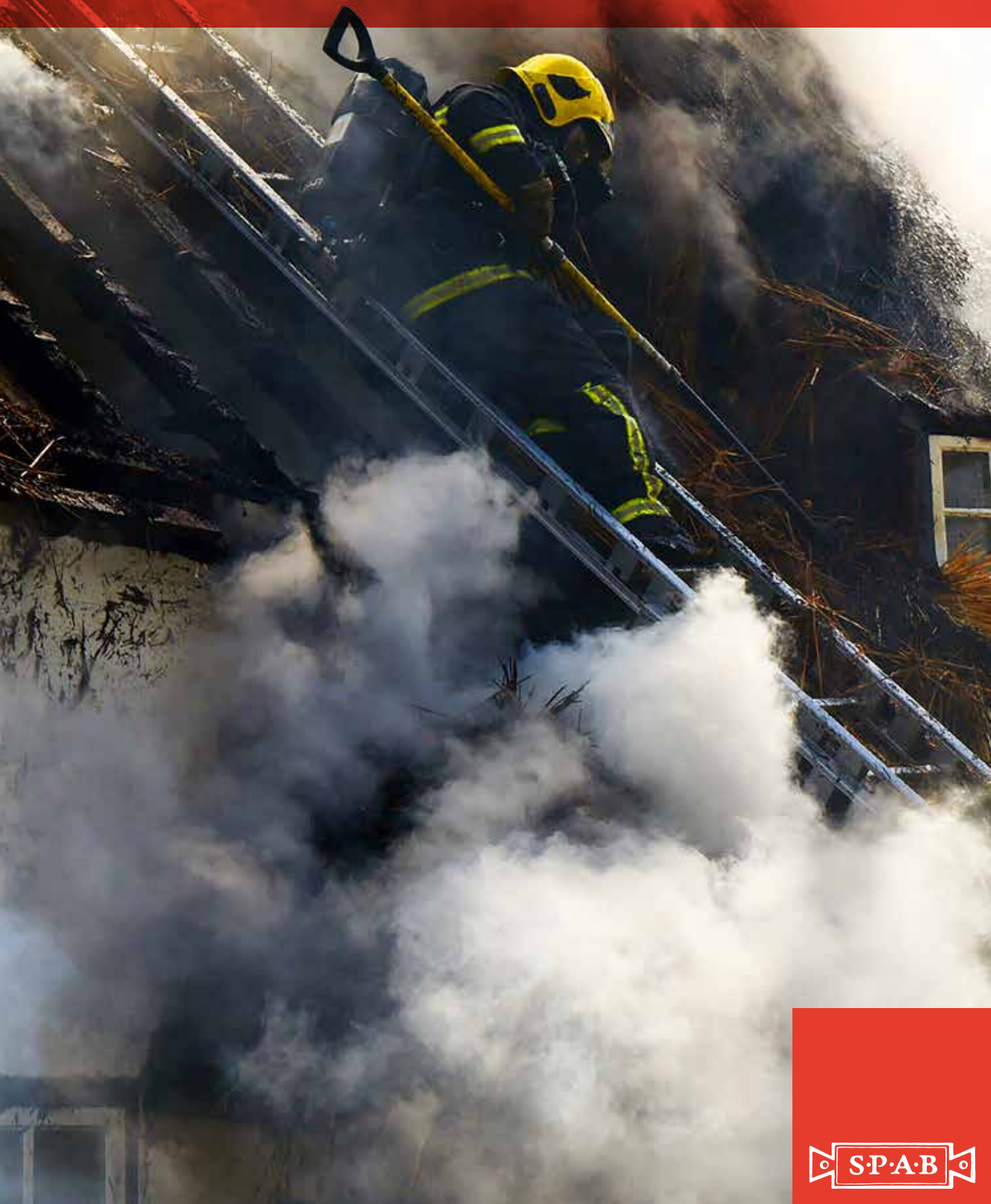


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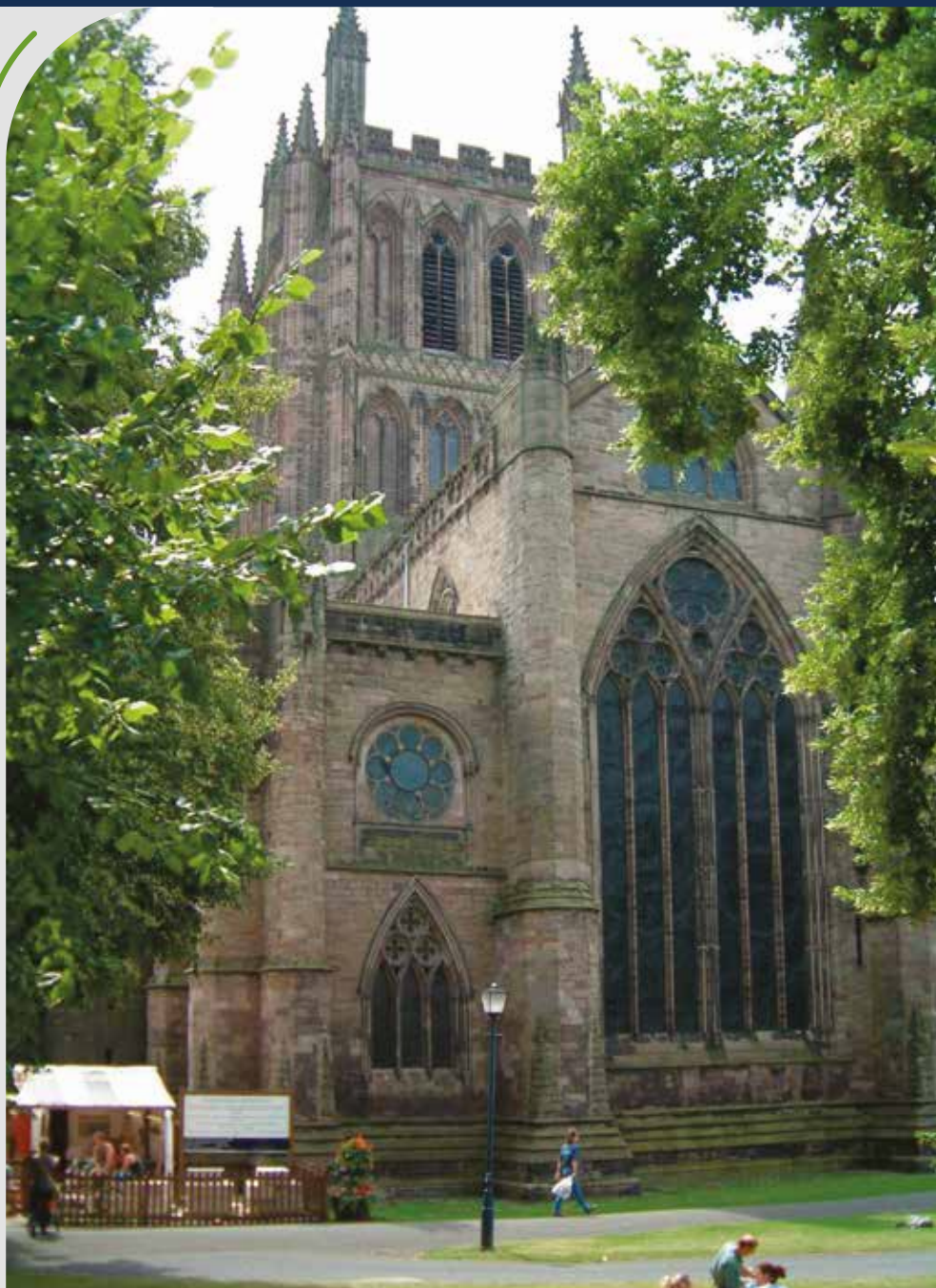
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Introduction from **Douglas Kent**,
technical and research director,
Society for the Protection of Ancient Buildings.

The purpose of the SPAB is to protect old buildings from harm. The Society's initial focus was on opposing the damage being inflicted by destructive restorations of the Victorian era and promoting instead an approach of 'conservative repair' but there are many other threats to the wellbeing of old buildings. These include the unpredictable, for example, flooding, fire, lightning strike and crime. Beyond the human misery and potential loss of life, the damage that disasters can wreak on our finite supply of old buildings is immeasurable.

Our forebears devised various practices to defend buildings from misfortune. Ancient burn marks can often be found on fireplaces and timber framing which seem to be deliberate, a superstitious effort to 'inoculate' buildings against fire. 'Thunderstones', comprising prehistoric stone axe heads, sometimes appear to have been positioned deliberately close to chimneys or hearths and under roofs to protect buildings from thunder and lightning.

Prevention remains better than cure and it is important that we plan for potential disasters. With the impact of climate change, major weather events are now occurring at more regular intervals with incidents, that a few years ago would have been considered to be once in a generation, now recurring in a decade. We must, therefore, assume that low-lying communities will flood, so historic properties that are potentially vulnerable need to consider measures to minimise the impact.

Much is talked about retrofitting our building stock in order to reduce its carbon footprint. The thermal upgrading of buildings is one aspect of this but the need to improve their overall condition and introduce elements to better resist the effects of a changing climate is vital, so that the structure and fabric is better able to handle weather conditions for which it was not designed.

We should not only plan for disasters but be able to implement a recovery process that is in tune with the historic fabric. The material make-up and construction techniques used in the past often mean old buildings are well equipped to deal with disasters. ➔

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For further information about the organisations, research and policy documents mentioned in this Briefing, visit spab.org.uk/advice/spab-briefings



Cover: Research and forensic investigation has shown that the main cause of thatch fires is embers, burning brands or sparks from chimneys falling onto the thatch.

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» The SPAB technical advice line frequently receives calls from owners, architects, surveyors and other building professionals who are faced with the aftermath and are seeking to understand how to move forward. Sadly, though, many don't ask and there is a lack of understanding about how best to deal with disaster. Typically, the first instinct is to rip out the damaged fabric of a building.

The risk of flooding is increasing but there are fears that damage to old buildings is being compounded by unsuitable responses promoted by many insurance companies, loss adjusters and contractors.

Over the years, there have been high profile debates about how best to rebuild after a building has been ravaged by fire. Owners commonly ponder the best way forward – whether they should try to reconstruct or build something new and very much of today. Reconstruction of partially-damaged elements of a building may offer the most fitting response but, where damage is severe or total, the SPAB favours a solution which is sympathetic in terms of design and materials but of our time, rather than being a recreation.

Old buildings are not immune to disaster – and cannot be made to last forever – but, by being prepared and following the approach advocated by the SPAB, we will ensure that they survive in a form that embraces their history and spirit for as long as possible. ❧

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Be prepared

David Scott, of chartered building surveyors *Scott & Co*, outlines what can be done to mitigate the impact of disasters on old buildings.

You may not expect a disaster but you can be prepared. One sure fact is that older buildings by their nature are very resilient. They are constructed from traditional materials with a form and mass that can cope if, and only if, they are maintained well before a disaster, and carefully handled after a disaster.

Fire can be the most destructive of traumas that historic buildings experience. The fire itself can be all consuming. Plaster, wood, glass and the roof will all be damaged. The process of putting out a fire can cause thermal shock whilst saturating the core. This in turn will increase the risk of reactivating dry rot as the building dries out. Smoke damage and the smell can be all-pervading.

While fire is never planned, its effects, as with most disasters, can be limited. The priority must be the preservation of life. Following this, a proper disaster management plan should be in place. This is not just relevant to stately homes and palaces. We all have personal valuables which we would hope not to lose. The extent of damage experienced can be limited by having properly maintained alarm and detector systems. Roof spaces should be reviewed. Can fire breaks be installed? Can fire be contained by upgrading fire protection on walls and doors whilst retaining historic fabric? Is there a risk of fire spreading from neighbouring properties? Are the electrics safe and are the cables above the insulation? Are the chimneys lined?

Following a fire that has been extinguished by water, a building will need time to dry out. This is the same for a building that has been flooded. Insurance companies will be keen to get all reinstated and the claim closed as soon as possible. This is certainly not good for older buildings. Rapid drying out can cause an unnecessary loss of historic fabric. Timbers will shrink, plaster will crack and walls could move. If insurance exists, ensure that the company and their loss adjuster understand old buildings. Do not get pushed into action that you are uncomfortable with. Ensure that you are in control.

Water damage post storm, flood or fire can cause all sorts of issues. Contaminated water may seep into the walling which can bring with it a multitude of organic worries. Sewage water potentially causes serious health and cleansing issues. Flood water from farmland can bring contaminated silts. Sea water brings salts. Water used for firefighting could bring other unknown contaminants such as asbestos fibres. Be prepared, you will not just be dealing with drying out.

DAVID SCOTT



Consider if any of the risks can be reduced. Maintain or upgrade drains. Maintain hedges to slow or redirect run off. Always keep on top of cyclical maintenance. Know where service cut-offs are located. Insulate water pipes. Have an asbestos check.

Remember that basic repair and maintenance to the fabric of a listed building will not need statutory consent. Changes to wall finishes, damp proofing (not recommended), redesigning of layouts or insulating, to mention a few, will all require local authority approval. If in doubt always seek professional advice.

Following a disaster, the priority is generally to get back to normal as soon as is possible. People look for that elusive silver lining, and consider what could be done whilst the repairs are underway. Take care, council approval is likely to be needed and the insurers rarely pay. Policies do not cover for future proofing or upgrading.

I know of some very desirable cottages on a river bank that often floods. One is still occupied by an elderly widow who has solid slate floors and rugs. When the waters rise she lifts the rugs and sweeps the water out. If caught out, her rugs hang on a fence in the front garden to dry. Her neighbours have modernised with wooden floors or fitted carpets which all have to be ripped up. The traditional unmodernised often outlasts because it has done so for generations.



ROGER HUNT



LEFT
Damage caused
by flooding in the
Cornish village of
Boscastle.

ABOVE
Sandbags are just
one measure used
to protect buildings
from flooding.

A proper disaster management plan should be in place.

In the Cornish village of Boscastle, it was the older traditional buildings that resisted the waters of the 2004 flood. Modern concrete block structures collapsed under the pressure. Organic contamination from the trout farm upstream was an issue as was the impact from floating motorhomes. It is impossible to plan for every eventuality.

On the Somerset Levels, where the flood waters of 2013–2014 lasted for weeks, problems of drying will have topped the list of worries. Traditionally constructed buildings take well over a month per inch of wall thickness to dry out. On average, this will be between two and three years post flood. Do not be rushed or persuaded that modern solutions will work. They may in the short term but problems will occur with salting, damp and rot if the process is rushed. Guarantees are of little use. Traditional buildings need traditional techniques and materials for reinstatement. Take the opportunity to reverse some of the errors of the past.

By being prepared you will be aware of the options available to you. Know the building and more importantly the locality. Assess the risks and develop a plan. Know what is valuable. Be empowered by the knowledge of what can be done but, above all, remember that disasters are not planned! ⚡

www.scottandco-buildingconservation.co.uk

Thinking ahead

Before taking any action, the first priority should always be human safety so have an escape plan and never put yourself or others in danger. Only use fire fighting, flood defence or similar measures if it is safe to do so. The emergency services must be able to get to the property quickly and have appropriate resources to hand – in an emergency, provide the address, post code and OS grid reference.

- Install smoke and heat detectors (preferably hard-wired) as well as carbon monoxide alarms. With thatched properties in particular, a detector in the roof space connected to a sounder in the main area of the building is advisable.
- Have fire extinguishers to hand and, in kitchens, a fire blanket.
- Provide guidance on how to deal with leaks, fires, power cuts and floods.
- Keep an emergency pack close to hand in a convenient and easily accessible location. This should include contact details for those who may need to be called in and insurance information.
- Know the location of valuables, important papers and other items within the property so they can be retrieved quickly during the initial escape or so the fire service can be advised.
- Where numerous items of value exist, prepare a list of priorities to speed and maximise the effectiveness of salvage efforts.
- Be prepared for the recovery phase. Understand the building and how to handle salvaged items and materials. Maintain lists of suppliers, specialists and equipment that may be required.

Permissions and consents:

It is advisable to consult with the local planning authority before undertaking any flood, fire or similar protection measures to establish whether listed building or other consents are required. Some works may need building regulation approval.

Flooding

Architect and historic buildings consultant

James Innerdale offers advice on minimising the impact of flooding and how best to implement the recovery process.

There are two approaches to improving the ability of a building to withstand flooding, flood resistance and flood resilience. Flood resistance involves measures to stop, or at least minimise, the amount of floodwater entering the building with the use of physical barriers and surface finishes that can be readily cleaned down after the event. By contrast, flood resilience involves measures to adapt a building to limit the damage caused once water has entered, with emphasis on allowing water in, but allowing it to drain out again quickly, so facilitating more rapid drying and re-occupation of the building. This strategy has the benefit of being able to deal with more rapid and higher floodwaters and is the strategy adopted by water mills which allow the water to flow under them.

For traditionally constructed buildings, where the need to maintain the ability of the walls to breathe is critical, a mix of the two strategies is likely to be most effective.

Understanding the risk

Any measures must be considered in the context of where the water is coming from and how it will drain away. For instance, a flood gate on the door is not going to stop rising ground moisture from coming up through the floor and may trap the water inside. The principal sources of flooding are from:

- Rivers having burst their banks or coastal flooding, with the potential for contaminated water
- Surface water run off, including roads, fields, paths and overflowing drains, again with the potential for contaminated water
- Rising ground water
- Backing up sewers, with associated contamination
- Leaking and/or badly maintained roofs and windows and rainwater goods
- Burst pipes

The severity and impact of any flooding will also depend on the height the floodwater reaches, the length of time the floodwater is present and the type of soil beneath. The length of time a building is underwater can be the most critical, as even materials such as lime plaster are more at risk of failure.

Flood resistance

Flood resistance measures can make the most difference when floodwaters enter the building directly from the outside as a result of rivers bursting their banks rather than from rising groundwater coming up through the floor. A more permanent version of sandbags are flood



The length of time a building is underwater can be the most critical.

doors and floodgates. Flood doors mean replacing the existing door. Floodgates can be introduced either at the front gate or more usually in a doorway, with permanent guide bars to either side into which interlocking barrier panels are fitted up to the anticipated level of the flood water.

Properties with suspended timber floors are also vulnerable to water entering through airbricks venting the floor void. Whilst these can be useful for draining the water away after a flood, they need to be temporarily blocked up to prevent water getting in. There are a range of covers that can be added in advance of any flood as well as airbricks with valves that close, preventing flood water from passing through. Care must be taken to ensure these do not reduce normal ventilation levels as this could lead to longer term problems with dry rot.

The introduction of sump pumps can help control the levels of rising ground water. The sump pump sits below ground level and is designed to pump out water faster than it enters the property. The pump has a float switch which automatically activates as required. This type of pump is commonly used to stop cellars flooding and can be employed in conjunction with membrane systems. It can also be helpful at ground floor level to stop, or at least slow, the rise of water levels inside the house. If the surrounding water level is high, it should be remembered that there is the danger that pumping can result in increased external pressure on foundation walls, which may cause fragile thin-walled structures to collapse inwards.

Backflow of sewage can cause major damage in flood situations. Fitting non-return valves to drains, either in a manhole or on the discharge pipework from the property can prevent backflow by automatically closing in flood situations. Similar backwater valves can be fitted to waste water pipes, such as those from kitchen sinks, basins, washing machines and dishwashers.

Flood resilience

These measures in part take advantage of the need for traditional buildings to breathe and the use of materials that absorb water, but also dry out without affecting their integrity and so avoiding, or at least minimising, the amount of stripping out required. When choosing a material it is therefore important to understand how wetting and drying affects its performance, either positively or negatively, depending on whether it is breathable/vapour open or barriered/vapour closed.

Breathable traditional materials, such as lime pointing and renders externally and lime plasters and compatible paint finishes internally, are therefore most suitable. Gypsum plasters and plasterboard by contrast are more vulnerable to water damage and, along with non-reversible tanking, sealants and water repellent coatings, also prevent drying out. The moisture is then trapped, allowing it to build up, with potential for increased decay of the masonry as well as providing conditions for rot and timber decay.

In basement situations, plastic membrane systems →



ROGER HUNT



DOUGLAS KENT

LEFT
Fully automated hydraulic flood defence system installed as part of the Wakefield water-front regeneration scheme.

ABOVE TOP
A temporary wooden flood barrier has minimal impact on the building.

ABOVE BOTTOM
Permanent flood gates may be necessary in areas prone to regular flooding.

→ with a cavity behind may be appropriate, but these must look to direct the moisture away, rather than trapping it behind. Options include membranes with ventilation of the cavity at the head and base allowing some moisture evaporation to take place, as well as sealed systems where the water build up within the cavity is disposed of via a sump and pump.

As part of more extensive works, a breathable limecrete may be an option as an alternative to a concrete floor. The depth and closed cell structure of loose fill foamed glass insulation below the limecrete screed prevents water from wicking upwards, thus reducing water levels reaching the final floor finish. In instances of flash flooding, the limecrete screed should also remain intact and structurally sound. The breathability of the floor, combined with underfloor heating, will allow it to fully dry out quicker than a concrete screed which may, in any case, need to be replaced as a result of salt damage or breakdown of the insulation.

Consideration needs to be given to the protection and location of electrics, heating and other services as losing power will impact the drying out process and the ability to start using the building again. As part of any improvement works, it is therefore worth repositioning the electrical consumer unit to the upper floors and running electric cables from ceiling level down. It is important to position sockets above potential flood levels and for the main parts of a heating system, such as the boiler, to be installed upstairs, or at least above the ground floor.

Managing the event

Reacting to a flood requires some planning and organisation. Even though the best preparations may be overtaken by circumstances, having a plan can reduce stress levels and save possessions that might otherwise be lost in the panic. In addition to the activation of any resistance measures, it is worth giving thought to what to do with furniture, electrical goods and other belongings that may be at risk. Any plan should cover how and where they are to be moved, how long this will take and even who is going to move them. It is also important to understand how the building is constructed and what can be kept and what will have to be stripped out after an event.

This is something that might be worth highlighting with insurers.

Recovery and drying out

After a flood, try not to be too hasty removing wet plaster, joinery or other building components indiscriminately. Make sure the building is safe, with services turned off pending inspection and no obvious signs of structural problems. Fully photograph damage for insurance claims if these are going to be made. Then, after letting the flood-water recede, check for any remaining standing water in areas such as underfloor spaces and ducting.

Any residual mud, silt and debris should be removed and disposed of appropriately. Air bricks must be cleared. Where required, as a result of contamination, surfaces should be rinsed down with detergent and, if necessary, disinfected. Wear suitable protective clothing and beware of hazardous materials.

To prevent serious damage, it is important to dry the building slowly, first by natural ventilation and then, where required, with extractor fans, background heating and dehumidifiers. It is important to keep the building secure against intruders, perhaps using temporary perforated boarding or metal grilles.

With suspended timber floors, allow room for expansion by carefully removing occasional boards to reduce buckling caused by swelling of the wet wood. Once the boards have dried, the lifted boards can be re-laid. It may be necessary to carefully dismantle wall paneling and door and window linings to improve ventilation and drying of the spaces behind. Depending on the time of year, soaked, very soft external brick or stone may need to be protected from frost.

Complete drying may take months or years until moisture levels are at or lower than before flooding and building materials can finish returning to equilibrium by themselves without further damage. This does not preclude reoccupation of the property before that time. Salt deposits (efflorescence) may appear during drying and can be brushed or vacuumed off, although heavily salt-laden joints in stone or brick floors might need repointing in lime. ❧

Try not to be too hasty removing wet plaster, joinery or other building components.



CHRISTOPHER GARRAND



ROGER HUNT

FAR LEFT
Extensive work underway to rectify damage following flooding in Cockermouth, Cumbria.

LEFT
Background heating and dehumidifiers are frequently used to aid the drying out process.



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Secondary Glazing

Theft and protection

Criminal activity related to old buildings is increasing. Mark Harrison, Historic England's head of heritage crime and policing advice, reviews the steps being taken to counter the problem.

Harm caused by crime or anti-social behaviour to our built and cultural heritage will often not only have a direct impact by damaging the fabric of the asset itself but may also have an indirect impact such as social or economic loss to the amenity of an area.

The problem of crime and anti-social behaviour relating to historic buildings is not a modern phenomenon, what is new is the sheer scale and extent of the criminality. In 2012 Historic England published research which showed that, in 2011, 18.7% of all listed buildings were physically affected by criminal activity. That is over 70,000 listed buildings. For almost 30,000 listed buildings the impact was classified as 'substantial'.

Our understanding of the threats posed to heritage sites, buildings and cultural property continues to improve. Among the most prevalent crimes involving buildings are architectural theft, in particular metal and stone, and criminal damage resulting from vandalism, graffiti and arson.

The challenge set for the authorities charged with the protection of the nation's heritage is clear; namely, that the historic and cultural environment should be passed to the next generation in as good or better condition than we find them. In 2010, Historic England, in collaboration with the National Police Chiefs' Council, the Crown Prosecution Service and a number of local planning authorities and heritage organisations, recognised the

need for a structured and coordinated approach to preventing and investigating crime and anti-social behaviour within the historic environment of England.

Significant progress has been made over the last seven years. The Heritage Crime Programme has stimulated an awareness of the existence and significance of protected heritage assets at a national and local level. Over 8,000 law enforcement and heritage professionals and local community activists have been provided with the advice, training and expertise they require to protect the historic environment in their local areas from the impact of crime and anti-social behaviour.

A growing number of police services have identified officers to act as single points of contact for matters relating to heritage and cultural property crime. This network of specialist officers, police staff and support volunteers is helping to provide an effective and efficient response to heritage crime and has been supported by the publication of *Heritage Crime: A Guide for Law Enforcement Officers*. In addition, several partnership campaigns have launched to target specific threats.

Across the country, local history and archaeological societies, metal detecting clubs and other groups are developing Heritage Watch schemes to seek to inspire and encourage communities to be more aware and vigilant to the threat of heritage crime within their local areas, and to report any suspicious activities to the police.

In February 2016, the Sentencing Council published new sentencing guidelines for theft offences which now include the theft, handling and disposal of stolen heritage assets. The new guidelines will help the courts identify all the relevant factors to include and consider when making sentencing decisions in relation to heritage and cultural property crime.

Historic England has published a suite of guidance and advice to assist practitioners and communities. When considering crime prevention measures, it is advisable to speak to the local authority planning department or relevant advisory body if there is any doubt about whether a permission or consent is needed for their implementation. #

www.historicengland.org.uk



ALL: CHURCHES CONSERVATION TRUST



FAR LEFT
Lead theft from roofs usually results in disastrous damage to the building's fabric due to water penetration.

LEFT
Criminal damage resulting from vandalism is a growing problem.



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Insurance

Clare Pardy of *Hallett Independent*, a broker specialising in art and heritage insurance, provides an overview of what to think about when insuring old and special buildings.

Insuring an old, listed or unusual building is, not surprisingly, more complicated than covering its more standard equivalent. Direct insurers are not really equipped to do it and the best advice is to approach a broker with the right experience and knowledge and an established relationship with a specialist insurer.

It is vital that buildings are not underinsured and the primary issue must therefore be deciding on the reinstatement value of the building – in other words the cost of rebuilding it in the event of a loss. This bears no relationship to its market value and can be either considerably more or less, governed as it is by a number of different factors. Principal amongst those is the cost of materials, the use of specialist craftsmen, negotiating permissions and access to the property. All of these elements will also have a knock-on effect on the indemnity period which is what is agreed as a realistic time in which the work can be completed.

First of all, sourcing the appropriate materials can be time-consuming. Obtaining the right sort of Welsh slate or handmade bricks can be difficult, especially if it is a partial reinstatement and the issue is one of matching existing materials. Any specialist insurer will have their own contacts and, working with an experienced loss adjuster, will know how best to obtain these, but this doesn't happen overnight. They will also have a broadly pragmatic approach, often employing contemporary materials for strength or resilience where they cannot

be seen, new oak for old but cut in a traditional way and to the right size for period floorboards for instance but there is no point in using hand-made nails if they are to be covered up. Equally, it might sometimes be necessary to go the extra mile and there are even examples of insurers re-opening quarries to obtain the right stone for an important building.

Having obtained the right materials, skilled craftspeople are required to do the work and there might well be a waiting list for these. It could be said that one of the few advantages of major fires in historic houses is that they can create and foster these skills and help to sustain skilled individuals and workshops. Each part of the operation will have to be agreed with the local planning authority, perhaps on advice from Historic England, Cadw, Historic Environment Scotland or a National Amenity Society, like the SPAB, if the property is listed, and it is essential that good relations are nurtured. Consideration will need to be given to getting materials on site – through traffic, congestion zones or over narrow historic bridges. This all takes time and will have a financial impact on the eventual cost which, in turn, needs to be factored into the reinstatement value.

Whereas standard properties will be valued with reference to the relevant RICS index, with a price per square metre, historic buildings with period detail will often need to be broken down into relevant architectural components and assessed individually. This might include the cost of producing moulds to reproduce parts of a plastered ceiling or reproducing a profile for skirting boards or panelling.

The demarcation of what constitutes buildings and contents can be complicated. Take painted ceilings for instance. These may be painted on canvas, in which case they would be regarded as contents, or painted directly on to the ceiling, when they would be categorised as part of the building.



Old buildings come in all shapes and sizes and, although only a minority will boast painted ceilings, if they pre-date about 1840, they will generally pre-date any form of standardisation. And it is this that really dictates the nature of the insurance required. This not only affects the reinstatement value but also the risk management and any claim settlement. Whether it is finding an appropriate lock for a medieval door or the right sort of smoke detector for a moulded ceiling, it is imperative that the insurer understands and is able to work with the owner to find a satisfactory outcome. If and when there is a claim, it is most unlikely that the local DIY store will stock the right sort of replacement door.

The main priority for owners of old buildings is having an insurance broker who understands the idiosyncrasies of the building and can find the right insurer to cover them. In many instances, the owner will have bought a property that requires work to be done, whether that is a new roof, rewiring and replumbing or simply the more cosmetic replacement of bathrooms and kitchens. Most insurers allow for a certain amount of improvement but become decidedly nervous at the prospect of major refurbishment involving contractors on site for a long period of time as this is, in itself, a major cause of fires. There is much that can be done by the owner to ensure that this risk is reduced and their broker should be on hand to advise them on the best precautions to be taken so that the overall risk is one more acceptable to insurers.

Having said that, there are companies who specialise in covering houses undergoing large repair projects and, although they will charge a slightly increased premium, it is possible once the work has been completed to negotiate much better terms at a reduced cost to reflect the extent and quality of the work. Communication is key here. Often new owners will instigate new works before thinking about their insurance requirements, whereas it is much better to confer with their broker at the outset

There are even examples of insurers re-opening quarries to obtain the right stone.

to understand what is required and so stand a better chance of securing the best cover at the best price. Buildings with thatched roofs are another property type that need specialist cover and a willingness on behalf of the owner to install a high level of fire protection, ensuring that they abide by quite stringent levels of risk management. It is very easy to be seduced by the romance of a thatched cottage but any new owner must be prepared to commit not only to its upkeep but also to a much higher standard of care. Again, there are specialist schemes for this type of insurance and your broker will be the best person to guide you through the process.

Once houses open to the public, owners will need to review their policy and extend certain elements of it. For houses that open for a significant part of the year (approximately 80 days) for instance, automatic terrorism cover ceases and a separate terrorism policy, customarily through Pool Re, must be arranged. Also it is advisable to review liability arrangements, in particular public liability, to ensure that the limit is sufficient and insurers are aware of visitor numbers and the increased foot fall.

The good news is that there are a multitude of different policy types and, with the right advice, it is not difficult to find the right cover for even the most unusual house. It is a false economy to go the direct route because inevitably their approach will be 'one size fits all'. There is also a wealth of advice available not only from your broker but from specialist companies and independent buildings and risk management surveyors who have vast experience of old buildings. #

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Art and document recovery

*Every minute counts when documents, books or artwork get soaked. **Emma Dadson**, key account director at Harwell Restoration, provides guidance.*

The speed with which an incident can be brought under control relates hugely to how much damage occurs to vulnerable items. To maximise speed of response, many of those caring for critical documents, archives and other artefacts have an emergency plan; in fact it is a requirement of both museums and archives accreditation.

This plan should cover things such as lists of suppliers and equipment that will be helpful, including freezers, disaster recovery companies, crates and blotting paper; salvage guidance on how to handle materials; and prioritisation of records.

Simple things make a big difference. Polythene sheets are very helpful to shroud shelving and individual items against water and prevent further damage. You can, of course, run out in an emergency to buy sheeting, but the response is far quicker if there is a supply of polythene sheets in the building as part of a disaster kit; and even faster still if it is pre-cut to cover the existing shelving so time is not wasted measuring and cutting during the crisis.

Once the incident is under control it is possible to move on to salvaging affected items. Paper is vulnerable both to initial water damage and secondary impacts such

as mould growth, ink-bleed, adhesions and distortion. If the worst does happen, the critical steps are to ensure that items are either air-dried within the first three days after the incident or, where this is not possible due to the scale of damage, for documents to be frozen to stabilise them. Frozen documents are then protected from secondary damage and can be dried professionally or defrosted and dried in small batches to a workable timescale.

Air-drying documents requires space, fans, dehumidifiers and large quantities of blotting paper. Documents can be interleaved between blotters in a sandwich effect – about ten levels high – and left to dry. Bound volumes may be fanned open to around 60° on a blotting paper base. No heat should be applied; paper will dry well with air movement and surface area exposure. A caveat would be how much space this process uses, and to be prepared to freeze documents if space runs out. Specialist document recovery companies have freezer capacity that will take contaminated archival collections. Air-drying is no good if the source of the water was foul so damage from rivers or sewage pipes needs professional sanitisation. Again, specialist firms are able to offer facilities for drying and sanitising damaged documents in large volumes.

Artwork requires different treatment and the process is generally more time consuming and labour intensive than with documents. Paintings on canvas cannot be frozen, but some prints and works of art on paper can.

Treatment of artworks involves deframing, drying and then a conservation assessment to address staining and other after effects. Realistically, in a major incident, it will not be possible to start immediate conservation so the first step is triage and air drying to ensure items are not vulnerable to secondary damage.

It is very rare that you have free rein to press ahead with restoration. Once an item is stabilised to prevent damage getting worse, it is necessary to provide insurers with accurate recommendations and costs in order for the piece to be fully restored. ❖

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A fire damaged fragment from a book, *Comedias del célebre poeta – español*.



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RIGHT

Documents and artwork frequently suffer water damage due to fire fighting.



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New or fake?

Following disaster, the natural instinct is to return a building to how it was, but often it is better to look forward rather than back, argues Iain Boyd, SPAB chairman and co-author of 'New Design for Old Buildings'.

There is a great catalogue of words in the building conservation world that begin 're-': repair, reinstate, renovate, reimagine, renew, refurbish, reconstruct, rehabilitate, not forgetting repoint, repaint and many others. But the one that sets alarm bells ringing for the SPAB is 'restore', which is unfortunate as it is the word most commonly used by the world at large, and, casually, by many in conservation. It is usually intended, with greater or lesser precision, to mean 'put back as it was'. But, and this is important, it is also meant to imply a good thing, and an assumption that 'restoration' is the correct or most suitable way to treat an old building.

Consequently, for those that use the term 'restore' when talking to the SPAB, it can be confusing to be met with frowns. Within the SPAB the word has the same kind of taboo as saying the name 'Macbeth' backstage in a theatre.

The reason is that condemnation of the practice of 'restoration' runs back to the SPAB Manifesto and, even earlier, to John Ruskin who, in *The Seven Lamps of Architecture*, described restoration as 'a lie from beginning to end'. William Morris called the results of restoration 'a feeble and lifeless forgery'.

They were using the term in a quite specific cultural context. Morris was writing in a time when the Church, in particular, was involved in taking perfectly good medieval buildings and 'restoring' – in reality reimaging – them as if they were English Gothic buildings from an earlier

century. Morris deplored this practice, both for its erasing of the truth of a building's history as well as for introducing a false and potentially misleading narrative.

But, at the SPAB, we still use the term specifically to mean (and condemn) the idea that it is possible to put a building back exactly as it was at some imagined point in the past. Caseworkers at the SPAB regularly see proposals to 'reinstate historical features', such as bay windows, timber framing or panelling, based on flimsy or conjectural evidence, or in replication of something seen (and liked) by an owner elsewhere. Alongside these, more serious cases come in front of the Society every year following disasters, usually fires, at significant buildings.

So, following a fire, flood or theft, should you 'restore' a building or do something with a quite different name? It may not seem much help to say: 'that depends' or 'every situation needs judging on a case-by-case basis', but it does and they do. Disaster often prompts a quick response to put matters right, but the better path is almost always to take time, take stock and consider possible courses of action.

The SPAB Approach and the Society's long standing philosophy can offer some guiding principles. The most important is to value the historic fabric that remains. While the initial response to disaster is often to clear a site in preparation for repairs, even in the worst cases, such as the fire at the Glasgow School of Art, it is found that much more can be saved than was first thought. Original material is irreplaceable and should not be discarded lightly. It may be unobtainable, for example stone from a particular bed of a quarry, or be unmatched by modern equivalents, as is the case with old slow-grown timber. While dangerous material may need removal and action must be taken to stop further degradation, the first step before clearance and potentially losing valuable historic fabric should be to protect the site and consider responses to the problem. It may be appropriate to save items under cover offsite for reinstatement at a later date.

Understanding the building is fundamental. ➤



LEFT
Careful roof repairs following a fire to Jordans, a Grade I listed Meeting House in Buckinghamshire.

It should not be forgotten that disaster is a valid part of a building's history.



JAIN BOYD

RIGHT & BELOW

New meets old at the Landmark Trust's Astley Castle in Warwickshire which was on the verge of collapse following a fire in 1978.



JAIN BOYD

→ What age of building are you dealing with and what is its history? Is it well-documented and relatively unchanged since its construction, or is it a palimpsest of styles with additions layered over the centuries? In the former case, it may be that reinstatement following the original pattern, for example within a section of paneling, is the most sympathetic course of action and this can still be recorded as an honest repair. In the latter case, there is a stronger argument for including something new and of today, but above all something of good quality that will last and contribute to the history of the building.

In design terms, consideration must be given to what would look best where repairs need to be made. Questions of design are subjective to a degree and owners must be allowed to have solutions which please them. But, in deciding on appropriate design, there is guidance and good practice to be observed which can help in decision-making. The SPAB position is that work should be recognisably of its time, but this can be delivered subtly and does not necessarily mean the introduction of acres of glass or space-age composites. On the other hand, if there is a silver lining to disaster, it may be that it provides an opportunity for making changes to a building and introducing good new design and features, or to include detailing that rectifies maintenance defects or upgrades to thermal and environmental performance. If so, this opportunity should be embraced.

Often the materials that remain after disaster are a good starting point for thinking about repair strategies. One of the many virtues of lime is that it can bounce back from the impact of flood or firefighting and, with adequate ventilation, may recover without further intervention. It may take brickwork years to dry out fully, but this spell of patience should be preferred when possible. Timber is one of the best candidates for repair and the practice of splicing new timber in to old sections, damaged either through disaster or rot, to effect a strong repair, is a standard skill for a good carpenter.

One course of action to be considered very carefully is the use of recycled materials. This should generally be avoided, firstly on the grounds that material may be introduced that confuses the history of the building, but secondly on the more practical point that reclaimed materials, such as roof tiles, may be well into their middle age. On principle, it is better to use newly-made traditional materials as their performance will be more reliable, and specifying them for repairs contributes to keeping craft skills and traditional manufacturing alive.

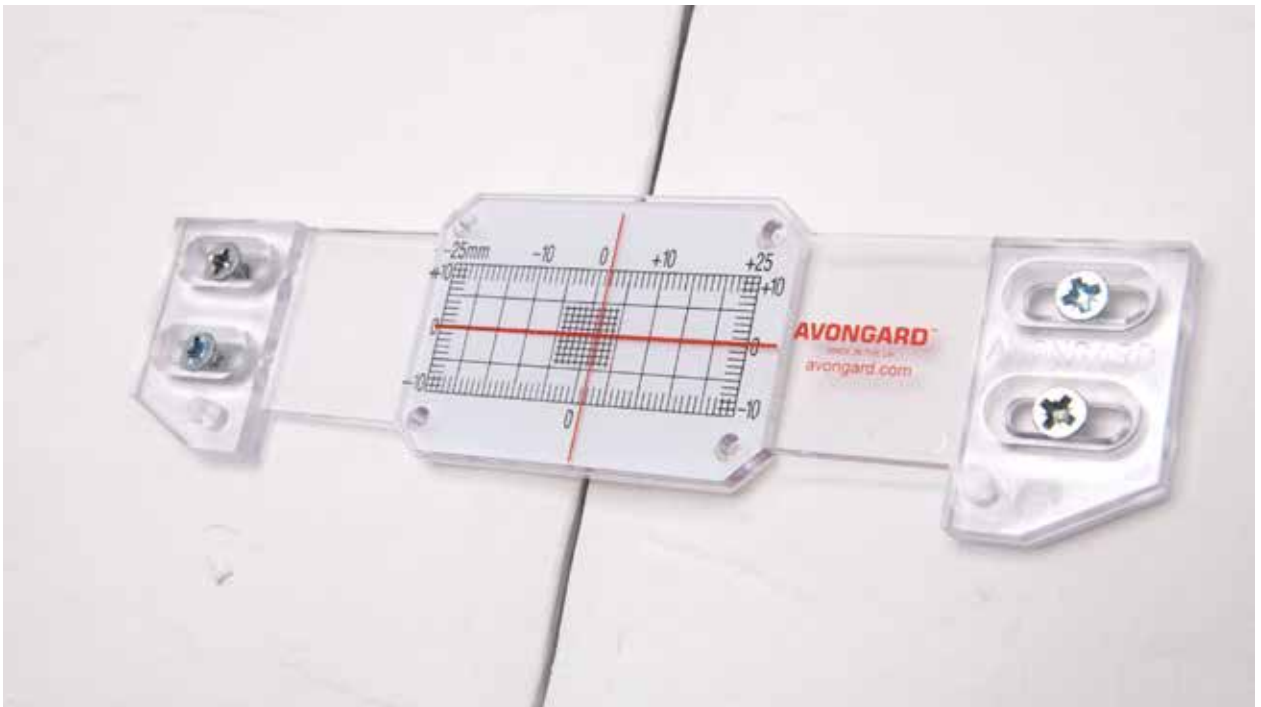
Lastly, in the hurry to make good, it should not be forgotten that disaster is a valid part of a building's history; it can often be the impetus for a new building phase, so should not necessarily be glossed over. After air-raid strikes on the Houses of Parliament in 1941, Sir Winston Churchill, the then prime minister, insisted that the bomb-damaged archway from the Members' Lobby into the Commons Chamber be retained as a reminder for future generations, a move that was opposed at the time, but which is now accepted as far-sighted wisdom. ❧



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Fire

*SPAB Scholar, architect and historic buildings consultant **Andrew Brookes**, of Rodney Melville and Partners, provides thoughts on preventative measures and an overview of the issues to consider when dealing with the aftermath of an old building fire.*

The fire brigade will provide advice regarding precautions which can be taken to protect life and property in the event of fire. Fire detection is, of course, a primary means of alerting building users and inhabitants to fire with detectors triggered by smoke or heat-rise appropriate to the area being monitored. There are statutory requirements regarding means of escape in case of fire, although these may not apply to existing uses of historic buildings. If in doubt, seek expert advice.

Depending on the size and complexity of the building, there are appropriate measures which can be taken to reduce the risk of damage from fire. These include the construction of fire-resistant partitions to provide compartmentation within the building, together with upgrading works to doors to provide fire separation. It is important to pay attention to attics and, in particular, unoccupied roof spaces which can allow the rapid spread of fire throughout the building if not adequately compartmented. Building owners like the National Trust implement such measures to contain fire, although these can be difficult to accomplish if there are voids, for instance, behind panelling, requiring extensive works to install the necessary fire compartmentation. The impact of such works on historic fabric would need to be minimised through careful and sensitive design. Listed building consent would be required for alterations to provide compartmentation and to upgrade existing doors.

Managing the event

The post-fire involvement of a conservation-accredited architect or surveyor requires an appointment to be made to act on behalf of the building owner. Mistakes can easily be made during the first days following a fire in the absence of expert advice from experienced construction professionals.

There may be competing requirements for advice. If the cause of the fire is unexplained, the fire brigade or loss adjuster may instigate forensic investigation to try to determine the cause. Any disturbance to the fire-damaged fabric could compromise forensic investigation. Safe access is a prerequisite following fire and the structure may need to be assessed by a structural engineer if the fire is thought to have compromised the structural integrity of the building.

Damage to the building fabric may be compounded as a result of exposure to the elements following damage to roof coverings. Damp damage will also result from extinguishment waters poured into the building by the fire brigade. The provision of scaffolding and a temporary roof



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is an urgent consideration, although usually requiring design input from the structural engineer and competitive tenders being sought.

Recovery

Fire damage to historic buildings can often result in exposure to hazardous materials. Asbestos is the primary concern as this can be found in pipework insulation, floor tiles and other finishes as a binder to plastics. Bakelite is also potentially asbestos-containing. The list of hazardous materials will include the potential for lead contamination from paint and lead sheet. All these risks need to be managed and analysis can be commissioned, particularly to identify asbestos. Awareness of statutory requirements in dealing with hazardous materials is an important factor.

Depending on the listed status of the fire-damaged building, early consultation with the local planning authority is an important consideration. Fire damage to a Grade I or II* building will usually require input from Historic England (in England). This early consultation is an urgent requirement as listed building consent will usually be required for repairs after a fire, depending on the extent of damage caused. To avoid delay, it is usual to submit a number of applications for listed building consent



Mistakes can easily be made during the first days following a fire.

LEFT
The 800 year old St Peter's Church in Ropley, Hampshire was almost completely destroyed by fire in 2014.

as the repair proposals are designed for implementation.

The imperative following a fire is to make rapid progress with works of protection, including propping and shoring, and the provision of a temporary scaffolding roof. However, this preliminary work has to be carefully planned with a view to the repair objectives and the salvage and re-use of historic fabric.

Salvage of fire-damaged fabric will be an important element of the initial work once safe access has been gained to the building. Even where damaged beyond reuse, fragments of the existing fabric can inform the repair process, including any decorative ceiling plaster, panelling and other items of interest.

It is also important to assess the cost of repairs and this can best be done by the preparation of a detailed fabric report, usually carried out on a room-by-room basis for the interiors and dealing with each element of the building fabric in a methodical manner. The external envelope of the building would also be assessed for repair requirements, including roof coverings, the external wall fabric and windows and doors. The fabric condition report is costed by a quantity surveyor to establish the cost of the proposed repairs which can then be assessed against the insured amount.

Extensive fire damage will usually require complete

renewal of the mechanical and electrical services which provides the opportunity for future-proofing of the installation and for it to be discreetly designed. Extensive works would usually require input from a mechanical and electrical services engineer.

Saturated fabric will carry a long-term risk of fungal and/or wood-boring beetle infestation, particularly as moisture levels in the fabric reduce. The drying-out regime needs to be carefully managed. The tried and tested method is to insert timber dowels into predrilled holes in brickwork and masonry. These are periodically retrieved and replaced. By carefully weighing the retrieved dowels the moisture content can be assessed by comparison with the 'dry' weight, reflecting the levels of moisture in the building fabric. Care would need to be taken when selecting sites for monitoring to avoid damage to finishes.

Clearance of saturated fire-damaged fabric is not a pleasant task, although this needs great care to ensure that any items removed are assessed before being disposed of.

Contract matters

To ensure that delays are minimised, fire damage repair projects are often managed by management contractors on the basis of an overall cost estimate with work packages sequenced in order of priority. The estimate will include structural repairs, roofing works, external fabric repairs and the detailed reconstruction of interiors. This avoids the delay which would follow if a conventional contract route were to be implemented requiring the entire repair proposals to be designed and let as a single contract.

Insurance

Contrary to popular belief, it is usual for insurers to recognise that delays in implementing temporary works, including propping and shoring, and the provision of a temporary roof, would almost certainly result in increased costs and further damage to the building fabric. Extensive fire damage is usually assessed by loss adjusters experienced in this specialised field, with early dialogue paramount between the loss adjustor and the construction professionals appointed to advise.

Insurance-funded work has a lexicon of its own which the construction professionals need to be aware of. Generally, fire damage work in compliance with building regulations will qualify for insurance funding as will any 'consequential loss' as a result of fire. 'Pre-existing damage' can be an area where the building owner would need to contribute towards the cost of repairs. There will also be the opportunity for 'betterment' which again will usually require a contribution from the building owner. It is usual for a dialogue to continue with the loss adjustor appointed by the insurers for the entire construction period, to ensure that costs are correctly allocated and that the building owner is fully aware of any cost liabilities. ❧

Thatch

*Although incidents of fires to thatched buildings tend to be no higher than for any other property type, a thatch fire usually results in total loss. Building surveyor **Stephen Boniface**, a partner at **Whitworth**, offers advice on how to reduce the risks.*

In recent years research and forensic investigation has shown that the main cause of thatch fires is embers, burning brands or sparks from chimneys falling onto the thatch. Chimney fires are another significant cause; although theories of heat transfer through chimney stacks are less likely. Other causes include defects with the chimney brickwork, electrical faults and external sources of ignition such as bonfires. It is also worth remembering that wood-burning stoves burn hotter than an open fireplace and great care must be exercised where a stove is fitted.

Reduce the likelihood of embers being taken up and out of a chimney by:

- Proper lighting and tending of open fires or stoves by using only dry, well seasoned wood and running at optimum temperature
- Keeping an eye on the fire when lit
- Ensuring a chimney height of at least 1.8 m (6 ft) above thatch

Maintenance including:

- Regular sweeping of the flue to avoid tar build-up
- CCTV checks of the flue interior for faults
- Removal of spark arrestors (they can be more of a hazard than a help)
- Ensuring flue liners are appropriate and, where installed, checking the condition regularly
- Maintaining pointing in good condition with no gaps when or where chimney brickwork is exposed, for example during re-thatching

Avoid flames or sparks reaching the thatch by:

- Taking care with barbecues — no barbecue should be lit under the eaves of the thatch
- Keeping bonfires well away from the building and ensuring sparks are not carried towards the building
- Not lighting fireworks or Chinese lanterns near the building
- Asking neighbours to observe similar guidance

Taking internal precautions including:

- Never leaving untended lighted candles, dissuading smokers and taking care with matches

➤ Using compression or push-fit joints to plumbing in roof spaces, rather than soldered joints, and avoiding any hot works

➤ Not using heat guns to unfreeze pipes — use warm cloths instead

Maintaining electrical fire safety by:

- Inspecting electrical installation every five years, instead of the more frequently recommended ten years
- Keeping cables and electrical fittings 300 mm away from thatch
- Using metal conduits in the roof space to avoid vermin damage
- Enclosing lighting and other electrical fittings with 'fire hats' and appropriate connector boxes
- Avoiding external electrical fittings near the thatch including lights under eaves and TV aerials; overhead supplies should have insulators

Added protection

Specific products aimed at reducing the risk of fire occurring in thatch include fire retardants and suppressants. Where new thatch is being formed, or where re-thatching exposes the frame, barriers and systems can be used to create a fire separation between the thatch and the building below. With any products, advice should be sought as to appropriateness and effect on the longevity of the thatch.

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Resilience for tomorrow

Roger Curtis, technical research manager for Historic Environment Scotland, considers the impact of climate change on buildings.

The changing climate in Britain and elsewhere has invited much comment and discussion. Predictions indicate that, in Scotland, winters will be warmer and wetter, summers drier. More extreme weather events are predicted, mainly those of intense rainfall, but also increased snowfall, higher winds and reduced intervals between such events. With this in mind, it is necessary to consider 'resilience', the ability of a structure to handle weather conditions for which it was not always designed.

As with many aspects of historic and traditional buildings, proper maintenance is the starting point. A properly maintained building has strength and durability; a poorly maintained one has little of either, and building elements that were thought of as stable may suffer failure. In addition, modern repairs carried out with poor materials or undersized components will not be able to cope.

Damp problems in older buildings are growing in frequency. This was especially noticeable following the wet winters of 2013 and 2014, when calls to Historic Environment Scotland's enquiry service relating to damp in older buildings increased by over 50%. It is also emerging that repair to existing fabric and the status quo may, in some locations, not be enough to keep a building dry; additional works to the building might be necessary.

Building resilience

So how does an owner build resilience beyond maintenance and repair? In Scotland, due to increasingly high levels of rainfall, an important, but often overlooked, starting point is masonry detailing at high level. This is the formation of small but significant details on the stone designed to shed water from the elevation. While many now think such details are purely architectural, they have an important technical function as well to prevent staining of rendered surfaces and saturation of masonry. In some contexts these details have been removed or misunderstood in their re-application.

High level masonry is frequently overlooked in repair and, where repairs are carried out, the water shedding details so crucial in a wet climate are overlooked. With more rain, this often results in saturated masonry and damp, particularly in the ends of buildings such as gables. Such augmentation of detailing is not always high up and can be very simple. Window cills often need improvement to better shed water; in the summer of 2014 the SPAB Scotland working party installed a lead drip under a church window to keep the masonry dry. Three years later, the previously wet stonework below is now dry.

What are sometimes termed 'extreme weather events' will oblige building owners to configure their properties for the worst expected conditions, not the average. Chimneys, generally being the highest point on a building, are the most exposed. Due to their height, they are also the most neglected but, should parts of the chimney come loose and fall, they have the potential to cause significant damage.

The ceramic chimney pots must be securely mortared down and, at the very least, pointing and mortar joints must be in good condition. A weak, neglected chimney may have stayed up in benign conditions; the increases in storm events will mean that they might not. Some traditional details that have evolved to address aspects ➔



Changed climatic conditions will affect the inside of buildings and their furnishings.

LEFT
Roofs and chimneys are particularly vulnerable to extreme weather events.



ROGER HUNT



HISTORIC ENVIRONMENT SCOTLAND

LEFT
Insulation in roof spaces can have a negative impact.

RIGHT
A lead drip strip fitted under a church window helps to keep the masonry dry.

➔ of weather have been forgotten. A good example of this is the 'snow board' a vertically mounted timber plank that prevents snow sliding off a roof onto areas below and causing injury or damage.

Rainwater goods may well have reasonable capacity, but complex routes for gutters, especially where there have been alterations or extensions, will be prone to blocking and overflow as rainfall gets heavier. As the intensity of the rainfall increases, so the ability of the water to pick up and move debris also improves; this leads to a greater frequency of blockages. Consequently, what worked adequately in the past may not do so now.

It would be wrong to imply that the solution is simply bigger gutters, but certainly properly fitted and detailed rainwater systems are required. This is also likely to include provision of overflows in critical areas such as at the junction of roof pitches, sometimes called valley gutters, where excess water can be released to the ground via a lead spout.

Traditional masonry finishes such as pointing and harling (render) can also play a part in buffering the effects of excess water, especially in areas of wind driven rain where building detailing alone will not be sufficient. Such finishes, generally lime-based, readily absorb and desorb moisture. Unlike modern cement based coatings their flexibility prevents cracking and their pore structure allows the dispersal of water vapour and liquid water when conditions improve.

Internal conditions

Changed climatic conditions will affect the inside of buildings and their furnishings. The desire to improve energy efficiency by reducing air leakage undoubtedly has benefits, but also downsides. Many homes, both modern and traditional, are now under ventilated, with consequent increased humidity inside. Higher levels of precipitation and generally warmer conditions will mean more moisture in all parts of a building. This changed environment often gives improved living conditions for insects

of all types, especially the clothes moth.

Regular cleaning and airing of rooms, often described in 19th century domestic manuals, will once again become important if these pests are to be controlled. This is more than just about damaged clothes and furnishings; occupant health can also be affected by the debris from insects, especially the dust mite which favours stale humid areas.

Attic or roof spaces can become under ventilated through poor application of insulation materials. The presence of wood boring insects, often seen in the softer parts of roof timbers, are always an indication that humidity levels in the space are too high. In solving problems of ventilation, it is common to default to mechanical systems involving ducting, fans and the like. This approach is not always necessary. Historically many such structures were passively ventilated through simple but well thought through routing of fresh and foul air, often allowing a high degree of control to minimise draughts yet maintaining comfort. Past refurbishments have frequently closed off these routes and replaced them with energy intensive, powered air handling equipment.

Proper management of air flow through a building can be achieved by the correct use of sub floor vents, windows and cupolas or opening skylights. In addition, hearths and chimneys, even when not used for heating, provide a good level of baseline ventilation. In work by Historic Environment Scotland, the unblocking of hearths, and the re-instatement of air movement through a chimney flue has improved air quality and comfort. As ambient temperatures increase, especially in cities, ensuring the full control of ventilation by the occupants is considered of primary importance when designing modern buildings, and the same applies to traditional and historic ones. Some degree of automation is appropriate, and the opening and closing of skylights can be simply configured to run automatically with humidity or temperature operated actuators. ❧

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Fire damage at St George's Goltho.

Lightning

The dangers of lightning strikes to old buildings is very real as Sarah Robinson, acting CEO and director of conservation at the Churches Conservation Trust, explains.

Very early on the morning of 21 October 2015, a passing motorist noticed fire from a small brick chapel in a field and called the fire brigade. It took only five minutes for the first fire engine to arrive but, by then, the roof and much of the interior was ablaze. The chapel was St George's, Goltho, in the heart of the Lincolnshire countryside, and in the care of the Churches Conservation Trust (CCT). Surprisingly, since it has no tower and there are tall trees in the surrounding landscape, the fire service's investigation suggested the fire was caused by a lightning strike from the electric storm that had hit the area early the previous day.

As CCT has learned to its cost, lightning strikes can cause great damage but, with over 350 churches to care for and limited funds, CCT has to be pragmatic. Our lightning conductor policy is based on the risk of strikes occurring.

Lightning is very high current electrical discharge between the sky and the earth and seeks out the path of least resistance, which may be via a tree, building or other tall feature. Installing a lightning conductor will make a building more, not less, liable to a strike as its purpose is to take the energy in the lightning directly to the earth where it can be discharged safely. A building without a conductor may still do this but there is a greater risk that damage occurs because the discharge is uncontrolled. Damage may be structural, for example to copings or pinnacles, or to electrical equipment via voltage surges or indeed fire.

CCT's policy is to assess the risks of a church being struck by lightning, in particular, whether the church is the highest point in the surrounding area or it has been

struck before. Under both circumstances it is CCT policy to provide the church with lightning protection. Given that most structural damage occurs at the tower end, and that CCT churches usually only have a basic electrical provision, we generally install a tower only system as this provides an acceptable level of protection. Such systems comprise two down tapes, usually on opposite sides. Two tapes have the effect of reducing the voltage each one carries, reducing the risk of side flash and for security against failure. Maintenance of lightning conductors is essential – a badly maintained system is actually more of a risk than none at all, as the lightning is attracted but cannot dissipate safely. We regularly test our lightning systems to ensure they remain effective.

At Goltho chapel, the roof timbers had smouldered for a long period until the fire took hold reaching extremely high temperatures. A local CCT volunteer was alerted and attended site, notifying the chief executive and key staff. Fire crews remained until the afternoon.

Once the fire services made access to the site available, our conservation manager, consultant architect and maintenance contractor visited St George's. Little had survived, what remained of the roof timbers were charred

beyond reuse, the interior had been destroyed and virtually all the plaster had fallen off the walls. Only the brick walls, some of the window glass and the font, badly cracked, remained. Although the walls were stable, cracks and loose areas were visible, the wall tops were unprotected, and the bellcote looked particularly vulnerable. Since

then, and with advice from Historic England, the chapel has been made secure, scaffolded with a temporary roof to provide long-term protection from the weather, and cleared under an archaeological watching brief. Today that protection remains in place until the future of the chapel is decided. ☘

A badly maintained system is actually more of a risk than none at all.



Top Left: Gentleman's Row, Enfield.
Main image: Gt. Nast Hyde House, Herts.
Bottom Left: Hatfield Broad Oak Priory, Essex.



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