Protecting our heritage

Building surveyors need to approach flood repairs to historic buildings carefully, says Nicholas Kelly

The flooding industry is awash with building flood repairs advice but (except for English Heritage's *Flooding and Historic Buildings*[1]) a dearth of relevant advice leaves historic buildings at significant risk of damaging works, threatening a large part of our built heritage.

One in five buildings are historic and provide vital tangible evidence of our cultural, historical, social, aesthetic and scientific heritage, necessitating sustainable management for both current and future generations.

Historic buildings are variously defined, but for our purposes are those whose materials allow 'breathing' (the absorption and desorption of moisture), either without decay or accepting managed deterioration. This could include: lime in mortar, render and plaster, stone, bricks, (from low temperature firings), and timber. By contrast, modern building materials are designed to exclude moisture, creating impervious envelopes with Portland cement, highly fired clays, plastics and impervious paint finishes.

Flood repairs

Standard flood repairs, designed for modern buildings, frequently cause irreversible damage when applied to breathable constructions.

The unnecessary stripping-out of breathable materials – once lost, historic fabric cannot be replaced, only replaced with a modern imitation – to 'allow drying' and replacement with impervious materials will inevitably trap moisture, causing the attack, decay and failure of historic materials. For example, the lining or tanking of timber-framed buildings with Portland cement renders or water-resistant plasters will trap moisture within a wall, causing deterioration of built-in timberwork, spalling or powdering of masonry and plaster, and paintwork delamination.

Knowledge of breathable constructions is now sufficiently established in the professional mainstream that ignorance or deviation could readily be argued negligent of those operating beyond their professional capacity and arguably their insurance, i.e. a ticking professional liability time bomb.

When scheduling repairs, you should approach historic buildings with an open mind, carefully appraising both building and damage, considering any consequential effects. Take advice where required from conservation officers, English Heritage or the SPAB Helpline in preparing appropriate repair schemes. Repairs should be at a minimum, guided by an understanding and respect for the physical, historic and aesthetic importance of the building. There is no standard flood – their speed, duration, depth, regularity and source all affect repairs, insurance availability and future risk management, though certain fundamental tenets should guide remediation.

Cleaning

This should be a careful operation to remove mud and debris, rinsing surfaces with clean water and saving displaced materials, taking particular care with decorative, damaged and loose materials. Using shovels for debris removal followed by hosing down is highly damaging. Non-ammonia low-sud household cleaning fluids can be used to disinfect, though lime itself is mildly self-disinfecting.

Assisted natural drying – using controlled air flows to secured exhaust points, temperature controls, selected sensitive opening up and interim mould growth checks – is recommended to gradually reduce moisture levels. The stripping out of wet plaster, timberwork and floor voids and dehumidified forced drying is unnecessary and costly, causing desiccation of delicate plasters and finishes, triggering damaging salt migrations and distorting timberwork.

While a one- to two-month 'strip-dry' for a short-duration flood may seem advantageous, obtaining consents and the extended periods of works to achieve 'conservation standards' can readily extend contract programmes and costs beyond a six-month 'natural dry' and refinish.

Sympathetic repairs, with minimal replacement using appropriate traditional materials, should respect the physical and aesthetic integrity of the building, and be completed by suitably experienced craftsmen.

Masonry

The cracking and movement of walls can reflect below-ground movement from subsidence or frost-heave, impact damage or lateral floodwater pressures. The inherent flexibility of historic structures, however, allows greater movement than new buildings, and greater capacity for distortion without structural failure than rigid and brittle modern materials.

The damp-activation of masonry salts causes surface spalling but can be contained with sacrificial lime pointing and renders. Freeze spalling requires insulation of damp areas during cold conditions.

Plasterwork

Lime plasterwork removal is rarely justified. Finishes soften and swell when soaked, usually without collapse, but dry hard. Bulging and cracking plasters and renders (which de-bond as soaked laths break the plaster keys) can be re-fixed or re-anchored using resin bonded wires and hangers to ceilings, or screws and washers. New plasterwork should be in lime to maintain breathability.

Figure 1 – The decay of timbers caused by repeated saturation (note the salt efflorescence to sub-floor brickwork)

Figure 2 – The staining and flaking of historic paint finishes with surface fungal growth

Timbers

Timberwork usually recovers well with minimal intervention from single short duration flood events, though longer durations or repeated saturation may cause expensive damage, which (dependent on historical importance) may be 'uneconomic' to repair, though such situations are the rare exception.

Excepting sensitive air-flow route creation, *in situ* natural drying with joint stiffening and strengthening and extended drying times is preferred, both reducing fabric loss and minimising expensive craftsmen costs.

Softwoods, doors and saturated hardwoods may require careful dismantling and controlled drying to avoid distortion. Stairs and windows often require bracing, support and strengthening, during both drying and repair to maintain their integrity and stability.

Metalwork

Periodic inspection should suffice for ferrous metals exposed to single short immersions when dried quickly, balancing the relative importance of different historic materials, if forced drying is specified. Historic fixings, furnishings, services and structural components may require specialist advice to control decay, as might metals affected by longer duration flooding or repeat events.

Exposed historic metalwork should be treated and refinished rather than removed, but this can remove decorative sequencing evidence.

Decoration

Specialist conservators should advise on the investigation, retention and refinishing of historic decoration, which provides evidence of former uses and tastes. Water causes staining, flaking and blooming to historic paints. It also causes dissolution of pigment binders and creates bacterial and mould growth conditions in historic pastes. Decorative repairs, especially wallpaper matching, can be expensive.

Decorative tile work should be cleaned and protected, with localised substrate inspection. Ash-bedding removal causes the unnecessary and expensive loss of historic tiles.

Services

Service replacements are often intrusive and damaging to the building. Electrical services can frequently withstand short immersions, subject to rinsing and recommissioning, otherwise replacements may be necessary. Consider the unnecessary loss of surviving historic services, which may in themselves be important.

Related considerations

At present, the primary statutory controls relating to historic building flood repairs are:

- listed building consent – regulating the extension, alteration or demolition of a building, as affecting its architectural or historic interest
- scheduled monument consent – regulating all works to a site above or below ground level, including removals, repairs and alterations.

Both statutory regimes may require archaeological involvement throughout the investigation, design and repair process. Without power, alarm systems are ineffective and the theft of architectural features and materials is a real risk. Salvage stores, temporary security measures, access arrangements and incident response procedures should all be considered.

Historic building repair costs are often quoted to exceed comparable new building works. There are though, no standardised costs; indeed, costs for two similarly flooded buildings can vary according to both their historic importance and the local listed buildings officer's requirements. However, by understanding environmental conditions, extending drying times and carrying out only necessary works, monetary and fabric savings are readily quantifiable.

Figure 3 – Spalling and delamination of plasterwork, caused by masonry salts

Insurance cover should provide fair and reasonable economic settlement to restore the building to its pre-flood state, without causing damage in future years. Costs should include any necessary specialist advice and procedures, and (given the potential complexity of any specialist repairs) be agreed without a fixed settlement period.

Allow a building to breathe

Historic buildings, by their very 'breathability', are more vulnerable to flood inundations, but equally can recover rapidly and at lower cost. They remain at wholesale risk of successive unnecessary and damaging interventions by professionals and contractors without either the necessary knowledge or experience.

Considered repairs should be guided by an understanding of:

- the importance and environmental performance of materials
- the nature of the damage and any future risks
- the future effects of our interventions on the building
- any legal protections.

Such an approach should help to reduce not only the risk of embarrassing, inappropriate and costly future repairs but their effects on both professional reputations and liability insurance premiums.

Further information

1 *English Heritage: Technical Advice Note – Flooding and Historic Buildings* is available free from *www.helm.org.uk*

The SPAB Advice Line is available for domestic and professional enquiries on T +44 (0)20 7456 0916

SPAB: Information Sheet 4 – *The Need for Old Buildings to Breathe* is available from *www.spab.org.uk*

Conservation Principles, Policies and Guidance is available from English Heritage on *www.english-heritage.org.uk*

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