

INFORM

INFORMATION FOR HISTORIC BUILDING OWNERS

Damp: Causes and Solutions

Historic Environment Scotland
Àrainneachd Eachdraidheil Alba

Introduction

Older buildings should not be damp, nor are they inherently prone to be, but like any building they can become damp if they are not properly maintained. Climate change is having an effect on all buildings; increased levels of precipitation and more frequent and severe weather events are putting buildings under pressure. The issue of damp is often misunderstood in older buildings and proposed solutions can be expensive, damaging, and misguided – focusing on the symptoms rather than the cause. Older buildings function primarily like any other – with well-designed roofing, weathering details and adequate drainage and rainwater disposal to keep the water out. However, unlike modern buildings, traditional solid-wall buildings also manage moisture via permeable materials such as stone, lime and timber. This is sometimes referred to as the need for old buildings to ‘breathe’. This ability can be compromised during repairs or alterations if the wrong materials are used, and can give rise to damp problems. Where dampness occurs, the source must be established and remedial action taken. By describing the common causes of damp, and identifying the areas to investigate, this INFORM will help building owners to remedy common damp problems.

Causes of damp

Damp can be caused by water penetration from leaks in the roof, defects in walls and masonry, moisture from the ground and inadequate ventilation. Water ingress routes might include the failure of roofing materials, defective rainwater goods, degraded detailing, or poorly specified interventions where work has been carried

out using inappropriate materials. Raised ground levels and changes in the water table can result in water being drawn up by capillary action, so called ‘rising damp’. Sometimes new work on a building can result in a build-up of moisture in areas that were formerly dry.

Symptoms and identification of damp

Damp in older buildings can show in many ways as the water moves through the building fabric. Symptoms can include the blistering of paint (Fig. 1), salts forming on masonry, tidemarks, discolouration of paintwork, peeling of wallpapers, mould and fungal attack (rot), wood-boring insect activity and increased levels of condensation on cold surfaces. Buildings may also smell musty or feel humid. When inspecting the interior of a building for damp prior to remedial works, it is important to include an assessment of the whole structure, with particular focus on the external condition. The use of damp meters and thermal imaging can be useful to confirm observations, but in most cases the signs and symptoms will be clear to an experienced professional who is familiar with traditional structures.



Fig. 1 Damp in a wall showing as blistering of this painted surface.

Addressing the problem

While there may be a single cause from an identifiable defect, the problem can show in many different ways. Damp problems can also be caused by a combination of factors, especially if a property has been neglected. For example, a damp wall may be due to saturation from a broken rhone above, and rising damp from a blocked drain at ground level and exacerbated by poor ventilation. When addressing damp issues it is important that the root cause(s) of the damp is addressed, and that work does not attempt to mask the various symptoms. Expensive solutions such as tanking, waterproofing, rot-treatment or injecting damp-proof courses, are often recommended by 'damp specialists' without addressing the cause of the water ingress. In many cases such interventions are unnecessary and may even be damaging.

Areas where common defects can give rise to damp problems are discussed below.

Rainwater goods

Overflowing water from a blocked downpipe can quickly saturate masonry (Fig. 2) and is likely to result in dampness and damage to internal decorative finishes. Green algal growth and staining is indicative of a persistent problem.



Fig. 2 A blocked downpipe causing saturation of the adjacent masonry. Plant growth is indicative of a saturated wall.

Lead-lined gutters behind parapets are vulnerable to blockages or damage from debris, and their failure can result in saturation of the masonry below (Fig. 3). Defective parapet gutters are especially damaging as the leak is directly into the wallhead. Structural timber, plaster finishes and internal decoration can be severely damaged if the problem is not resolved.



Fig. 3 Staining of masonry showing a blockage in the gutter behind this parapet.

High-level masonry

Pointing on skewes, copes, chimneys and other upper-level masonry requires regular inspection. These exposed elements are particularly vulnerable to water penetration. Exposed gables, chimneys, skew copes and parapets must be properly pointed and detailed to shed water. A chimney in poor condition will result in water ingress (Fig. 4). While some stone types are less durable than others, attributing water ingress or dampness to 'porous stone' should be treated with a degree of caution – defective pointing or detailing is the more common culprit. Often staining of internal plaster finishes at ceiling level will indicate wet masonry.



Fig. 4 The poor condition of this chimney has resulted in dampness internally.

Roof coverings and junctions

A dislodged slate, or the failure of flashing can lead to a build-up of moisture in walls, timber and plaster. As water penetration in such areas is often slow or periodic, leaks can remain undetected but will create conditions for timber decay to progress, initially in the sarking timbers, and then often into the structural timbers and lath and plaster below.

Renderers and external finishes

Damp walls are often attributed to the presence of cement renders, however, where the wall is dry and the render is sound it may not in itself cause a problem. An external lime finish is desirable, but in many cases replacement would not be economical or practical. However, if the cement render is cracked or defective then water can enter the fabric, and a wall can quickly become saturated as its ability to dry out is significantly reduced by the presence of cement. Moss and other plant growth growing between cracks is an indicator of saturated masonry, but symptoms may not be readily visible externally (Fig. 5).



Fig. 5 Moss growth in cracks in this cement render indicate saturated masonry behind.

Below-ground drainage

Water must be piped clear of a building through below-ground drainage. Failure of this important element, through a crack or break, can result in saturated ground beneath a property, which can lead to rising damp. Standing water adjacent to a building is often a sign of blocked drains. Below-ground drainage should be checked and cleared by rodding or pressure jet.

Building services

The water that causes dampness does not always come from outside. In some cases failures in mains water pipes, heating systems, grey or foul water will give rise to damp. Over an extended period even a very small drip can result in saturation of timber and masonry. A common example is the overflow on a WC cistern, where a small overflow eventually saturates the wall.

Underfloor areas

Adequate air movement beneath suspended timber floors is necessary to disperse water vapour from the ground beneath. This is commonly provided by openings in the base of the walls, protected by a cast iron grille; these should be open and clear (Fig. 6). Suspended timber floors should generally not be replaced with concrete floor slabs as this can result in raised moisture levels in the layers below, leading to increased moisture movement up the walls. The application of a plastic damp-proof membrane below a floor is likewise inappropriate for older structures.



Fig. 6 A sub-floor vent; note the appropriate height and finish of the ground level.

Chimneys and flues

It is important to ensure there is a degree of air movement in redundant flues. Soot and other deposits in a chimney flue will attract moisture, and a closed-off chimney can become damp, causing combustion salts to leach into masonry and adjacent plaster and cause staining. Chimney heads should not be capped off, but protected from water ingress by the use of vented cowls. Where hearths have been closed off, a vented opening is required.

External ground levels and finishes

High external ground levels can often cause problems with damp. This generally shows as tidemarks or the staining and blistering of internal paintwork. Over time, external ground levels tend to rise, and occasionally earth will need to be scraped away (Fig. 7). In some cases a french drain – a shallow trench filled with coarse gravel – may be appropriate to manage the dispersal of ground water.



Fig. 7 Lowered ground levels and the clearing of the sub-floor vents during the refurbishment of this 19th-century cottage has resolved the damp problems in the walls.

This may require the re-siting of drains and other features. A good finish for paths next to walls is gravel laid on larger aggregate. Plastic sheeting should not be used, as it may route water into the wall footings and prevent the earth from drying. Where liquid water is encountered in basements, and water ingress cannot be resolved at source, some form of pump extraction system may be necessary.

Repairs to internal linings and related timber work

Where a leak has occurred and the problem has been resolved, wall linings such as lime plaster and timber panelling do not necessarily need to be removed, although some repairs may be necessary. Where timber has been affected, moisture levels should be monitored during the drying phase to minimise the risk of timber decay. Repairs to timber elements should be limited to timber that has decayed, and defective elements should be cut back to sound timber. Repairs should be like for like, e.g. lath and lime plaster. The use of foil-backed plasterboard should be avoided as this can inhibit the free movement of moisture.

Internal decoration

In some cases the internal plaster lining can be encouraged to dry out by removing paint and vinyl wallpapers (Fig. 8). Skirting boards can be removed, and replaced once any debris behind has been removed.

Internal re-decoration should maintain the breathability of the building fabric. Traditional limewash, distemper or clay-based paints are ideal for lime-plaster walls; whilst emulsion paint is normally satisfactory, plastic-based paints and vinyl wallpapers should be avoided (Fig. 9).



Fig. 9 The use of breathable materials will help ensure defects do not remain hidden; this ceiling has been painted with a modern clay-based paint.



Fig. 8 The removal of a vinyl wallpaper and skirting board allows the wall to dry out and debris to be cleared.

Attics and roof spaces

Works to improve energy efficiency can include the installation of considerable insulation material in lofts and attics. The resulting colder attic space can give rise to condensation, especially in the winter months. This can show as drips on nail heads and staining on the sarking timbers and, if it persists, mould may start to grow (Fig. 10). Attics must be kept adequately ventilated by eaves and ridge vents, and in some cases the use of a suitable breather membrane under the slates. It is advisable to use a vapour permeable insulation material between joists such as sheep's wool or hemp fibre 'wool' to allow the building to 'breathe'.

Conclusion

Poorly maintained buildings are vulnerable to damp problems. With correct maintenance, repair and adequate ventilation, traditional buildings can be kept dry and healthy. To address damp problems the source of the moisture must be identified and addressed before other works are considered. With the right approach and correct use of materials the removal of internal linings is not normally required to enable drying. Treatments suggested for use in modern construction are often not appropriate for traditionally constructed buildings and may cause further problems.



Fig. 10 Mould growth in an attic following insulation works; proper ventilation will prevent this.

Contacts and further reading

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Historic Environment Scotland's INFORM Guide and Short Guide series contain further information on the conservation and maintenance of traditional buildings. These publications are free and available from our technical conservation website. Alternatively, you can contact us on technicaleducation@hes.scot for these or any other publication enquiries.

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