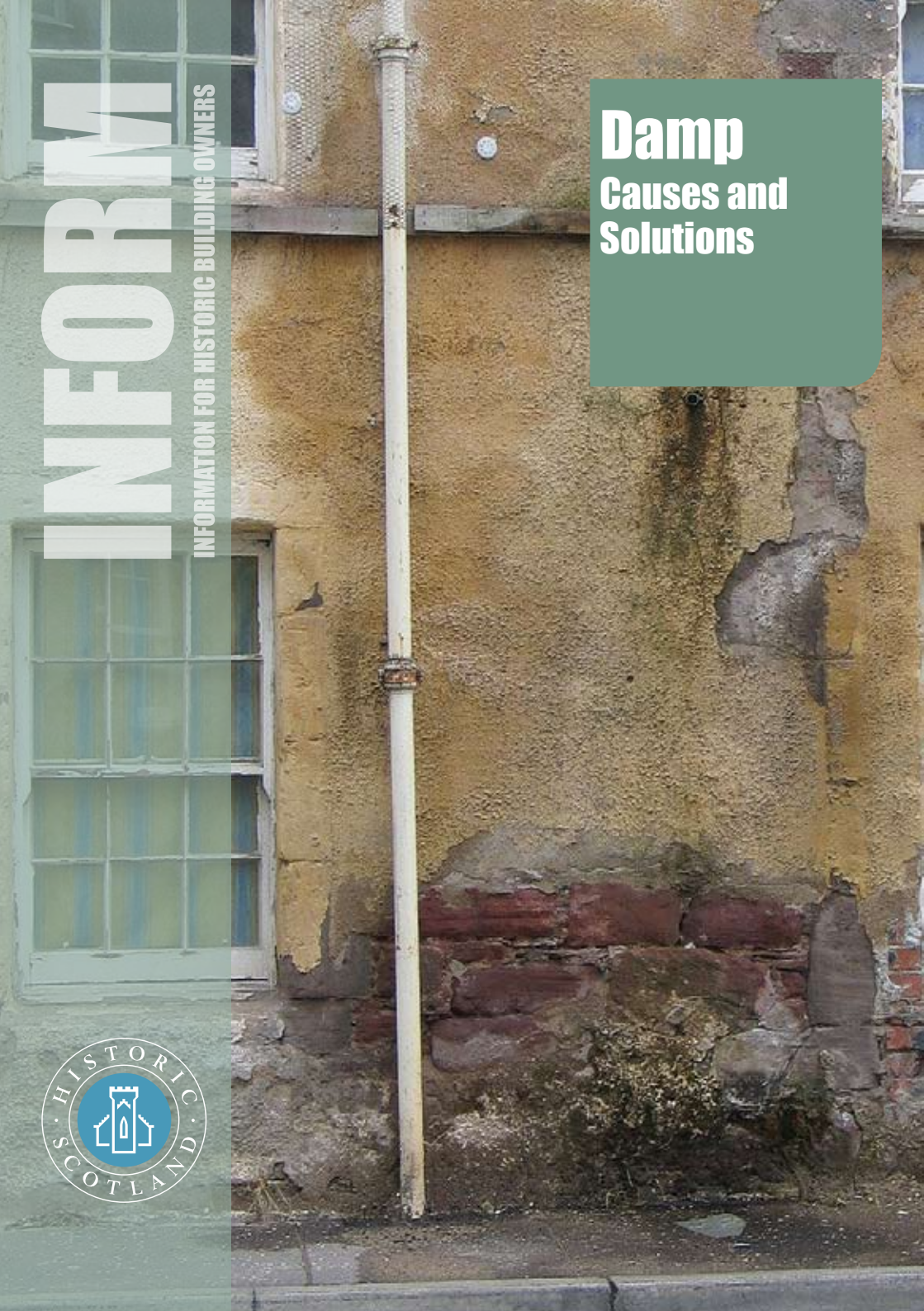
INFORM

INFORMATION FOR HISTORIC BUILDING OWNERS

Damp

Causes and Solutions



HISTORIC SCOTLAND

The subject of damp in buildings invites much comment and speculation. The issue is often misunderstood and proposed solutions are often expensive, damaging, and usually affect the continued performance of your property. Traditionally constructed buildings, (normally those built before 1919) can be prone to damp problems if not properly maintained. Frequently this can also be attributed to later changes and modifications.

Understanding how a building is constructed is key to dealing with various forms of decay resulting from excessive moisture levels, or "damp", as it is commonly referred to. Unlike modern construction methods which rely on impervious barriers to protect against moisture, a traditionally built structure needs to breathe to accommodate moisture. It relies on the free, unrestricted, movement and dispersal of moisture through its materials to perform effectively. The presence of surface staining, mould and/or stale air, usually indicates that a problem has interrupted this process and the cause requires attention.

By describing the common causes of damp, and identifying the simple points to look for, this INFORM seeks to illustrate the best approach to help remedy the problems.

Common causes

Most damp problems arise through the failure of materials, the building's detailing or inappropriate interventions where work has been carried out with the wrong material. If a new problem emerges there will be a need to carefully consider any work that might have been recently carried out which could have initiated . Many problems, however, go unnoticed for some time.

Lack of maintenance

Serious problems can be prevented from getting worse by the early detection of water ingress, and by carrying out appropriate regular maintenance in the following main areas:

Roof

Where regular inspection of roofs is not carried out, a small leak from a dislodged slate, tile or lead flashing, or cracked gutter, can remain undetected for some time. This can lead to an increasing build up of moisture in walls, timber and plaster. Unless the problem is particularly acute this will rarely escalate into creating actual drips, but it will create excellent conditions for rot to flourish leading to progressive decay of structural timber and decorative finishes.

Rainwater goods

The correct functioning of all forms of rainwater goods is vital. Failure in any single element can allow large volumes of water to pour into walls, spreading outwards as it filters down through the structure. Such a failure is most visible during or just after rain, where soaked sections of the wall are most easily seen. Even small leaks can drain behind wall face renders and be drawn into the core of the wall. From these "flooding" incidents the porous nature of traditional walls means that they can quickly become saturated, and transport the penetrating moisture some distance from the

Blocked downpipes causing staining and failure of render

A leaking gutter saturating a wall

source. As with roof problems, where timber comes into direct contact with the saturated stonework, this creates ideal conditions for damaging wet and dry rot to flourish. The conditions can also encourage insect and beetle attack.

Inappropriate materials and repairs

When repairs are carried out care should always be taken to use appropriate traditional building materials as modern alternatives are not always suitable. Their inappropriate use often has an adverse effect by inhibiting moisture movement and dispersal.

Poor quality work can also create or contribute to damp problems. Water penetration through walls and chimneys can occur as a result of poor re-pointing, or through inadequately installed lead coverings at roof junctions, especially on exposed elevations.

The situation is often made worse by the use of non-porous surface coatings such as cement render and masonry paint. Here, moisture can be absorbed through fine cracks in the coating, but cannot then evaporate back out through the waterproof surface and is held within the wall as a result. Aside from creating possible structural issues problems and inappropriate internal conditions, the large scale saturation of walls leads to reduced thermal performance and consequential effects on heating bills.

A masonry wall saturated from leaking element above.

Moisture build up

Related to dampness emerges within a building, staining is likely to appear on plastered internal walls. This is an indication that the masonry and mortar in the wall will be completely saturated and that it is acting as a wick; drawing more moisture through the wall or directly from the ground. Ground moisture can also build up due to a leak or blockage in underground pipework, problems with surface drainage, or due to a high external ground level around the property.

As a result damage to interior finishes can develop progressively. Dissolved salts, resulting from the rising damp process can appear on internal plaster surfaces. The deposited salts absorb further water from the air. As a result, most applied non-breathing paint surfaces will blister and flake. The underlying plaster will also become friable.

Poor ventilation

The current need for greater thermal comfort, while minimising energy consumption, has led to an increase in the application of different forms of insulation. In addition to installing sealed windows, this is often linked to closing off traditional ventilation grilles and restricting airflow within the structure, resulting in stagnant humid air building up within enclosed spaces. Blocked chimneys, enclosed underfloor voids and airspaces behind skirtings and panelling all contribute to the lack of proper ventilation. This creates a range of conditions suitable for a number of decay mechanisms to set in. Woodbeetle infestation, dry rot and wet rot outbreaks can all occur as a result of the increased moisture levels. Aside from the potential damage to a structure, poor ventilation can have an adverse or even serious effect on

Mould growth from condensation on the cold part of a lined wall

occupants, especially if gas or propane heaters are used without a flue.

Ventilation, or air circulation around buildings, is equally important outside. Large shrubs and overhanging trees close to walls, can raise the humidity levels considerably. This can then be progressively absorbed by any adjacent structure.

Condensation

Damp, resulting from condensation, occurs where water in the air inside a building condenses on a cooler surface. This is usually indicative of cold spots in the building, sometimes called cold bridges. It can also occur where there is poor ventilation or where short intense heating cycles do not allow the walls to fully warm up. This situation allows the heated air to hold more water, which condenses when the temperature drops. Excessive condensation frequently results in severe mould growths which can in turn create health hazards.

Blistering and peeling of a non-permeable paint

Summary: What to look for

- Leaks in concealed internal plumbing can be a major source of damp and associated decay. Even a small drip from a WC overflow can create considerable damage.

- Leaking gutters and overflowing downpipes can quickly saturate a wall. Look for staining and damp patches, especially after rain to identify where the problem lies. If there is a parapet gutter on the property, check for staining around the overflow.

- Failure of below ground drainage where a small crack or fracture in a waste water or sewage pipe can gradually saturate the ground beneath a property. A specialist drain survey may be required to check for breaks or damage.

- Once rain water is taken off the roof, it should be piped away from the building, either to the main drain or to a soakaway placed well clear of the building. Check that the gutters and downpipes are of sufficient size for the roof. Check for blockages where the downpipe enters the ground, especially if it leads into an open gully, and that the subsequent drain is clear .

- Is there vegetation close to the walls which could trap moisture or whose roots are damaging the drains? Avoid planted areas and shrubs too close to walls.

- Ensure that ground levels outside have not risen, compromising the original design intent and causing dampness in the walls and adjacent timbers.

Partially obscured vent inhibiting ventilation and tiling concentrating moisture.

- Maintaining a steady level of heating inside a building (15-20 degrees C) allows the walls to warm up sufficiently to prevent cyclical condensation on hidden surfaces. If the building has been uninhabited, or unheated, for a period more moisture will be held in the fabric and this needs some warmth to drive it off.

- Chimneys and flues should not be blocked off if fires are not in use. A ventilated chimney cap should be used and the hearth left open to allow a through flow of air.

- Are the vents above ground level and the voids below floor level clear? Ground level vent grilles should be clear of all ground level finishes and internally free

of any applied insulation. Do not block or remove vents. The area below floor joists should also be kept clear to avoid moisture transfer, and the ground level outside set approx 150 mm below this level.

- Check the pointing on skews, copes, chimneys and other upper level masonry. These exposed elements are vulnerable to water penetration and can let in rain in a variety of conditions.

- A traditionally laid roof would not have included felt or roofing papers as part of the original construction. The inclusion of this sort of material in later repair or replacement work may require the addition of concealed vents at eaves, ridge or gable ends to keep the moisture levels in the roof space under control.

- Inappropriate materials could have been used as external or internal finishes that restrict the breatheability of the building. Traditional external finishes such as lime render, distemper or limewash allow moisture to pass through the structure unlike modern equivalents, such as damp resistant paint which will tend to hold moisture in the building.

- Many modern internal paints are not sufficiently permeable to allow the dispersal of moisture from a plastered wall and their use should be treated with caution. Dry lining or framing out with plasterboard should only be considered as a last resort, as this could create areas with restricted airflows, unless it is detailed and ventilated correctly.

A solum vent at the correct height. Note the staining from previous raised ground level.

General points and background

If a damp problem is to be properly fixed it is important that the source of the problem is properly identified. Affected areas need to be allowed to dry out thoroughly before remedial work is carried out. If the source is not treated, or the problem is incorrectly diagnosed, the original problem will continue to develop and unnecessary or incorrect repair work may cause added problems. Treatments suggested for use in modern construction may not be appropriate for traditionally constructed buildings.

Where site conditions or climatic issues cannot be fully overcome, it may have to be accepted that there will always be moisture movement in the building and consequently it may not be possible to solve the problem completely. The functional requirements of the traditional building structure, and the environmental expectations of modern demands need to be balanced. The aim should be to adopt sympathetic measures which give the property and its occupants a healthy and habitable future.

Further Reading :

SPAB Technical Pamphlet No 8 – *The Control of Damp in Old Buildings* 1992

SPAB Technical Information Sheet No 4 – T*he Need for Old Buildings to Breathe* 1993

Massarwi, I & P, *Damp Buildings Old and New*, ICROM 1997

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