

Fighting Damp

Advice from the SPAB
for National Maintenance Week



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The Damp Busters

Damp - and what to do about it - is the issue raised most frequently by callers to the SPAB's (The Society for the Protection of Ancient Buildings) free technical advice line. As Britain's longest-established building conservation charity (we were founded by William Morris in 1877), we have nearly 140 years of knowledge and research to draw from to answer those queries and help property owners make the right choices for their building.

In the Society's founding Manifesto, Morris pleaded for those entrusted with old buildings 'to stave off decay by daily care', seeing this as the prime way to protect them and give them a future as well as a past. Since 2002 SPAB has taken this important advice as the basis for its National Maintenance Week, an annual campaign to encourage everyone who cares for a building, regardless of its age or purpose, to be aware of the steps they can take to remedy faults.

The message is simple, without treatment, relatively minor faults can become more serious, invasive and costly to rectify. For National Maintenance Week 2016, we have gathered our technical advice on damp into one downloadable document. The following notes give valuable information on damp, its causes, the parts of a building that might be affected and what to do about it.

Although some of the information is tailored to the needs of older buildings, there is much here that could also prove helpful for those who have modern buildings.

If you would like to talk to one of the team, our technical helpline is staffed by impartial building experts and is open every day. Telephone the SPAB Technical Advice Line on 020 7456 0916 (Monday - Friday, 09:30am - 12:30pm).

First, a word about preventative maintenance, it's important:

Preventative maintenance is work that, if carried out properly, will reduce the probability of decay. This contrasts with corrective maintenance, whereby decayed material is renewed. The importance of preventative maintenance cannot be over-emphasised. It can not only restrain, or even completely remove, the need for repairs later, but it will prevent the loss of original fabric. In addition it is cost effective. People are often surprised how quickly a structure can deteriorate. Work to put right superficial corrective maintenance is disruptive and costly in terms of both fabric and finances.



A Brief Introduction to Damp Busting

Damp is something that strikes a chord with anyone who cares for a property. Lack of regular maintenance can be a prime cause of this common problem, especially if blocked pipes and gutters are causing an overflow of water that is penetrating and adversely affecting a building.

Watch out for symptoms and signs of dampness

Damp rooms usually have a distinctive and easily recognisable smell. Stale trapped air caused by poor ventilation is another good indicator.

Damp patches and patches of algae (ie green staining) are indicative of rain penetration. Look for any corresponding defects (leaking gutters, pipes, roof tiles etc) at or near the locations of the green staining or damp patches.

Dampness on or around a chimney breast is often caused by falling damp! – rainwater directly entering the chimney mouth and filtering down through the walls below. Capping your chimney could eliminate this problem.

If your house is pre c.1919 it is likely that it was built using lime. This is a 'breathable' material, but later additions such as modern, hard cement renders and masonry paints may actually be trapping moisture into the walls. Crescent-shaped mould in the corner of two external walls is more typically due to active condensation.

Causes of condensation can be due to:

- Design, layout and construction of the building
- Use and occupation of the building
- Defects to the building
- Or any combination of the above



Defective downpipe

Salt clusters on the wall surfaces can be due to water leaks / ground water. (There are salts originating from the ground).

Remember, rising damp, penetrating damp and condensation are not causes of damp but describe the transportation of moisture.

A great deal of dampness to ground floor walls is commonly referred to as being caused by rising damp necessitating a new damp proof course to be injected - But rising damp is not a cause it describes the movement of moisture in a particular direction.



Blocked gully

So what are the common causes of damp to ground floor walls?

- Raised external ground levels against outside walls – where the ground is higher than either the physical horizontal damp proof course or higher than the internal finished floor level.

- Leaking high level gutters, overflow pipes and rain water pipes

- Faulty drains can also be a source of internal damp. External drain openings should always be kept clear of plants, debris and blockages to allow water to run free, but a blocked, cracked or broken pipe beneath or inside a house will also cause a damp problem.

- Blocked cavity wall voids

- Leaking potable water main supply at or near the building

- Where suspended timber floors have been replaced with solid floors – rarely is the damp proof membrane under the solid floor (if one exists!) properly related to the perimeter walls, causing moisture to squeeze out from beneath and upwards.

- External renders applied to external walls bridging the damp proof course and in contact with the ground

- Dampness to common or party walls – the adjoining property must also be checked

- High local water table and or susceptibility to flooding – check with the Environment Agency, local water provider and or local authority for further information



Foliage growth in hopper head



Dampness caused by rain penetration

In the context of buildings, rain penetration refers to the ingress rainwater above ground at various points in the external envelope of the construction - through roofs, walls, chimneys and openings such as windows and doors. This includes spillage from gutters and downpipes. Water penetrates buildings by various mechanisms, for example, gravity, wind pressure and capillary action. It not only damages the fabric but also creates unhealthy conditions for occupants, together with less visible problems like poorer thermal performance.

Rain penetration is distinct from other forms of dampness, such as condensation and rising damp, which require different solutions. (More on these later.)

Rain penetration is probably the most common cause of damp, and is particularly due to neglected maintenance or previous inappropriate work. Exposed parts of buildings such as roofs, chimneys, parapets and sometimes south-westerly facing walls are most susceptible to moisture ingress, especially where access for maintenance is difficult. Something as straightforward as a slipped tile can cause significant damage, as can leaks from parapet and valley gutters not cleared of autumn leaves.

High electrical moisture meter readings at wall bases due to rain penetration are frequently misdiagnosed as rising damp and used to justify unnecessary damp-course treatment. Elevated readings can also occur in virtually dry walls, due to salt deposition from evaporation. Green staining on external walls, broken roof tiles on the ground and leaking gutters and downpipes are symptomatic of rain penetration. Tests to determine moisture within the wall thickness can help rule out surface condensation. Always employ an independent chartered surveyor or consultant, not a remedial treatment contractor with a vested commercial interest in encouraging over-specification.



Rotten roof on a Georgian building

Remedies must aim to cure dampness by addressing the cause or, failing this, managing it by treating the symptoms. In

some cases, dampness can be considered insignificant and requires no remedy. Applying staged remedies can help accurately diagnose the cause of dampness. Before embarking on extensive work, therefore, the first step may entail nothing more than basic maintenance, such as clearing a blocked gully. Work should generally be like-for-like but modifications are sometimes justified. Where rain seriously penetrates an exposed wall, for instance, the reinstatement of a lime render or use of traditional tile-hanging, weatherboarding etc might be considered.

Up on the roof

Water is potentially most likely to enter through the roof, so putting right minor problems here before they worsen can avert the need for more extensive repair.

Slate and tiles

Check your roof twice-yearly. Reinstall slipped or missing slates or tiles, and replace broken ones before roof timbers or plaster ceilings are harmed. True slates can be re-fixed with copper wire ('tingles'), but heavier stone slates must be nailed or pegged. Isolated tiles are re-secured by hooking the pegs or nibs over the battens or laths. Junctions in roofs are potential trouble spots. Ridge and hip tiles may work loose, needing re-bedding in a soft lime mortar, and lead flashings and mortar fillets at chimneys etc should be inspected for early signs of deterioration. In the loft, look for water staining and other evidence of leaks, bearing in mind that this may be some distance from the point of entry.

Be aware that some unscrupulous contractors rely on roofing felt to compensate for bad workmanship. Ensure that loft insulation does not block eaves

ventilation, promoting condensation and timber decay.

SPAB's experience shows bitumen-coated fabric on the outside of roofs or spray-on coatings underneath can be a false economy, and cases have been reported of serious damage resulting to the structure. Such treatments prevent proper inspection, hinder the re-use of slates or tiles and, by reducing ventilation, increase the risk of timber decay.

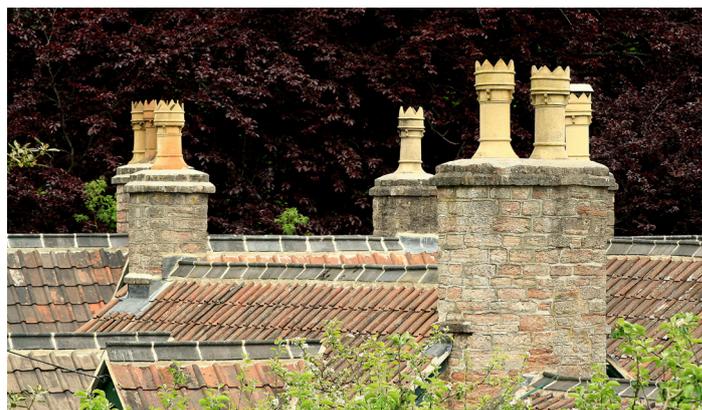
Lead flashings and mortar fillets

Mortar fillets with cracks should be repointed or, if cracking is extensive, re-formed.

Where lead or other metal flashings exist and are split or holed, replacement may be necessary using a short length of matching material. Vertical splits, though, can be repaired by covering them with a small section of new matching flashing, wedged and pointed above the original.

Chimneys

The chimneys of old buildings need more frequent maintenance than masonry less exposed to the weather, but this is often neglected because of difficult access. Erosion of mortar between bricks or stones in a chimney can lead to smokiness, dampness, increased fire risk and instability.



Buildings at Tyntesfield estate

Mortar joints are most susceptible to weathering at the top of a stack (weed growth may be a symptom), on the sides where it faces the prevailing wind, or the point at or just below where it passes through the roof. Thatch, therefore, is often best fully stripped around chimneys during re-ridging or more major work to reveal any perished mortar posing a very high fire hazard. Mortar for repointing or re-bedding bricks or stones should normally be lime-based (without cement), as should that for repairing any defective areas of protective render.

Redundant television aerials and fixings should be removed to prevent corrosion damage to masonry.

Thatch

Good thatch should not require regular maintenance, but it is important to report any concerns to your thatcher promptly. Re-ridging will be required several times during the life of the thatch. With long straw, there is also a tradition of undertaking localised repairs to the main coat, where differential decay (for example, caused by rainwater erosion in valleys) or rodent damage has occurred, and this can extend its life considerably. Keep lofts draught-free and clear of old thatch and other combustible material. Sweep chimneys in use twice a year and carefully monitor the condition of the stack, especially in the roof space.

Metal roofs

Where lead sheeting still has some life left, holes and splits are best made good with lead-welded patches, not solder, but fire safety must be remembered. Proprietary adhesive tape is available for temporary repairs. Where individual sheets have reached the end of their useful life, they will require replacing.

Copper, stainless steel and aluminium roofs are light and consequently susceptible to wind damage. Sheets should be refixed immediately, otherwise flexing (“drumming”) can necessitate total replacement. Other minor defects (such as holes) may be addressed by covering with patches of matching material.

Shingle roofs

Timber shingles can split, detach, decompose or suffer woodpecker attack. Inspect shingled roofs, both inside and out, and reinstate loose or decayed shingles before moisture penetration causes more extensive problems. Use nails made of copper (for pre-drilled shingles) or stainless steel (without pre-drilling). Zinc strips can be inserted behind courses of shingles where woodpecker damage is a risk.

Moss removal

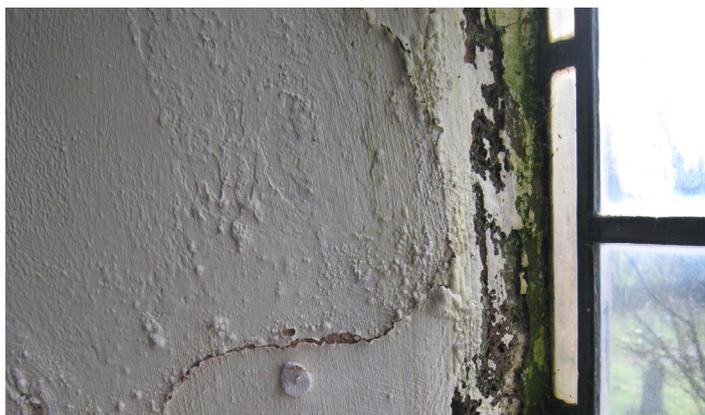
Excessive moss is often undesirable on roofs. Moisture retention may cause damage to roof coverings, and acidic rainwater run-off to gutters or roofs below can corrode certain metals. A seasonal brushing down should help control the build-up. Sometimes copper strip growth inhibitors are fitted at every ten courses of slates or tiles, remaining effective for 30-40 years. Alternatively, sacrificial lead flashings can be provided at drip-off points.



Unruly moss growth

Windows and doors

Painted external joinery can deteriorate rapidly if finishes are not maintained. Paint protects the wood beneath. It's much simpler and cheaper to refresh external paint regularly work than having to replace compromised windows and doors. It's a good idea to check the condition of external paintwork once a year.



Damp plaster by a window

Rain

Poor external rainwater disposal is another common cause of damp. Frequently, the first signs of a problem will be first noticed internally. Concentrated and prolonged wetting is likely to cause damp patches and plaster mould on walls and ceilings, and the decay of timber skirting boards, panelling etc. Investigation will often reveal rot in concealed timbers, such as roof truss bearings beneath parapet gutters. Commonly this occurs because of because of poor maintenance.



Damp plaster

Gutters, downpipes, gullies and ground level drains can become blocked if leaves, moss and debris (for example broken tiles etc) are allowed to accumulate. In addition, components can corrode through lack of decoration. Gutters may fracture where bolt fixings rust, and downpipes frequently leak at joints where blockages hasten corrosion.

Poor detailing is a further factor. Over-sized and over-fixed lead linings may suffer fatigue, for instance. Eaves gutters supported by too few brackets can sag. Where maintenance is neglected, bad detailing – such as excessive swan-neck arrangements – can accelerate deterioration. Rainwater fittings may be broken or distorted by mechanical damage. Lead downpipes are vulnerable to knocks from passers-by at low level and ladders higher up.

Good maintenance involves regularly clearing out rainwater fittings, particularly after the autumn leaf fall, and checking the system for defects. Periodic redecoration of ironwork is important to inhibit corrosion.

It can be a good idea to fit plastic leaf guards to gutters or wire balloons above downpipes. Leaf guards still admit pine needles and are sometimes easily dislodged, and material left to gather around wire balloons may cause blockages. Where visually acceptable, overflow pipes can be introduced above hopper heads. Snow should be cleared from parapet and valley gutters with wooden or plastic shovels to prevent moisture seeping through joints. Alternatively, duckboards or electric heating tapes can be provided to keep gutters clear of snow.

Fittings are best checked for leaks in heavy rain. Proprietary adhesive tape is available for temporary repairs. Where poor access hinders maintenance, additional hatches or fixed ladders might be considered.

Rising Damp

True rising damp is rarer than commonly perceived but is regularly misdiagnosed. According to Douglas Kent, SPAB Technical and Research Director, the inappropriate installation of damp-proof courses to combat rising damp accounts for much unnecessary work on old buildings

What is rising damp?

Rising damp is the upward movement of moisture through walls and sometimes floors by capillary action from below the ground. It can rise to 900mm or more in walls, depending on the masonry type, water-table level and evaporation rate. Salt deposits generally form a horizontal tide-mark, below which there is discoloration. Floors can display moist patches and staining. Rising damp is distinct from other forms of dampness, such as rain penetration and condensation, which require different solutions.

True rising damp is commoner in old buildings than new ones but rarer than often supposed. Modern buildings keep water out with a system of barriers: damp-proof courses (DPCs) have been installed in walls since 1875 and damp-proof membranes (DPMs) in floors from the 1960's.

Most old buildings lack these and therefore damp rises to some degree. This is usually not a problem where the construction can 'breathe', allowing evaporation, and may actually be advantageous in humidifying overly-dry centrally-heated buildings. Excessive dampness arises where the moisture equilibrium is disturbed, as with misguided attempts to seal surfaces.

Misdiagnosis

Rising damp is widely misdiagnosed on the basis of high electrical moisture meter readings alone. Elevated readings occur not infrequently in old buildings that are virtually dry, due to salt deposition from evaporation, or can indicate another problem altogether, such as penetration from rainsplash. If rising damp exists, there will be visible indications too, such as an accompanying tide-mark, but not, for example, the external green staining symptomatic of rain penetration. High nitrate concentrations are likely. Tests to determine moisture levels within the wall thickness can help rule out surface condensation.

In SPAB's experience, mortgage lenders can demand unnecessary damp-proofing work during house purchases. Although chartered surveyors have a duty to follow a trail of suspicion, some simply pass all responsibility onto remedial treatment contractors with a vested commercial interest encouraging over-specification. It is worth challenging any recommendation you believe is questionable and, if necessary, seeking a second opinion in writing from an independent chartered surveyor or consultant (note, not contractor). The SPAB may be able to advise you on suitable names.

Control

Measures that help your building 'breathe', such as replacing hard cement render or pointing with a more suitable lime-based mortar, may be the best solution.

Conversely, applying water-proof renders and coatings can exacerbate damp problems. Where a floor has a DPM that is displacing moisture into the bottoms of walls, this might be replaced with a 'breathable' construction. Alternatively, a 'breathing' strip for evaporation may be cut through the floor around the room perimeter and infilled with a material such as lime concrete or grated over. Externally, ground works and improved drainage can assist.

Repairs



Working with lime mortar



Tubs of lime mortar

Damp-proof courses (DPC's)

There should be a presumption against retrospective DPC's, which, inappropriately installed, can be damaging, ineffective and an unnecessary expense. They can perhaps have a role, though where irreversible alterations mean a building is effectively now functioning as a modern sealed structure. When selecting a DPC system and it is not feasible to insert a physical DPC, the SPAB suggests following BRE's (The Building Research Establishment) advice to consider only methods that have been awarded an Agreement or other third-party certificate. Chemical injection is the only method that currently satisfies this requirement. Physical and chemical DPC's, however, should be avoided in earth buildings, where major structural damage can result, and treatment is difficult in flint and rubble-cored walls.

In older buildings, lime plaster should normally be used for any repairs. Salt-resistant plasters are favoured instead by many DPC installers but tend to just temporarily disguise continuing damp problems and may require listed building consent. A poultice of whiting and water is an old method of removing patches of residual salts from plasterwork. Decoration with paints such as limewash and soft distemper, where possible, will maximise 'breathability'.



Condensation

Condensation is the release of water that occurs when air is cooled to its 'dewpoint' temperature and can carry less moisture as vapour. Water may condense indoors as warm, damp air comes into contact with colder building components, particularly where ventilation is poor – for example, in room corners, roof or floor voids and cupboards. Condensation forms on surfaces, but can also be 'interstitial' - occurring within the thickness of building materials and elements. It is often associated with mould and timber decay. Condensation is distinct from other forms of dampness, such as rain penetration and rising damp, which require different solutions.

Moisture is present in older buildings not just from the activities of occupants, but also the fabric as it 'breathes'. Historically, generous ventilation helped this escape via open fires, and loose-fitting doors and windows. The balance of the internal environment can easily be upset, though, increasing the condensation risk. This may occur when more moisture is produced – often from cooking, washing or the use of flueless bottled gas stoves and heaters. It also can happen where ventilation is reduced by double-glazing, over-zealous draught-proofing or blocking flues and air bricks. Similarly, condensation forms where walls are cement-rendered externally, or insulated with a vapour barrier

internally, compromising their 'breathability'. Additionally, cold spots from gaps in insulation are conducive to condensation, as are walls or floors of high thermal mass when heated up suddenly.

Diagnosis

Condensation occurs mostly in winter and is often first noticed when water droplets form on hard surfaces, or mould appears on absorbent finishes. Moisture meters frequently reveal diffuse areas of damp on plaster, especially with north-facing walls, but this is commonly misdiagnosed as rising damp and used to justify unnecessary damp-course treatment. Elevated readings can also occur in virtually dry walls, due to salts deposition from evaporation. Salt tests are otherwise usually negative.



A condensation drain hole at Chippenham St Paul

The use of meters in 'condensator' mode or tests showing an absence of dampness within a wall thickness can assist in pinpointing condensation as the source of moisture.

Controlling condensation problems

Simple lifestyle changes can produce dramatic improvements at little or no expense: ideally, generate less moisture. Place lids on pans while cooking, dry clothes outdoors, close kitchen and bathroom doors when in use and vent tumble driers to the outside if not of the condenser type.

Improving ventilation to the exterior can also help. Even when it feels damp outside in winter, the lower vapour pressure will tend to draw out moisture. Open windows and avoid draught-proofing those in kitchens and bathrooms. Ensure that lofts, floor voids and redundant chimneys are well ventilated and avoid foam treatments on the underside of roofs that can cause serious timber decay. Increased heating can maintain surfaces above dewpoint, especially if run constantly at a low level rather than intermittently. Lagging cold pipes may prevent surface condensation, as can improving insulation levels (taking care not to cause interstitial condensation instead). The use of 'hygroscopic' materials that temporarily store excess moisture, such as sheep's wool, can help avert condensation.

De-humidifiers can reduce condensation effectively when rooms are warm and damp, but are of limited benefit when they are cold and humid. In domestic buildings, simple lifestyle changes that lower humidity and/or keep surface temperatures above dewpoint will tend to provide a more practical and less expensive long-term solution. Similarly, whole-house ventilation systems, which can have a role in controlling condensation, should not automatically be seen as the answer.

If in doubt seek advice. The SPAB runs a technical helpline for anyone who has a query about the care and repair of a building. The free and completely independent helpline answers hundreds of questions every year from householders and building professionals.

The SPAB's helpline is staffed by specialists and is open from Monday to Friday between 9.30 am and 12.30 pm on 020 7456 0916.

The technical advice line is partially run with the generous financial support of Historic England.

If you found these notes helpful, why not join the SPAB and learn more about historic buildings from our quarterly publication for members, *The SPAB Magazine*, or make a donation to support our work in protecting historic and fragile buildings.

Visit **spab.org.uk** for more information.