

Lime Plaster & Plaster Lath for Damp Buildings

LSE
Preservation



LIME PLASTER

&

PLASTER LATH

For Damp Buildings



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Surveying for Damp Issues with Historic Buildings

Buildings fall into two categories for the purposes of surveying for damp:

- I. Modern buildings built with a damp proof course and barriers to rainwater penetration.
- II. Old buildings built prior to mid to late 19th century depending upon the region of the country. Old buildings relied on the walls breathing and shedding moisture before damp became a problem.

Damp Proofing Old Buildings

In old buildings, walls were built to such a thickness that normally damp would not penetrate to the inside. The joints were always of lime mortar or earth and were more porous than the building's structural elements comprising brick, stone etc. Consequently the joints would drain and shed water by evaporation, therefore not allowing damage to these structural elements. The joints were the sacrificial element of the building.

Because lime and earth mortars are so porous, timber in contact with these mortars is less prone to decay than when bedded in cement mortar.

Historic houses, when built, were able to breathe and shed water. They were also heated by coal or log fires in an open fireplace which promoted rapid air changes by way of air being drawn out through the chimney. Windows and doors were not sealed as they are today allowing air movement into and out of the building



Internal finishes were lime washed which allowed surfaces to breathe and, although it would discolour when damp, it would not peel off the wall like wall paper nor blister like modern paint. Over the years most of these houses and buildings have been altered to suit our modern lifestyle, nearly always to the detriment of the building.

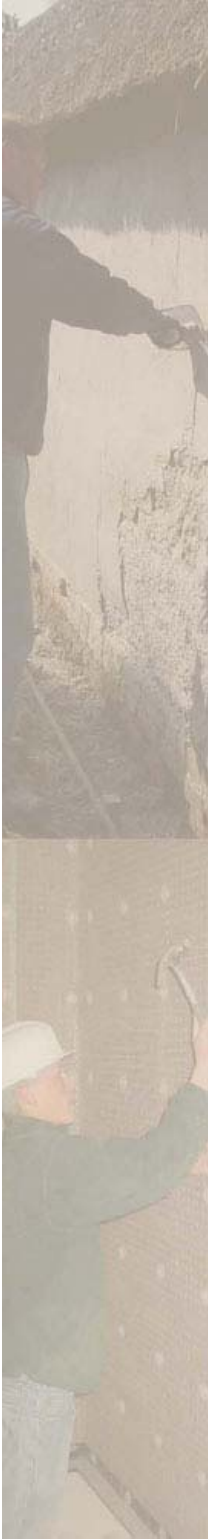
The heating has been changed and the windows and doors have been sealed and draught proofed. Consequently, we now no longer have the same amount of air movement.

From the day they were built many of these buildings have had moisture from the ground, rising into the walls by of capillary action. This moisture contains salts in solution. Initially for many years the moisture in the walls would evaporate harmlessly, outside during fine dry weather and inside, as a result of the rapid air changes induced by the heat from the open fire drawing air rapidly up the chimney.

When this moisture in the walls evaporates, the soluble salts it contains are left in the walls at the point of evaporation which would be within the surface of the masonry or plaster finishes.



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Salts block the pores and cause moisture to rise further up the walls to a point where evaporation can continue. A proportion of salts are also hygroscopic (moisture attracting) and in humid conditions (modern living, no open fire, etc) will attract moisture to the wall causing a damp area or band even when there is no capillary moisture.

In many buildings the floors have been concreted on top of a plastic damp proof membrane which reduces the area of evaporation of moisture from the floor possibly causing more moisture to rise into the walls. Hard cementitious internal plaster finishes have been applied, which are far less porous than lime wash.

Ground levels are often higher than the original, either above the height of the masonry plinth in earth structures and/or sometimes above the level of the internal floors.

These problems along with defective roofing, joinery, rainwater goods, chimneys, pointing etc., can cause excessive damp in old properties. Also to consider, as Graham Coleman, a well respected expert from BRE wrote:

"Another factor to consider is that, all things being equal, rising damp tends to rise higher in thick walls than thin walls; this is due to the lower surface to volume ratio of thicker walls, evaporation being mostly subject to surface area. This is an important feature to consider when dealing with properties with larger dimensioned walls - simply the so-called 'allowing walls to breathe' syndrome to stop the rising water may prove of little effect in such cases".

G.R.Coleman. 2000

To compound this problem houses were often externally decorated with non-breathable paint or rendered with hard dense cement rich finishes. These applications reduce evaporation significantly from the outside surface which then cause damp to rise further up within the wall with the resultant internal damp staining.

When renders crack they allow water to penetrate through, either by capillary action into fine cracks, or directly into larger cracks and debonded areas. The water is then trapped behind the render and can penetrate to the inside face of the wall structure.

Consequently, by the 21st century a great many old traditionally built houses now have damp problems often caused over the last 100 years, by changes in heating, ventilation and wall finishes.

Due to a lack of knowledge and understanding of older buildings, traditional materials and the way they work together, these damp problems have not been addressed correctly.

People buying houses do, for the most part, expect them to be weather proof with a dry interior.

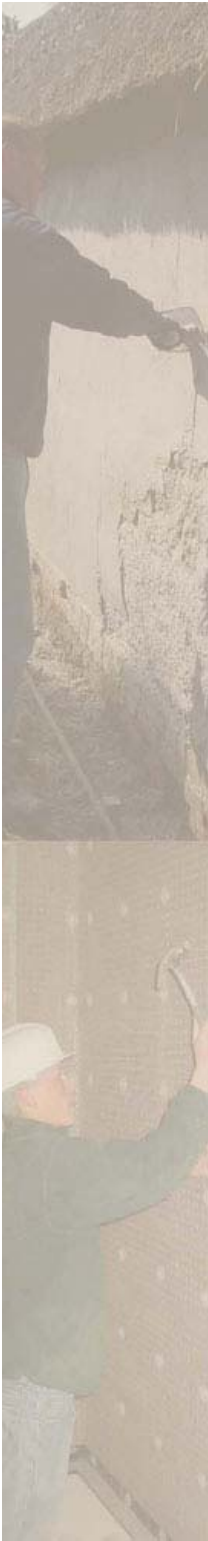
Conservation of houses means that they have to be owned and lived in to be cared for. They have to be fit for this purpose.

How to conserve these properties and make them fit for purpose is driven by two opposed camps.

Some conservationists want the very least intervention into the property, so that the historic fabric and features of the property can be preserved for future generations, which is laudable. However, many firmly believe that when a property is damp the application of lime plasters and lime wash can reverse the problem, by allowing the walls to "breathe", even when the way the whole building functions (i.e. modern heating and ventilation) has changed since it's original construction.



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At the other end of the scale some Preservation companies consider any visual damp, or damp recorded on a meter around ground floor walls, to be indicative of a rising damp problem. This, they will recommend can be cured by insertion of a chemical damp proof course, followed by hard moisture resistant sand cement render. This is often detrimental to the older traditionally built buildings. Given that there are probably 3000 trading preservation "specialist companies" (and many more builders who will have a go at it) and that there are only a few hundred with any qualifications (and far less who genuinely understand older buildings) this leads to unnecessary and often damaging work to historic buildings.

Then there is the middle ground: Experienced building professionals in both the conservation and preservation industries who understand the importance of keeping older properties in good condition so they can be preserved and who can also identify historically important elements and features, which must be conserved. However they also realise the practical issues of carrying out effective long term repairs and treatments, so that the occupants can enjoy living/working in these buildings and therefore continue to look after them.

There are a number of basic environmental health requirements for occupying a property, or bringing up children and housing the elderly, the most basic is that it must be dry and warm.

Some people not in these groups may decide to tolerate some damp in a house because they consider the well being of the house to be more important than their own creature comforts. However these people are few and far between. There is a far larger group of people who would impose damp conditions on people living in old properties due to a lack of understanding of the problems.

The Survey



The biggest problem for older properties is the method of surveying. Most surveys on old properties are commissioned by Estate Agents when they are sold. Most Estate Agents have only one interest -selling the house at the best price.

The Royal Institute of Chartered Surveyors, Trading Standards, and even The Estate Agents professional bodies, all state that surveys should be carried out by a qualified CSRT surveyor, and any work should be carried out by a BWPDA member company. This is often in the terms of the mortgage company instruction. However, many

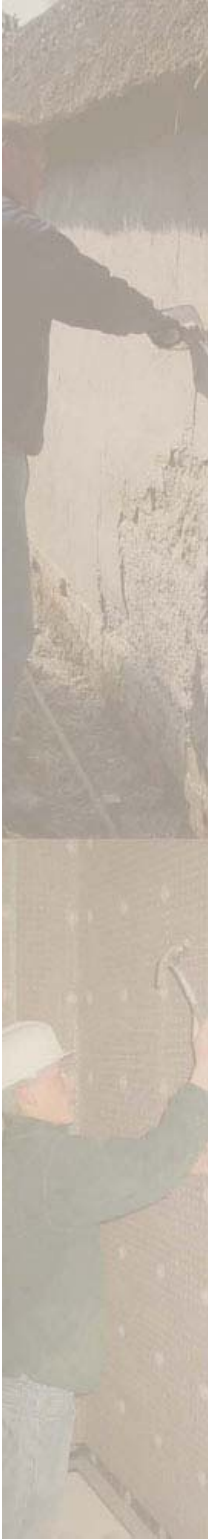
Estate Agents will try and use a cheaper unqualified company for a free survey. It is these companies who, through a lack of training and understanding, will usually in an effort to provide the cheapest quickest fix, recommend an injected chemical damp proof course and associated cementitious re-plastering.

Given that the survey is free there is some pressure to find some work. It costs on average £70 to attend a property write a report and send it. These costs have to be recovered somewhere.

In the ideal world, surveys would be commissioned by Building Surveyors or Architects who would undoubtedly use a surveyor or company that they knew to have the relevant experience, knowledge and qualifications. If Solicitors had a better understanding of guarantees they would insist that work was carried out by qualified companies, guarantees issued were meaningful, enforceable, and underwritten by insurance



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(and not by chemical companies) for the protection of their clients. This would ensure that companies do not use chemicals unnecessarily, just to comply with the terms of the guarantee.

The Conservation Project

When surveying an older property and specifying the necessary repairs, an initial survey would identify the obvious causes of damp problems such as the ground levels, roof problems, joinery decay, external finishes etc.

These would then be repaired and the building allowed to dry, allowing at least a month for every inch thickness of masonry, or by speeding up the process a little by gently heating and ventilating but not too quickly, as rapid drying could cause some cracking.

Plaster finishes could then be checked and monitored to see if damp returns. Given that rising damp can be seasonal this could take some years.

Walls can be checked for salts. If salts are found above the level of the outside ground then you can be reasonably sure that damp has risen up the walls at some time.

If the rising damp is as a result of excessive ground water at the base of the wall, then external drainage can be installed and or landscaping improved, taking care not to disturb or undermine what could be very shallow footings.

If the damp is cured but salts remain a problem, then sacrificial lime mortars or a poultice can be applied. However, if the moisture movement is cured, salts are unlikely to be drawn into the plaster, as they will for the most part only move in solution apart from high concentrations of deliquescent salts.

The reality is that all the above work can only apply to a conservation project. The work is normally driven by the purchase or inheritance of a house. Potential owners normally have financial and time constraints. If the problems with damp cannot be assessed and a cost for repairs given prior to purchase, it is likely that the sale of the house will fall through.

If houses do not sell they will not be looked after and will continue to suffer from ongoing damp and decay.

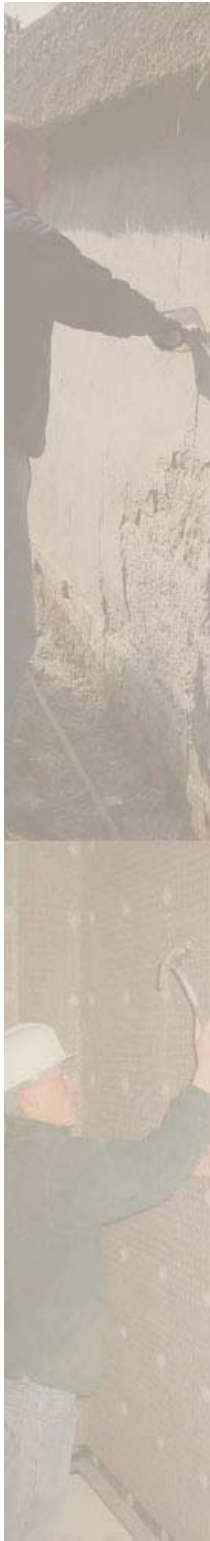
The Options.

If an old property is surveyed by a competent CSRT or Chartered Surveyor and is found to be suffering from the effects of damp, then all potential causes should be checked such as roof, rainwater goods, high ground levels, external finishes etc.

The extent of the damp should be plotted by use of a moisture meter. Carbide meter tests on samples from within the wall can confirm the presence of moisture.



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The walls should then be analysed at varying heights for salts. A check sample should be taken from well above the potential rising damp area to ensure that salts were not built into the structure in earth based mortars, cob etc.

If Sulphates, Nitrates or Chlorides are found to excessive levels in a band above floor level then that would be indicative of a rising damp problem.

If the outside ground level is not high and all other potential problems are investigated and ground levels cannot be reduced, then the problem will be ongoing.

If the damp cannot be cured then the wall is not suitable for lime plastering. No amount of breathing plaster will cure a damp problem if the building does not have open fires, draughty windows and doors and a limecrete, earth or timber floor.

Lime mortar plaster may well be less prone to damage from salts and damp, but it is unlikely to cure the problem and could become damp, stained and affected by salts.

If the building was built with a damp proof course, the installation of a new damp proof course will reduce moisture rising in the wall, but it is unlikely to reduce it enough for the use of lime mortar plaster.

Should the potential owner accept the financial risk and disruption if the damp reappears and spoils the walls? They should at least be made aware of the risks by the building professionals and given all of the options.



The Building Lime Company a division of LSE sells lime plasters and promotes their use for all traditionally built houses, but not on damp walls.

LSE have been involved with a large number of properties that have been re plastered with Lime mortar over damp walls, in some cases by market leading conservation practitioners and specified by leading conservation architects. The

walls have become so damp after a short period of time that the building work could not be completed. The lime mortar has had to be removed and replaced with a Ventilated Plaster

Lath, at great expense and distress to the owner of the property.

Historically, houses were lined with timber wainscoting (a stud work on the wall with vertical boarding over) when they became damp. Grander houses had internal stud work and lath linings or hessian stretched over timber and then papered. We have even seen examples of timber lining covered with tin sheeting and wall papered. Timber linings will decay if they are not correctly detailed and ventilated.



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The Ventilated Plaster Lath System



When surveying an older property and specifying the Our approach is to line the walls with a ventilated lath incorporating a mesh stud profile, which can be finished with lime mortar, light weight plaster, plasterboard or timber wainscoting if required.

The system has been in use since the 1940s. It was introduced to this country by John Newton and Co.

John Newton used to supply hair to the lime market until the late 1930s. He then introduced the Newtonite Lath damp proofing wall lining system

to the building market. It was used extensively in all manner of buildings and has proved extremely successful at protecting finishes from the effects of damp, without affecting the building's structure.

The Newtonite Lath has since been superseded by Newlath Ventilated Plaster Lath.

The lining is detailed so that it is ventilated and moisture can evaporate from the wall surface, although it is unlikely to in the modern sealed and heated house environment.

If the walls are dry lined or plaster boarded the minimal number of fixings can be used. Therefore, there is minimal damage to finishes behind the system. It can be fixed over existing sound finishes and detailed around/up to architectural features.



The Newlath is not installed to remove or cure damp. It is a lining system which when fixed to the wall protects plaster and decorated finishes from the damp in the walls. It does not cause moisture to move into other areas because it is ventilated. It does create a warmer, dry environment in the property without affecting the way the wall works.

Externally, unsound/defective cement renders should be removed and, where applicable, renewed with a lime render.

Removal of sound, watertight cement render can often cause damage to the underlying substrate and this



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should be given due consideration before proceeding with any render removal.

The Alternative Approaches

- I. Stripping off plaster and replacing with a hard sand cement render which is always unsuitable for older buildings built with lime mortars. Creating a damp barrier on the wall face is likely to drive moisture up the wall possibly causing decay in timber elements.
- II. Installing a damp proof course which is not suitable for buildings built without a damp proof course and is never effective in thick masonry walls.
- III. Applying a lime mortar render which would have to be treated as possibly sacrificial, as it is likely to become damp and stained if the cause of the damp has not been cured.

Penetrating Damp



Old houses were built with walls thick enough so that water could not penetrate through. However, in some situations the walls have become either too porous or the location is extremely exposed, such that rain water does penetrate through to the inner face.

The remedies employed to protect the walls were often ineffective or unsightly. The more effective remedies were slate/tile hanging or Mathematical tiling on battens. However, they do not suit every house or every situation.

Sand cement render was used in most situations from 1900 onwards. Cement render invariably cracks allowing rain water in and compounding the problem.

In some situations the use of an external cavity lath membrane, (detailed so it is ventilated) and plastered over with a lime mortar, can be the most effective cure for the problem. It is aesthetically pleasing and is a long term solution to the penetrating damp problem. The inside would then require a month for each inch of wall thickness to dry out



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Basements and cellars



In old buildings, basements still need to breathe and the walls are not often strong enough to take a tanking system.

Tanking systems are of a stronger material than brick or stone so are prone to de-bonding and cracking.

Tanking will not accommodate any building movement.

We would recommend the LSE Membrane system in preference to cement based or epoxy systems, the benefits being:

- The complete system would be guaranteed for a full 10 years by LSE.
- If the system is inspected and serviced annually the guarantee can be extended every 10 years for a further 10 year period.
- The system would be guaranteed by the GPI insurance guarantee so as the work would be guaranteed in the event that LSE should cease trading for any reason.
- The system would be very flexible and would accommodate any movement in the building.
- The system is very fast track to install and there is no drying period.
- The system can be plastered to a finish of your choosing and decorated with any products you wish.
- By installing an internal perimeter drain, sump and pump the system can be installed to deal with a certain amount of free flood water.
- The LSE Drain system will conform with BS 8102.



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JOHN NEWTON
& COMPANY LIMITED (EST. 1848)

