

Establishing the Presence of Rising Damp

INTRODUCTION

There is a lot of discussion in the media and on the internet about rising damp – what it is, misdiagnosis and whether it even exists.

Rising damp is simply water from the ground that enters a structure by capillary action – the tendency of water to be drawn upwards in porous materials. Building materials are porous, therefore moisture from the ground can rise into the structure of a building – much as water is drawn into a piece of tissue paper or a sponge – unless there is a barrier, such as a damp proof course, to prevent it from doing so.

The problem causes discoloured wall coverings, often with a characteristic tide-mark due to salts dissolved in the ground moisture evaporating out towards the top of the profile.

Due to the fact that there are many other causes of dampness in buildings, such as rainwater ingress and condensation – as well as the high cost of remedial work for rising damp – it is vital that investigations into a suspected case are undertaken by a trained and competent surveyor, such as one who holds the CSRT (Certificated Surveyor in Remedial Treatment) qualification.

CHARACTERISTICS OF RISING DAMP

Rising damp is characterised by a descending moisture gradient within a wall from floor level up to a height of about 1.5 metres, although on rare occasions an impermeable covering on the face of a wall at lower levels, may cause the damp to rise higher than this.

A good indicator that a damp problem is being caused by rising damp is the presence of a salt deposition line. Ground salts migrate in solution with the moisture and will be deposited at the point where the water evaporates from the wall.

Sulphate salts will produce efflorescence on a plaster surface, whereas chloride and nitrate salts are hygroscopic, that is they attract moisture from the atmosphere and are seldom visible, although they can cause a line of increased dampness on the wall. While harmless to health, such salts can be responsible for damage to plasterwork and other wall coverings. Salts will continue to evaporate out long after a rising damp problem has been resolved unless the wall is resurfaced with salt resistant plaster or render.

RISING DAMP DIAGNOSIS TECHNIQUES

There are three phases to any investigation and diagnosis of damp in a building:

1. Visual inspection
2. On site measurement of the extent and severity of the problem

3. Laboratory analysis of samples

Visual Inspection

The first task when investigating a suspected case of rising damp is to carefully examine the property in order to fully understand the building, as well as the client's requirements and expectations.

When determining the presence of any moisture in the fabric of a building it must be understood that no method of diagnosis can differentiate between water from one source or another, so all potential causes of dampness – including rainwater ingress and condensation – must be taken into consideration.

A visual inspection will therefore involve a thorough check of the common causes of dampness, such as faulty guttering, downpipes and flashing, as well as damaged pointing, cracked rendering and raised external ground levels. Rising damp can be caused by excess water pooling around foundations, such as might be caused by leaking water pipes.

If faults are found by a surveyor, the client should be advised to remedy them, allowing a period of time to elapse before further checks are made.

Only when all construction defects have been identified or eliminated from the investigation, should the effectiveness of the building's damp proof course be assessed.

On Site Measurement

To support the findings of a visual inspection the surveyor will then begin the process of quantifying and developing a full understanding of the damp problem. There are two types of moisture meter commonly used by surveyors during site investigations.

Electric moisture meters are commonly available and used for on site testing and screening. The vast majority measure either the electrical resistance of the wall materials, or the capacitance in a sensor, both of which are influenced by moisture.

These meters are quick and easy to use, have the advantage of being small and portable, and are valuable tools if used properly. Being non-destructive they are particularly suitable for pre-purchase property surveys. However, there are limitations to their use which must be understood by the operator.

Readings from electric moisture meters can be influenced by many factors, such as salt contamination, material density and the conductivity of different wall coverings. Reasonably accurate measurement can only be achieved on timber. If used on plaster or masonry, readings can be inconsistent and are not truly quantitative and readings from different situations should not be compared.

For this reason isolated readings from electric meters are generally of little value. However, electric meters can be used to take a number of readings

very quickly, so they are particularly useful in establishing a pattern of relative readings over a surface.

Electrical meters are not suitable for checking the efficacy of a new damp proof course in a building that has previously been suffering from rising damp, as the presence of remaining salts can produce high readings.

A calcium carbide meter, often known as a 'Speedy' meter, can be used either on site, or as part of a laboratory-based analysis. Samples are obtained by drilling a hole in a wall and collecting some of the dust, a measured sample of which is placed within a pressurised container and mixed with calcium carbide. The calcium carbide reacts with any water present, producing acetylene gas, the volume produced determining the moisture content of the sample.

The calcium carbide meter is a very useful tool for assessing the exact moisture content of a sample, but training is necessary in order to correctly interpret the results. The meter can only indicate the total volume of water in the sample tested and cannot differentiate between capillary and hygroscopic water.

Laboratory Analysis

In order to achieve precise quantitative results a laboratory analysis is vital. A variety of tests are available, giving more comprehensive results than on site testing. Analysis in a laboratory is also necessary to accurately determine the presence and concentration of ground salts.

Gravimetric, or oven-drying analysis is able to distinguish between moisture derived from the ground and that due to existence of hygroscopic salts. It involves removal of a drilled sample from the wall which is weighed and then left in a controlled environment – at 20 degrees centigrade with a relative humidity of 75 percent – to be allowed to reach its equilibrium weight before being weighed again. The sample is then oven-dried and reweighed. The difference in weights can be used to accurately determine the hygroscopic and capillary moisture content of the sample.

Although this test takes some time and will be more costly to undertake than on-site testing, it is the most accurate test currently available.

Moisture Profiling

Moisture profiling can be particularly useful when diagnosing rising damp. This involves taking a series of vertical samples in order to establish the distribution profile of salt and moisture within a structure. Although relatively expensive to carry out, the process can be useful in sensitive buildings, historic structures where there is doubt in the diagnosis, or as part of litigation.

Sampling

Due to the possible influence of hygroscopic salts, condensation and ambient humidity, the results of tests taken from surface plaster alone can be

misleading. If doubt exists concerning a diagnosis or in case of dispute, in-depth drilling and sampling below and at intervals above the damp proof course line may be necessary, with moisture content being assessed using either an oven drying or calcium carbide method.

Whilst the use of insulated probes with an electrical meter can help to eliminate interference from surface contaminants, the readings obtained can only be compared relative to each other and must therefore be interpreted with caution.

If samples are to be removed from site for laboratory testing, they must be stored in airtight containers to prevent any loss or gain of moisture in transit. In addition, an accurate record of the exact location for each sample is essential for correct interpretation of the results.

If an active electro-osmosis damp proof course is present within the wall under investigation, this must be switched off before tests are undertaken, to prevent erroneous results.

REMEDIAL ACTION ON DIAGNOSIS OF RISING DAMP

If the source of the dampness problem is identified as rising damp and it has been identified that this is due to the lack or failure of a damp proof barrier, a new damp proof course may be required. This can be in the form of a physical barrier, a chemically injected damp proof course, or in some circumstances an electromagnetic system.

In most cases the deposition of ground salts will also necessitate the removal of areas of damp or salt-affected plasterwork. This will not in itself remove water and salt accumulation from the wall, which may continue to evaporate out over time. For this reason subsequent replastering must use materials resistant to the passage of residual moisture or salt in the drying wall. Gypsum-based plasters are not usually recommended where walls have been affected by dampness or salt contamination.

Further information on the diagnosis of rising dampness in masonry walls can be seen in various PCA guidance notes, BS6576 and BRE digest 245.