

Identifying & Rectifying Water Leaks

Water leaks can be one of the most difficult building problems to rectify, often because their source or cause can be difficult to identify. Water known as a universal solvent is capable of dissolving steel, amplifying biological activity such as mould and bacteria and of course the decay caused by fungi such as wet rot.

While liquid water is readily identified, its movement, different forms and ramifications can often be difficult to recognize without specialist equipment.

Water characteristics

Water can move in, liquid, solid, gas or vapour forms. In its gas phase it can move through most substrates including concrete. Its movement can be horizontal, vertical aided by gravity downwards and capillary action upwards. Heat and thermal differences can cause movement in all directions as air or conductive materials become vectors. Vapor barriers, both designed or accidental can have extremely positive or negative effects on building damage and are increasingly a cause of concern. Vapor barriers or retarders must be designed to prevent moisture ingress but must not trap moisture. An increasing problem is the design of vapor barriers on the wrong side of insulation.

Causes of leaks

One of the leading causes of water damage and leakage is poor construction detail especially around windows and doors with almost total reliance on silicone sealers over engineering design. Increasingly the design of drips has been omitted and capillary action, gravity or wind drive causes intermittent or continual water ingress

Measuring Leakage

Surveyors have almost always used the Protimeter type conductive moisture meter, unfortunately few have understood that the meter is calibrated for wood and that it cannot be competently or accurately used for brick, concrete, plasterboard and many other building materials. Measurement is required to assess environmental differences and extent preferably in three dimensional terms.

Envelope leaks can be very difficult to identify although new techniques including pressure differentials and nebulae sprays or tracer gas can be used with great effect.

Moisture content can be measured with ultrasonics, calcium carbide, and conductive meters. Another technique includes the use of thermal imaging and infra red thermography. Basically wet materials including insulation become colder when wet and IR cameras can often be used in conjunction with other test equipment with great success.

While high moisture content can be an indicator of leakage it can also be the result of condensation. Condensation is one of the most misunderstood building faults. Often blamed on life style conditions it is invariably the result of either poor ventilation or more often thermal or cold bridging. Missing insulation, failure in thermal breaks caused by poor construction are often the cause.

Measuring moisture

While moisture content of specific areas is a recognized measurement technique of leaks, this can be impossible when surveying a large building or indeed hidden areas. Two additional and relatively new techniques can be used to accurately identify moisture problems.

Specific Humidity

Specific humidity (Sh) is a function of temperature and relative humidity (Rh) which is calculated on a psychrometric chart. While RH is a measurement of percentage of how much moisture can hold, Specific humidity measures the actual content. This of course depends on some evaporation and this measuring technique can be enhanced by slightly increasing temperature with accurate readings of suspect areas against ambient or comparison areas.

Mould Measurement

Today's building materials are invariably permeable and cellulose based. This means porous (Chalk like plasterboard) and made of wood, paper, (lining of plasterboard). Any excess moisture or reservoirs will accumulate in these materials which are absolutely ideal for mould growth. While mould is recognized as a health issue, its presence can also identify the problems of leaks. The genus or different species of mould can assist in the cause or location of the excess moisture. You will note the term leak has now been replaced with moisture excess due to the other potential causes.

Mould assessments are extremely accurate and can now measure both live and dead mould, a significant advancement when considering interment problems, where mould can die off when dry only to reappear in future moisture events. Costs for accurate mould analysis have dropped dramatically and accurate assessments are seen to be a cost effective, environmental measurement tool.

About the author

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