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## Investigation of Moisture and its Effects in Traditional Buildings

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This Document is currently a working draft. Further amendments are possible before the process of drafting is completed. The organisations that have collaborated to create the text are committed to its publication and use as a guide, standard or measure of competence. Process and procedure for each of the partner organisations must be followed before formal adoption or endorsement.

Until the draft methodology is finalised, agreed and formally adopted by the partner organisations, the following text remains an unadopted and unenforceable discussion paper and cannot be used to dictate, measure or benchmark competence or duty of care.

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# **Investigation of Moisture and its Effects in Traditional Buildings**

## **Explanatory notes**

The following methodology outlines the principles that surveyors should adopt to deliver best practice in investigating moisture related issues in traditional buildings. It goes on to list out specific items that the surveyor should have knowledge of and consider at each stage of the diagnostic investigation and repair process.

The document is intended to be a framework for moisture investigations in buildings of all types and ages. It is important to note that the term traditional refers to buildings with solid walls built from permeable materials such as brick, stone, earth, timber, and lime-based mortars, plasters and renders. Traditional construction absorbs moisture but readily allows it to evaporate when conditions become drier. This is in contrast to modern construction which relies on impermeable barriers to prevent moisture entering the fabric.

It should be appreciated that there are existing regulations, standards and guidance that will be applicable to traditional buildings and while it is not practical or necessary to list them all in this document, it is assumed that to be competent, surveyors will have awareness of these documents and will understand when they should be applied in the diagnosis of moisture.

Additional considerations apply where a building is deemed to be a 'heritage asset' either by statutory designation (e.g. being a Listed Building) or being identified as such by the local planning authority. Although measures to investigate and deal with moisture problems will still be determined primarily by technical issues, their potential impact on a buildings heritage values and significance should influence the approach taken.

Consulting the relevant Historic Environment Record (held by the Local Planning Authority) will help to establish whether the building is a 'heritage asset' (either designated, e.g. Listed, or undesignated), what might be important about it, and whether statutory consent will be needed for any proposed works, including invasive investigations.

This methodology is aimed at those providing consultancy advice or surveys at the pre-acquisition stage – i.e. to prospective owners of a building and assumes that a non-invasive inspection will be undertaken initially, until such times as an invasive inspection is deemed necessary.

It is also assumed that *impartiality* in the context of this paper means that the surveyor is acting within the limits of their respective organisations ethical standards and rules of conduct, and therefore any report will be impartial in that it gives a fair opinion and does not intentionally put fee over providing the most suitable solution for the client and their building. For example, it is appreciated that contractors may be asked to visit a property and provide a quotation to solve a damp problem, rather than just providing a report with no quotation included. In these cases, impartiality is taken to mean that the contractor will report impartially on the facts of the problem and suggest remedial works that are proportionate to any defects discovered and respect the nature of the property.

Further, it is noted that in the context of this paper, *conflicts of interest* are stipulated in the knowledge that any report with a quotation may involve the surveyor or contractor being remunerated for work where this is made clear. However, what is intended is that any secondary contractor or any remedy specified by the surveyor or contractor does not contain a product, treatment or process that will benefit the surveyor or their firm financially without declaring this to the client. Members are expected to follow their own organisations guidance and regulations on ethics, rules of conduct and conflicts of interest.

## Methodology

Stage	Demonstrate knowledge in these points:
<p><b>1A. Understanding The Building: Context</b></p>	<p>How to build a holistic picture of the building beyond its construction today, including:</p> <p>The approximate original construction date.</p> <p>Construction materials &amp; techniques – from historic through to modern.</p> <p>Setting – how the building sits in its environment (elevation, ground levels, drainage, wind exposure) – what is the moisture and temperature ‘stress’ on the building, including reference to UK weather exposure zones, whether the building sits in an area prone to flooding, and the ground conditions of the site.</p> <p>Alterations &amp; Additions – how the building has changed since it was first constructed – and document changes to materials used, and the likely consequences of these changes in both construction and maintenance (e.g. use of impermeable mortars in repointing and rendering).</p> <p>Use – present and any past uses.</p> <p>The current condition of the building.</p> <p>Heritage significance of the building – understand the concept of heritage values and significance. Appreciate the differences between various types of heritage asset designation (e.g. Scheduled Monuments, Listed Buildings, Conservation areas, etc).</p>
<p><b>1B. Understanding The Building: Differences between old and new buildings</b></p>	<p>Be able to clearly identify different building types and how to survey accordingly.</p> <p>Understand the ability for building materials used in traditional buildings to wet and dry, and how this relates to the property being surveyed.</p> <p>Recognise that traditional buildings are constructed with different detailing and levels of performance expectations from modern buildings, and that moisture presence in such buildings may not be down to a construction failure. Understanding that occupation patterns can influence the moisture within the building.</p> <p>Understand the differences between modern and traditional construction in terms of moisture movement and thermal performance.</p>

## 2. Understanding Moisture

Demonstrate a clear understanding of the relationships between temperature, relative humidity and absolute moisture content and vapour pressure. Consider the three states of water, and the means by which water can move in its liquid and gaseous states.

Understand the difference between porosity and permeability.  
Understand how water enters and moves in permeable materials.

Understand larger scale moisture movement processes (e.g. rain penetration and hydrological pathways formed by open joints and voids).

Understand how heating, ventilation and moisture are interrelated.

Understand and be familiar with the operation of equipment that may be used to identify the presence of moisture in building materials and in the air. Understand the uses and limitations of this equipment and be able to determine which methods of moisture measurement are appropriate for the property.

Knowledge of the various techniques and types of devices used to locate and measure moisture in the built environment, including for example: electrical resistance' meters,

capacitance meters,  
hygrometers,  
thermo hygrometers,  
thermometers,  
thermal imaging devices,  
anemometers,  
microwave meters,

atmospheric data loggers and borescopes.

Understand carbide meters and the process of gravimetric moisture analysis.

Understand the difference between direct and indirect moisture movement techniques.

Understand the difference between invasive and non-invasive tests and their implications.

Understand how to record this information in an unambiguous format that can be understood by the client and can be used in diagnosis.

Be aware of long-term monitoring methods and equipment.

Be aware that traditional building fabrics may be subject to seasonal fluctuations / cycles.

Understand typical sources of moisture (external, internal, ground, building services and drains).

Understand the movement of moisture in buildings and the factors that influence the rate and susceptibility of building elements to same, including porosity, permeability, vapour pressure, vapour pressure differential, human activity and how

	<p>these relate to building materials, construction types and internal environments. Understand humidity control and the importance of absolute moisture content of air and relative humidity.</p> <p>Have an awareness of the effect that human occupation of a building can have on moisture variables (for example, through washing/showers, drying of wet clothes and cooking).</p> <p>Understand how buildings react to temperature changes and what thermal gradients are.</p>
<p><b>3.Understanding moisture related building defects</b></p>	<p>Understand what causes deterioration of building fabric including for example the following: Porous materials: Freeze and thaw cycles, Wetting and drying cycles, Soluble salts, Organic growth (including moulds).</p> <p>Non-porous materials: Corrosion of metals. Timber: Insect infestation, Decay.</p> <p>Understand the main mechanisms of dampness in buildings, as outlined in this document.</p> <p>Be able to recognise and identify evidence of infestations by the most commonly encountered wood destroying insects and take steps to determine if the infestation is active. Be able to identify the most common forms of wood decaying fungi that affect buildings and understand the conditions necessary for growth.</p> <p>Understand how past interventions and consequential changes in the building could influence moisture accumulation in the fabric</p> <p>Why damp may be manifest in a building:</p> <p>Understand sources, ventilation, heating and insulation positions / types and the impact these have on moisture levels.</p> <p>Understand the reasons for surface mould in buildings.</p> <p>Understand the significance of salts in assessing moisture problems, how salts can move through the building fabric and how this might influence a resistance meter. Understand how such salts can damage building materials. Understand the potential effects of some impermeable wall and floor coverings.</p> <p>Consider existing external ground levels, drainage, cold areas and ventilation.</p>

<p><b>4. The Condition Assessment</b></p>	<p>Thorough inspection of a building to enable assessment of its condition and identification of possible sources of moisture, including above and below ground water supply services.</p> <p>Recognise that defects may not be caused by the original design but could be the consequence of alterations.</p> <p>Understand the differences between and uses of the standard levels of building survey and how assessment of any defects found from a building pathology point of view should be communicated.</p> <p>Consideration of existing maintenance regimes, (or lack of) as well as the introduction of future planned preventative maintenance.</p>
<p><b>5. Diagnosis &amp; Recommendations</b></p>	<p>Provide a holistic diagnosis that identifies and deals with causes rather than a focus on symptoms.</p> <p>Understand that dealing with damp is usually/often a staged process – recognise how deal with the obvious defects first (including for example matters such as ventilation, ground levels, and lifestyle). Then allow a period for monitoring, and natural evaporation and re-assess before moving onto other treatments.</p> <p>Be able to identify where further focused investigations may be needed (for example, sampling or opening up), understand the implications of such and that permission will be required from the building owner.</p> <p>Understand that where the survey terms requires recommendations for remedial works that such must be proportionate with the defect and significance of the building.</p> <p>Recognise that any recommendations for works should bear in mind any legislative or regulatory issue. Understand that any introduction of permanent new modern materials to a Listed Building is likely to require prior Listed Building Consent. Any works proposed to a Listed Building will require justification.</p> <p>Where possible, consider all options for repair that minimise the impact on heritage value and significance.</p> <p>Understanding and consideration of the significance of the building both as a whole and in the materials and components used in its construction and the implications on this for any works proposed. Be aware that a detailed heritage impact assessment is required where Listed Building Consent is needed.</p>

<p><b>6a. Legal Requirements: Planning &amp; Building Control</b></p>	<p>Consideration of when and/or if such will apply.</p> <p>Understanding of legislation relating to specific types of property (e.g. Listed Buildings) and areas, and that conflict can exist between Building Control and Planning / Listed Building Consent requirements.</p> <p>Understanding that not all buildings, or all parts of a building, may have the same level of significance and that they might need to be considered differently depending on the individual facts that apply. Traditionally constructed buildings are not all the same and should not be expected to perform equally. There should be an awareness and consideration of regional variations in vernacular styles and quality of materials used. This is likely to have an impact on decisions</p> <p>made. Listed Buildings have been identified as having greater national significance and will require additional consideration.</p>
<p><b>6b. Legal Requirements: Other Legislation, Regulations &amp; Standards</b></p>	<p>Knowledge of the following legislation and guidance that may also apply to any recommendations:</p> <p>Party Wall Act</p> <p>Health and Safety / CDM</p> <p>BS7913</p> <p>BS5250</p> <p>BRE Digest 245</p> <p>Historic England, PCA and RICS guidance documents</p> <p>Understanding when legislation / regulations are mandatory and when they are used for guidance, as well as when they do or do not apply.</p>
<p><b>7. The Report</b></p>	<p>In addition to the content typically included in a professional and impartial survey report (e.g. client, surveyor and property details, limitations and exclusions, etc) the report should include the following information:</p> <p>A summary of the surveyors' observations, including an assessment of significance.</p> <p>An impartial diagnosis of the damp problem, which should be clearly explained and laid out systematically to communicate the relevant risks to the reader,</p> <p>Where recommendations for the repair and recovery of moisture affected structures are recommended the solutions should be clearly explained and prioritised as appropriate.</p> <p>Where monitoring and staged interventions are appropriate or beneficial, the client should be informed of these options together with the likely cost and time implications of such recovery strategies.</p>

	<p>Where appropriate, clearly state whether the building concerned represents a financial risk to the buyer / lender, and why, and,</p> <p>Any conflicts of interest should be clearly stated.</p>
<p><b><i>Additional considerations for post- acquisition work and/or when working for owner/occupiers:</i></b></p>	
<p><i>Invasive Investigations</i></p>	
<p><i>Long Term Monitoring</i></p>	
<p><i>Specification Writing</i></p>	
<p><i>Contractor Appointment/Contract/Contract Administration</i></p>	