

Impacts of Damp & Moisture in Heritage Buildings

5 October 2017

Aim

To enhance the level and quality of knowledge exchange between heritage professionals and the research community.

Objectives

- To identify the key research areas and questions from the heritage sector that can be addressed by environmental research.
- To identify where knowledge needs can be met from existing or new knowledge derived from research.
- To explore opportunities to enhance collaboration between heritage stakeholders and academia.
- To ensure that findings from existing research collaborations are rapidly shared across the community.
- To consider how best to develop research ideas for projects related to damp & moisture in the heritage environment.

Notes from discussion session: identifying priority evidence requirements and research needs

General considerations:

By their very nature, historic buildings are inherently tolerant and stable to changing conditions, so maintaining their integrity in the manner for which they are designed should help maintain resilience. But at what time or under what conditions is this equilibrium with environmental factors lost and when is it best to intervene?

A move towards a focus on 'traditional' rather than 'heritage' or 'historic' buildings will help include a wider variety of buildings (and to move away from the perceived niche 'heritage' label)

How should priorities be identified when time, resources and money are all limited? Should priority be given to maintaining the exterior or the interior of a building? In practice, budgets are often a barrier meaning work has to take place sequentially but possibly with sub-optimal results.

What is the value in achieving sustainable properties in the longer-term? Arguments taking account of whole-life energy use and/or embedded carbon etc. can all help quantify the long-term environmental costs.

What specific data is needed? Modern technology can allow rapid and comprehensive monitoring and data collection. Long-term, short-term and/or intermittent monitoring are all possible but decisions must be driven by the specific questions that need answering.

The practicalities of rebuilding/retrofitting can be significant: requirements for continued public access, sourcing and storing of materials etc. all need to be factored in.

Whatever approach is taken, much of the work on traditional buildings relies on the quality of the workmanship and finishing. A key question is how best to maintain and enhance the level of skills and capabilities available?

Research and evidence needed:

- Water dynamics: differential impacts of various saturation and drying conditions leading to different conservation requirements, e.g. wetter summers may mean walls may never dry out; more driving rain could force water internally. How fast can a property be dried out using conservation methods? (e.g. hot-mix mortars)?
- Post-flooding. The rate and process by which buildings/materials dry out and appropriate restoration techniques to use, to help inform risks assessors and insurance companies. Need to share this knowledge with such practitioners to better understand the process of drying and to ensure suitable solutions are used at the appropriate point in the drying process.
- Advantages and disadvantages of waterproof and hydrophobic surface coatings for buildings.
- Rising damp - is this a myth? It could occur in saturated buildings with porous stone or when caused by defective drains/guttering, but more evidence is needed.
- How best to match stone types when stone from the original quarry is not available?
- Impact of weather/climate. New projections are needed on the duration and severity of extreme weather, e.g. impacts vary with the length of episodes of driving rain (a few minutes or many hours?), and the direction of sustained high winds (96 hrs in direction of jet stream or swirling around?)
- Modelling of changing water droplet size and shape. Lots of anecdotal evidence of impact but not currently supported by research.

Knowledge exchange:

Lack of effective synthesis and translation of evidence from research for use by practitioners continues to be a barrier. How can we help educate the construction industry, including members of the public working on DIY projects, whilst recognising that education can only go so far, particularly for lower-income levels, if cheap products continue to be on offer?

- Professional organisations can act as advocates
- Embed conservation issues in education and skills courses (not just an add-on)
- Provide case studies and examples of where new technologies (e.g. digital) have been used.
- Recognise that the internet is a key source of information:
 - A central repository for curated research outputs
 - Information on emerging sensors and non-destructive monitoring equipment
 - summaries and fact sheets are needed that can be quickly assimilated (e.g. why lime?)
 - online tool(s) with simple steps to help guide users (pros and cons of different approaches/materials)
- Work through trade bodies, as a means of focussing information on key questions raised by their members.

Enhancing the value of research:

- Recognise that much of the research is also applicable to modern buildings – broadens use.
- Enhance the wider value placed on knowledge, experience and skills in the conservation of Align approaches and solutions to the Treasury Green Book – engages with policy, explains implications for UK economy etc.
- Work to inform relevant Standards: are these still valid or should they be revised to reflect recent findings.
- Help interpret the wider implications of for example water ingress, in terms of lost collections, value destroyed – economic arguments are always strong.
- Behavioural research is needed as to why key messages from research/professional bodies are being not being pushed/taken-up. Practitioners are often driven by familiar products and supply chains, rather than emerging evidence on appropriate methods and approaches. But need evidence as to why short-term and/or cheap options are often not the most sustainable solution.

All presentations are available at: <http://www.arcc-network.org.uk/adaptive-places/heritage-buildings/>

Further information on the featured research is at:

- Oriel Prizeman & Christopher Whitman, Cardiff University: <http://sites.cardiff.ac.uk/architecture/research-projects/correlating-maintenance-energy-efficiency-and-fuel-poverty-for-traditional-buildings-in-the-uk/>
- Lucie Fusade, Scott Orr, Martin Michette, Oxford University: <http://www.oxrbl.com/>
- Elizabeth Laycock, Sheffield Hallam University: <https://www.shu.ac.uk/about-us/our-people/staff-profiles/elizabeth-laycock>



Participants

Jill Fairweather	CADW
Neal O'Leary	CADW
Stephen Jones	CADW
Paul Hughes	CADW
Michael Davies	Davies-Sutton Architects (CADW)
Maureen Young	Historic Scotland
Ewan Hyslop	Historic Scotland
Soki Rhee-Duverne	Historic England
Iain McCaig	Historic England
Polly Martin	Historic Houses Association
James Caird	IHBC
William Page	Historic Royal Palaces
Jana Horak	Welsh Stone Forum
Oriel Prizeman	Cardiff University
Scott Orr	Oxford University
Lucie Fusade	Oxford University
Christopher Whitman	Cardiff University
Martin Michette	Oxford University
Elizabeth Laycock	Sheffield Hallam University
Phil Sivell	ARCC network
Roger Street	ARCC network
Vicky Hayman	ARCC network

Agenda

10.00	Welcome	Neal O'Leary CADW
10.10	Introductions	Roger Street ARCC
10.20	Aims & Objectives	Phil Sivell
10.25	Stone decay, water ingress and conservation at Skelmorlie Aisle, UK	Maureen Young, HES
10.45	Correlating maintenance, energy efficiency and fuel poverty for traditional buildings in the UK	Oriel Prizeman, Cardiff Uni
11.05	Investigating the effects of internal wall insulation on moisture in solid brick walls	Iain McCaig - Historic England
11.25	Building Adaptation – use of traditional materials and improving building detailing	Ewan Hyslop, HES
11.45	Practitioners Forum	All
12.35	Lunch / Tour of Castell Coch (case study)	Michael Davies
13.35	Driving rain: predicting future trends and developing new pointing mortar	Lucie Fusade & Scott Orr; Oxford
13.50	Reigate Stone at the Tower of London: Mitigating problem stone decay in urban environments	Martin Mchette, Oxford Uni
14.50	Demonstration of HES thermal imaging & microwave scanning equipment	Maureen Young, HES
15.20	Group Discussion to identify priority information and/or research needs	Roger Street ARCC
16.00	Summary	Neal O'Leary CADW