

**Conference Summary – For web publication.**

## **Wall Insulation: getting it right in old buildings**

The Wales Traditional & Sustainability Building Skills Advisory Group (TSBSAG) organised a conference on the subject of Wall insulation in old buildings. It was held at Court Colman, Bridgend, on Tuesday 25<sup>th</sup> March 2014.

Trevor Francis, Chair of TSBSAG opened the event, outlining some of the challenges that the people of Wales are facing in sustaining their historic building stock, particularly as the pressures to insulate all properties in response to Wales's carbon reduction targets are increased. Financial incentives to insulate; challenging economic conditions and fuel poverty; a lack of understanding of the mechanics of old buildings; regional climatic challenges; a diverse housing stock and a lack of skills in the sector all contribute to making potentially significant and costly mistakes in preparing Wales's pre-1919 housing stock for future climate change.

'We think we know at least some of the problems – but what are the answers?' This was Trevor's challenge for the speakers on the day. Trevor's presentation can be downloaded here: [1 Trevor Francis Introduction](#)

John Edwards, Assistant Director of Cadw, the first speaker of the event, set the scene. He outlined some key facts:

1. Traditional Buildings make up 34% of all the domestic housing stock in Wales, compared to only 22% in England, 20% in Scotland and 16% in Northern Ireland
2. Heat loss is greater through damp walls than dry: sometimes buildings can be over a third less energy efficient if damp.
3. The most effective way of ensuring energy efficiency and sustainability is to keep historic buildings in good repair – as now enshrined in the British Standard BS 7913:2013: Guide to the conservation of historic buildings
4. Some energy efficient measures can have an adverse effect on sustainability.
5. External wall insulation can considerably change the aesthetics and character of Wales's built heritage and there is a clear economic value on aesthetics in terms of tourist appeal and house value.

John drew our attention to Heritage Cottage, which is a Cadw owned building, on which extensive research is being undertaken to understand the mechanics of 'typical' in-terrace Welsh cottages. He highlighted the fact that many of the standard methods for determining the structural integrity and energy efficiency nature of Wales's buildings, such as a Valuation Report, Standard building Survey report, Energy Performance Certificate and a Green Deal Assessment falls well short of giving an accurate picture of the energy efficiency of old buildings.

Having gathered extensive data on heat and moisture management and all of its structural components of Heritage Cottage the research will go on to identify appropriate energy saving interventions. It will also aim to identify how to best extrapolate results to use in a broader

Wales-wide context feeding results into the Sustainable Traditional Buildings Alliance (STBA) Guidance Wheel and into a Building Information Model (BIM). You can stay up to date with this research at: [Cadw](#)

John's presentation can be downloaded here: [2 John Edwards Energy Efficiency in a Broader Context](#)

Caroline Rye, Director of ArchiMetrics, presented information on her research into U-values of old buildings and gave us some warnings about insulating buildings without first understanding how the buildings respond to heat and moisture.

The presentation highlighted a number of key facts which could aid homeowners, builders, specifiers and others in resisting the in discriminatory pressures to 'insulate at all costs'.

1. Part L1B of the Building Regulations No. 3.8 do allow Special Consideration to be made for buildings of traditional construction with permeable fabric that both absorbs and readily allows the evaporation of moisture.
2. Compared to BuildDesk U-value tables, Traditional buildings U-values have been overestimated in 77% of cases that have been investigated as part of this research. This means that U-values of old buildings tend to be much better than commonly thought.

Some significant consequences of overestimation of U-values for retrofitting solid walls were highlighted. These are:

- Overestimation of energy and financial savings as a result of insulating solid walls, which can affect any payback on loans, for example on the Green Deal
- Excessive resource use – eg insulating materials
- Over insulation, which can lead to excessive cooling and interstitial condensation
- Using high performing (vapour closed) insulation can lead to interstitial condensation and/or trapped moisture

Further information can be found at:

[SPAB](#)

[Historic Scotland Technical Paper 10: U-values and Traditional Buildings](#)

[STBA paper on Responsible Retrofit of Traditional Buildings: A report of Existing Research and Guidance with Recommendations \[www.stbauk.org\]\(http://www.stbauk.org\).](#)

Caroline's presentation can be downloaded here: [3 Caroline Rye U-values & Retrofitting Traditionally Built Walls](#)

Colin King, an Associate Director with the Building Research Establishment, provided the conference with details of the methodology of the research that BRE is undertaking on behalf of the Department for Environment and Climate Change (DECC). The research is in its early stages, looking at thermal performance and risks associated with insulating buildings of solid wall construction in the UK.

Some results of the initial research have highlighted how important it is to recognise the unpredictability of human behaviour. In addition 76 unintended consequences of the research have been identified to date, including an increase in condensation and mould; an increase in dust mite and bed bug populations; premature decay in timbers; a lack of correct skills available in the market place to assess wall construction and the qualification for EWI pitched too low.

The research is ongoing and is due to be completed in 18 months with a full report being produced then. Colin's presentation can be downloaded here: [4 Colin King DECC research update](#)

Neil May, Director the Natural Building Technologies, demonstrated the recently launched STBA Guidance Wheel: a decision making tool which has the potential to transform knowledge sharing and assist in risk identification in the in the whole retrofit arena. The tool allows the user to customise the context, concerns and selected measures to reveal guidance on specific types of properties and conditions.

A key feature of the Wheel is its alerting the user to how making changes to one part of the building fabric affects other elements of the building: identification of potential risks associated with implementing certain measures.

The Guidance Wheel is supported by a 'Knowledge Centre' which is a repository of information, based on research and case studies. This information source can be used in conjunction with the STBA wheel, or as a stand-alone resource.

To use the STBA Guidance Wheel, and tap into information about the ongoing STBA activities look at <http://responsible-retrofit.org/>

Frances Voelcker, an Architect and researcher on the SUSREF project, presented details of the research which had been undertaken in North West Wales. The underlying rationale for the research was 1. that thick solid stone walls are rarely considered in UK standard guidance on improving energy efficiency in buildings, with cavity wall construction in middle England being the benchmark and 2. that many insulation products are not proven in the climatic extremes of West Wales, where high levels of wind driven rain are commonplace.

The extent of the research was relatively limited in its scope in the number of buildings and insulation interventions studied, but the results gave a clear indication that much more research needed to be undertaken in this area. A significant outcome of the research was confirmation that accurate detailing of installing insulation, both internally and externally, is essential to minimise cold bridging and consequentially condensation and mould build up. Frances's presentation can be downloaded here: [6 Frances Voelcker Practical Consideration in Wet and Windy Wales](#)

Tim Martel is currently developing the course material for the Association of Environmentally Conscious Building (AECB) course on Retrofit, and the paper he presented at the conference on the Financial Modelling of Retrofit will form a key part of the course material. In his presentation he made comparisons with the cost of retrofitting a building, compared to not-retrofitting, and encouraged the conference to consider a range of factors contributing to the costs, including, the type of house and the complexity of installation of insulation measures; the depth of insulation measures applied (light, medium or deep); heating costs; the capital costs of any installations; and the lifetime costs to the environment. In his conclusions Tim summed up by saying that over the lifetime of the building (60 years), the installation of most retrofitting measures would save money; that savings seem to vary only a little with the type of house, but that occupant behaviour is important as they tend to increase the temperature of their houses after retrofit which tends to result in an overestimation of Carbon Savings made.

For further information contact [timmartel3@gmail.com](mailto:timmartel3@gmail.com) or the [AECB website](#)

The final 2 presentations of the conference focused on education and training in the sector. Tim Forman presented his research as part of his ongoing PhD undertaken at the Welsh School of Architecture. His presentation entitled 'Solid wall insulation installers: knowledge, motivation and the role of policy' summarised his research which aims to:

- Understand the challenges to following best practice guidance
- Understand how best practice is affected by installer practice (technical knowledge, skills and motivation)
- Study trends in management, quality assurance, installer practices, technical knowledge, training and government policy
- Outline opportunities for improving the delivery of Solid Wall insulation, external support and government policy instrumentation.

It is largely funding which is currently driving the sector forward, however with a lack of coherence in the provision of these incentives; a shortage of appropriately trained installers and a considerable variation in quality of advice and provision, the sustainability of the sector is very much in the balance. Inappropriate pressures on Time, Finance, Technology, Skill, Knowledge and Motivation all lead to gaps in performance and unintended consequences. Tim's full presentation can be downloaded here: [8 Tim Forman Knowledge Motivation & Policy](#)

John Edwards gave the final presentation of the day 'Education & Skills – Sustaining our Traditional Buildings'. He made it clear that notwithstanding the challenges outlined in Tim's presentation to the burgeoning insulation and energy sectors, there remains a fundamental lack of education and understanding about the mechanics of old buildings throughout the construction sector. This leads to poor specification and workmanship and ultimately, very often, to inappropriate energy saving interventions. John's presentation can be downloaded here: [9 John Edwards Skill required for the Sector](#).

During the day a number of Case Studies were presented. These covered a broad range of topical issues ranging from illustrating specific examples of retrofitting old buildings to the use of specific insulation materials. The presenters were:

1. Joanne Atkinson, Groundwork Caerphilly. Arbed 1: Retrofitted External Wall Insulation. Her presentation can be downloaded here [CS Joanne Atkinson](#) and her paper on '[Assessing the execution of retrofitted external wall insulation for pre-1919 dwellings in Swansea \(UK\)](#)' is also available to download. For further information please contact Joanne on [joanne@atkinson5.plus.com](mailto:joanne@atkinson5.plus.com).
2. Andrew Simmons, Simmons.Mills Architects. The 2009 Passivhaus retrofit of a Victorian solid walled house: 5 years on. Information about Grove Cottage can be found in the AECB's Green Building Magazine Volume 18, No. 3, Winter 2008, and by contacting Andrew directly on [andy@simmondsmills.com](mailto:andy@simmondsmills.com)
3. Caroline Rye, Archimetrics. Insulating Solid Walls: Findings from pre and post refurbishment performance monitoring from the SPAB Building Performance Survey. Caroline expanded on her presentation that had been delivered earlier in the conference. Her case study can be downloaded here [CS Caroline Rye](#).
4. Peter Draper, Rounded Developments. Peter delivered a case study about his hands on experiences supporting owners of old homes in and around Cardiff: Building Detectives needed to solve Sustainable Retrofit mysteries. Rounded Developments can be contacted for further information on sustainable refurbishment of old homes on [www.sustainablebuildingresource.co.uk](http://www.sustainablebuildingresource.co.uk).

5. Nigel Gervis from Ty Mawr delivered a case study on Building Health and Energy Efficiency where he showcased a range of natural building materials appropriate for using to improve the thermal efficiency of old buildings. For further information visit Ty Mawr on [www.lime.org.uk](http://www.lime.org.uk).
6. Trevor Francis , Swansea Metropolitan University. Trevor's case study was on developing the professionals and crafts for both today and tomorrow, and his presentation can be downloaded here: [CS Trevor Francis](#). This Case Study proved to be a very active discussion forum for students, lecturers, professionals and practitioners. A discussion which will no doubt continue over the next few years

## **Conclusion**

The Conference on **Wall Insulation: getting it right in old buildings** proved to be an extremely useful forum for raising awareness amongst a broad spectrum of people working in the Construction Sector in South Wales. The above report outlines the salient points made at the conference and it indicates that there is much important information available in the sector about appropriate retrofitting of old buildings, however, an enormous amount of work remains to be done to better understand Wales's historic building stock and how it should be sustained whilst contributing to the meeting of Wales's Carbon reduction targets.

We await the results of the research currently being undertaken by DECC and BRE with great interest, and would encourage the use and sharing of the Guidance Wheel to assist in decision making when looking after Wales's old buildings.

But finally, it is evident that training, education, skills development and general awareness of the mechanics of old buildings is significantly lacking in Wales. This, together with the considerable political, financial and time pressures placed on insulating all Wales's domestic building stock and the lack of training and short termism of this emerging sector poses a threat to the long term sustainability of Wales's old buildings.

The debate must continue, we must continue to learn and share information. Please do stay in touch with the Wales Traditional & Sustainability Building Skills Advisory Group to follow this emerging debate.

## **Acronyms**

BIM - Building Information Model

DECC – Department for Environment and Climate Change

SPAB – Society for the Protection of Ancient Buildings

STBA - Sustainable Traditional Buildings Alliance

SUSREF –

TSBSAG - Traditional & Sustainability Building Skills Advisory Group

## **Further information available:**

Energy Efficiency in Old Buildings, SPAB Briefing booklet. [www.spab.org.uk](http://www.spab.org.uk)