The Chartered Institute of Building

submission to the

The Green Construction Board

on the call for evidence on

Solid Wall Insulation (SWI)

24th April 2015

Solid Wall Insulation Review

Introduction

The Chartered Institute of Building (CIOB) is at the heart of a management career in construction.

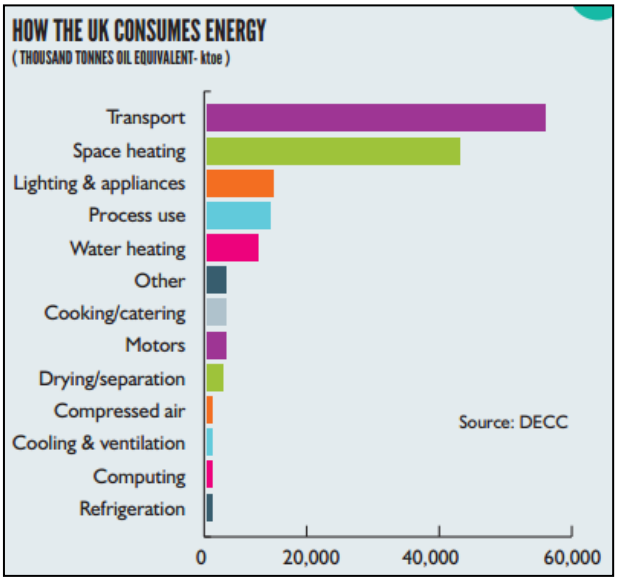
We are the world's largest and most influential professional body for construction management and leadership. We have a Royal Charter to promote the science and practice of building and construction for the benefit of society. Our members work worldwide in the development, conservation and improvement of the built environment.

We accredit university degrees, educational courses and training. Our professional and vocational qualifications are a mark of the highest levels of competence and professionalism, providing assurance to clients and other professionals procuring built assets.

We welcome the opportunity to respond to this Review and we are happy to be involved in the debate as it develops.

Background

The pressure to address the threat of climate change is growing. The Climate Change Act 2008 established a legally binding target to reduce the UK's greenhouse gas emissions by at least 80% below 1990 base year levels by 2050.



It is acknowledged that buildings are a major contributor to these emissions. 45% of UK emissions are produced from heating and powering homes and buildings[1].

As the chart indicates, space heating is the second largest component of consumption of energy after transport. Here the construction industry is making huge strides to reduce inefficiency in new and existing buildings. The challenge for the construction industry is not just to maintain the old and build the new. It is to greatly improve and repurpose buildings and structures to meet the demands of the future.

[1] Centre for Low Carbon Futures, 2011

Numerous studies have shown how poor buildings and infrastructure burden the economy and reduce our health, wealth and wellbeing. Research by Ecotec in 2010 on the social impact of poor housing illustrates the importance to the public purse of good homes. It is estimated that poor housing creates extra health costs of £2.5 billion a year, increases the cost of crime prevention by £1.8 billion and costs the economy £14.8 billion a year, through lowering educational standards[2].

Approximately half of all dwellings in the UK are more than 50 years old and one fifth are more than 100 years old. Most new building have cavity walls, but many pre-1919 buildings are constructed of solid natural stone or brick which, uninsulated, can lead to up to around a third of heat escaping.

The Government's recent Carbon Plan highlighted the fact that a quarter of the UK's emissions come from domestic property and reducing demand for energy is the cheapest way of cutting emissions. It made a series of wide ranging building improvement targets including '*achieving between 1 million and 3.7 million additional solid wall insulations*[3]'. Insulating the SWI housing stock presents a huge challenge for energy efficiency policy, potentially offering significant savings to more than 7 million solid wall dwellings in the UK. This in itself could help take around 2.28 million households out of fuel poverty and help reach carbon reduction targets.

Outline of broad concerns and recommendations

Solid wall insulation (SWI) is often identified as a means to reduce heating bills, extend the lifespan of properties and reduce the impacts of damp and noise. However, the CIOB has concerns regarding the use of SWI in both internal wall insulation (IWI) and external wall insulation (EWI) and these are across a number of broad areas:

- *Technical performance with SWI*

We do not believe that enough is known about SWI and the way it affects the performance of buildings. Further research should be undertaken to analyse the true energy savings, technical risks and potential heritage loss associated with SWI. We are aware of DECC funded research carried out by BRE entitled *solid wall heat losses and the potential for energy saving*. This review the energy performance gap in solid wall insulation and provides relevant analysis which may aid future policy making in regards to SWI.

We recommend that further research funding and capacity is made available.

[2] CIOB, *The Real Face of Construction*,
[3] HM Government, *The Carbon Plan: Delivering our low carbon future*, December 2011

- *Training of technical and professional staff*

We recognise that SWI does have the potential to create thousands of jobs within the construction industry and throughout the supply chain. But training within the industry is predominantly in new construction rather that the repair, maintenance and improvement of existing building stock. This means the starting point is lower than some people think when it comes to upskilling in energy efficiency retrofit. There is very little accredited learning available, but the CIOB has made some progress in this area by developing a unit for supervising construction work to existing buildings as part of the Level 3 Diploma in Site Supervisory Studies which is also available as an award.

We recommend that accredited learning in energy efficient retrofit is developed to upskill the existing workforce and that subjects involving existing buildings are made a mandatory part of built environment education.

- *Existing building fabric performance*

Walls can be over a third less energy efficient if damp (as cited in British Standard BS 7913:2013). Wall insulation should not be applied to damp walls, but often is carried out due to a lack of a proper damp investigation process. Energy efficient measures like these can actually have an adverse effect on sustainability. The need for energy efficiency and low carbon may influence the selection of materials and work methods (for example adoption of SWI) rather than adopting good repair and maintenance measures. Currently, repair and maintenance is not seen as an energy conservation measure, but it should be and policy needs to reflect this.

We recommend that Government policy should see good practice repair and maintenance as an important energy conservation measure.

- *Development of professional standards*

Once we know how to properly deal with SWI, a well thought through standard should be developed.

We recommend that a standard for SWI is developed, starting with the initial assessment of buildings, before decisions on SWI have been taken through to completion and post occupancy evaluation.

- *Construction Management*

We believe that the supply chains do not deliver the quality and appropriateness of work that is required.

We recommend that responsibilities for design and construction need to be clear and that robust quality management processes should be developed – the CIOB are very willing to offer support in this and other areas.

Further issues to note

Everything should commence with understanding the construction and condition of a building along with its environment. This is essential but is often ignored. Clients need to be made aware of the importance of this part of the process. There should also be a robust standard practice that details how to go about assessing, surveying, inspecting all types of buildings. This should be undertaken before decisions are taken to provide SWI. This will no doubt require those involved to be trained to the required competency levels.

Separately, we should note:

- We should be noting what the building regulations say about UK Exposure Zones. In exposure zone 4 (Wales, the west country, western parts of Lancashire, Cumbria and about a third of Scotland) it recommends that cavity wall insulation should not be installed unless there is a rain screen (i.e. water proof cladding). This same information should be used to inform choices on SWI. This means that one needs to think about the weather protection of EWI and the huge risks involved with IWI in situations where there could be penetrating dampness.

- One cannot possibly understand whether interstitial condensation is being caused with the installation of SWI unless the U-Value of the existing structure is known and modelling with dynamic software takes place. In almost all cases the U-Value is not known. The U-Value can be estimated but published data contained within software is acknowledged to be inaccurate especially where traditional solid walls are concerned, and this equates to about one third of all UK buildings.

- Without the 'real' U-Value of the original building fabric the increased energy efficiency of the SWI cannot possibly be calculated, this means that the energy savings cannot be calculated. As stated above published data on U-Values is inaccurate and therefore payback calculations based on this data will be inaccurate and usually cite a better payback than what is achieved. This means SWI investment decisions are considerable risks. A database of U-Values for different types of walls and thicknesses should be developed based on real in-situ U-Value tests of walls in existing buildings. The database would need to contain hundreds if not thousands of different types of walls with different types of masonry units, different types of mortar, different mortar / masonry percentage make up, different finishes, different categories of condition, different exposure zones and different thicknesses and then a means of bringing all this information together in a meaningful and efficient way would be necessary. Acquiring, disseminating and using

information and data (i.e. Smart Data) in a centralised network such as this will aid best practice and learning across the retrofit sector. Data relating to the UK's existing building stock, including 'before' and 'after' measurements, as well as feedback on ongoing monitoring tools will help to improve efficiency and reduce CO2 emissions.

- As we don't have U-value data one cannot calculate the existence and extent of thermal bridging. Thermal bridging can result in mould and condensation. The energy modelling process will design out thermal bridging, but it is realised that most retrofits will not be 'designed' or 'modelled'. In the absence of this, robust guidance is required to minimise the extent to which thermal bridging occurs.

- Solid walls of traditional buildings absorb moisture and this then evaporates. This must be understood in order to specify permeable insulation where we have such walls. Almost always impermeable insulation is used. Trapping moisture inside walls can potential lead to their deterioration especially if timber is present which can rot.

- Ultimately SWI carries many risks which are not understood but which could lead to building deterioration and a detrimental effect on the health of occupants. Far from being an automatic choice, alternatives to SWI should be sought wherever possible until such time that a lot more is known about SWI. This highlights our first point regarding the technical performance associated with SWI.