Energy and Efficiency and Old Buildings

Date of course: 22nd November 2023

Location: Haughley Park, Stowmarket

Report by: Richard Evans

Introduction

The course was attended by about seventy five people and I estimate that around eighty per cent of the attendees were practitioners involved in either the restoration or management of old and listed buildings.These included surveyors, specifiers such as architects and engineers, heritage officers and others employed by local authorities. The remaining attendees were building owners and other interested people.

The speakers referred to visual images consisting of technical diagrams/ drawings, specifications of materials, photographs and short videos - the details of which are difficult for me to communicate in this report.

Apart from the introduction and closing of the course which was given by **Simon Sturgis** (Director of 'Targeting Zero' and Trustee of the Suffolk Preservation Society), the course was presented by **Roger Hunt** and **Marianne Suhr** (co-authors of '**Old House Eco Handbook**') and **Dan McNaughton** who is a building services engineer employed by Historic England. Roger Hunt is an award-winning writer and blogger with an interest in sustainable architecture and Marianne Suhr is a building surveyor, writer and broadcaster who specialises in the repair and renovation of historic buildings.

Roger Hunt's and Marianne Suhr's presentations mainly centred around their 'Old House Eco Handbook' which they were constantly plugging (and which can be purchased online for around £30). Early in the day I asked if there were any handouts of the presentation and was informed that due to copyright issues it was not possible; this was a pity. There were also many references to the '**SPAB'** approach **(The Society for the Protection of Ancient Buildings) -**

a charitable organisation founded in 1877 giving advice to anyone with regard to the preservation of old buildings.

Most of the content of the course was pertinent to the large scale and very intrusive renovation of old buildings.

Course Content

Old Houses can be Green presented by Roger Hunt

The emphasis of this section was the study of the fabric of a building prior to the consideration of new energy systems. Consider easy ‘wins’ such as:

- Replacement of halogen bulbs with LEDs
- Roof insulation
- Draught-proofing floors
- Good heating control (‘Nest’ type controls and zoned heating thermostats)
- The overhaul of windows
- Draught-proofing doors
- General maintenance such as the repair of leaking gutters

Emphasis was given to the fact that if a building was in a poor state of repair, then the installation of efficient ‘eco’ energy systems was basically pointless.

Insulating Solid Walls presented by Marianne Suhr

This section dealt with the implications of internal and external insulation and the material considerations.

Very technical in content, the science behind wall insulation was explained including 'U-values', 'K-values', 'Dew points' and 'Interstitial condensation'.

Much heat loss through walls is due to air leakage through gaps - especially around and through windows. Thermal imaging is a method to assess where most heat loss is occurring and 'airtightness tests' can be used to measure the rate of air loss.

Dampness in walls causes more heat loss and is one of the reasons old buildings that are not well maintained perform so badly in retaining heat. Leaking gutters and damp issues must be addressed.

It is imperative that an expert studies a building before insulation is applied to an existing wall; materials need to be assessed for thermal conductivity (U-Value) and thermal transmission (K-value).

Insulating walls externally is technically superior to insulating internally as the wall fabric will act as a thermal store. Water condensing within the wall causes interstitial condensation which is very bad for the building fabric and has to be avoided; additionally, the ‘dew point ‘ where vapour condenses should be calculated by an expert. It is very important that materials used for insulation are ‘breathable’ and hygroscopic i.e. the material used should be able to absorb, store and release moisture e.g. wool. This also applies strongly to internal and external wall paint finishes. Wood fibreboard is a recommended insulation material. Whether applied internally or externally, lime wash is the recommended paint finish.

Insulating walls which have a lot of window area is most likely unnecessary as much of the heat loss will be via the windows.

Insulating walls internally it seems is difficult if the complete wall area cannot be insulated e.g. where there are window reveals, as cold bridges will occur through which heat will travel.

It appears to me that the viability of the insulation of existing non-insulated walls is driven by the details that prevail in a building. It was interesting to observe that no real examples of a successful application of insulation internally were shared and only one example of the correct application of insulation externally was presented. This example was a project overseen by Marianne Suhr and listed buildings consent had to be sought to cover up the timber frame externally. An example was shown on how not to do external insulation to emphasise the influence of existing building detailing on the viability of the project.

Windows and doors presented by Roger Hunt

Easy ‘wins’ are draught strips and insulated blinds which are very effective in preventing draughts and increasing insulation.

It was interesting to note that the argument for allowing double glazing in listed buildings with old glass single pane windows was not strongly made. Secondary glazing was supported, though; the advice was that it performs very well if produced with good quality wood and is detailed well.

Further emphasis was put on the prevention of draughts through windows - sash windows especially have several possible routes through which draughts can travel.

Insulating Roofs presented by Marianne Suhr

This section of the course was perhaps the most technically complex and without having the technical details, it is difficult to relay the presentation. But a few golden rules to note are:

- The more insulation the better.
- Added insulation can generate more humidity in the roof space if the roof space is intended to be cold i.e. insulation is applied on top of the ceilings of heated spaces.
- The roof space must be adequately ventilated to prevent humidity building up.
- Use ‘breathable’ sarking felt or if not, ensure there are ventilation gaps
- If roof insulation is applied to the underside of the rafters making the roof space a ‘warm’ space then ensure the insulation material is breathable.

Heating presented by Dan McNaughton

This section was disappointing as - apart from their application in a mixed solution heating strategy for large buildings with lots of land i.e. stately homes - there were no examples given of where heat pumps have been employed as a solution to heat 'normal' residences which are old and listed.

The presenter described the various forms of heat pumps (air source, ground source and water source).

The basic technical concept of heat pumps was explained along with the basic design criteria.

It was emphasised that the supply market and the number of qualified design engineers available in the domestic market is limited. The market is susceptible to aggressive marketing techniques.

It is obvious to me that heat pumps as a heating solution in old buildings can only be viable if the fabric of a building has been specifically enhanced to achieve the required insulation necessary for a heat pump to perform adequately. Where possible, underfloor heating should be used as the method of space heating but whatever solutions are adopted it is imperative that a qualified engineer is engaged to design the complete heating system.

Insulating Floors and Underfloor heating presented by Marianne Suhr

Again as with the Insulating Roofs section, this component of the course is difficult to relay as I have no technical drawings etc. Here are some notes:

- With correct materials and method, suspended timber floors can be insulated but it is likely that the existing floorboards will have to be written off.
- Underfloor heating to suspended wooden floors is not viable as there is no ‘heat soak’.
- Installing underfloor heating to ancient ground floors necessitates the complete removal of the existing floor build up and its replacement with a breathable structure such as that constructed from ‘Limecrete’ which is a breathable material.

- Many ancient houses that originally had stone floors laid directly onto clay have been renovated incorrectly due to the use of concrete slabs. Concrete does not allow the floor to ‘breath’ causing dampness to escape via the walls only which can cause dampness in the walls.
- Electric underfloor heating is not recommended as it tends to break down and is very costly to operate

Ready for the future presented by Roger Hunt

This section dealt mainly with climate change and in particular the design/ detailing of renovation projects that address the increase in rainfall and risk of floods. Consider issues such as gutter, downpipe and drain-sizing and the positioning of electrical outlets and wiring (install much higher).

Again the good maintenance of old buildings was mentioned as being essential as a defence against the increase of severe storms and other extreme weather.

Sustainability in the general sense should be considered in the choice of materials and methods of construction when renovating an old property.

The day ended with some final questions from the attendees.

Please see following two pages of useful Key Tips for Controlling Dampness and Upgrading Energy Efficiency which was produced by SPAB.

Advice on Old Buildings

By Douglas Kent BSc (Hons), BSc, MSc, MRICS
SPAB Technical and Research Director

Key Tips for Controlling Dampness

Dampness is the biggest cause of deterioration in buildings. Standard solutions used to treat dampness in modern properties may be highly inappropriate and ineffective in traditionally constructed (pre-c1919) ones. To successfully treat dampness problems, it is important to understand their nature and causes, how to accurately diagnose them and the range of methods suitable for their control in older buildings:

1 Recognise that different types of dampness exist classified by their source, eg condensation, rainwater penetration and below-ground moisture (including sometimes rising dampness).

2 Among the causes of dampness are inappropriate methods and materials (particularly non-breathable ones in old buildings pre-dating c1919), blocked gutters and lack of ventilation.

3 Different forms of dampness require different solutions so the effective control of a moisture-related problem relies upon the accurate diagnosis of the source and cause.

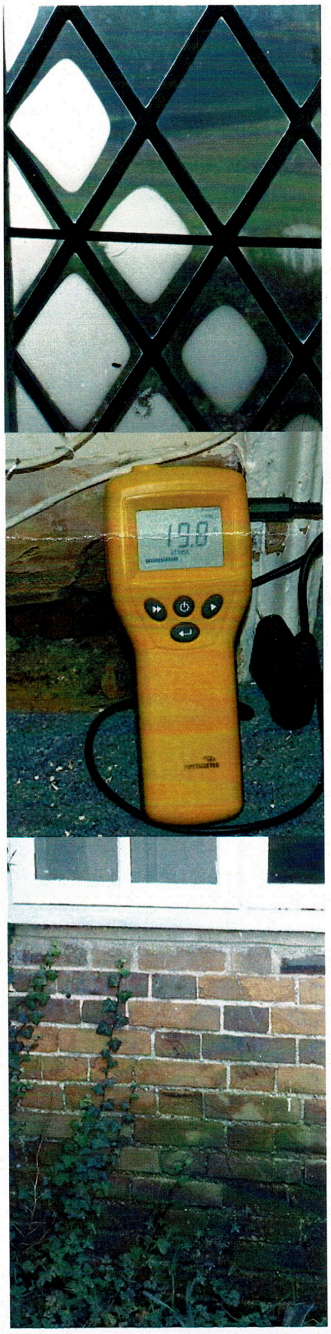
4 With any dampness defect, try wherever possible to address the cause rather than disguise the symptoms.

5 Remember old (pre-c1919) buildings need to 'breathe' whereas new ones depend on barriers - new buildings become damp when barriers fail, old buildings when barriers are added.

6 Damp-proof courses (DPCs), damp-proof membranes (DPMs), tanking (water-proof slurry) and water-repellents may be appropriate for new buildings but are generally unsuitable for old ones.

7 With all buildings, good maintenance and care is vital to prevent dampness.

8 For help, consult an independent specialist rather than a remedial treatment contractor with a vested commercial interest.



Society for the Protection of Ancient Buildings

The **Society for the Protection of Ancient Buildings** (SPAB) is the UK's largest, oldest and most technically expert national pressure group campaigning to save old buildings from decay, demolition and damage.

To find out more about the SPAB's work and how you can become a member, please **visit www.spab.org.uk or call 020 7377 1644.**

Key Tips for Upgrading Energy Efficiency

Old buildings are sustainable but their energy efficiency can usually be improved with care. Misguided work compromises their special interest and saves little, if any, energy. It can also cause condensation, promote rot and aggravate human health problems, including asthma.

1 **Pinpoint essential work, perhaps using thermal imaging and air tightness tests. This is preferable to adopting a cruder approach - such as automatically replacing all old windows. It's also important to use compatible methods and materials. Remember most pre-c1919 buildings need to 'breathe' and require more ventilation than modern ones.**

2 **Ensure advice taken on any major work is from someone with appropriate knowledge and values—the SPAB can often suggest the names of specialists over our free technical helpline.**

3 **Adopt a step-by-step approach: consider first basic maintenance and 'quick' wins, then further measures and, finally, big hits as part of a more extensive retrofit. There is little sense, for instance, in attempting insulation upgrades if draughts have not been properly addressed!**

4 **Recognise the fastest, least inexpensive way to achieve thermal comfort more efficiently in old buildings is generally not by making major fabric changes but with simple methods to reduce demand for heating, eg with heated chairs or cushions, local floor heating and local radiant panels to allow lower background temperatures.**

5 **Draughtproofing is an unobtrusive and cost-effective way of cutting energy use providing ventilation is not overly restricted. Loft insulation and secondary glazing can be among the more straightforward ways of improving insulation levels. If the insulation of walls is increased, use a breathable material. Avoid also spray foam insulation and colourless water-repellents on old buildings.**

6 **Have boilers serviced regularly and set to optimise their efficiency, and bleed radiators. Fit thermostatic radiator valves (TRVs) to automatically control the air temperature of rooms. Running heating at a constant low temperature and avoiding sharp fluctuations is usually advisable with old buildings. With boiler upgrades, low-carbon options can include heat pumps, electric heating (such as storage heaters), biomass and solar water heating.**

More from the SPAB …

Need free, friendly and impartial technical help? Call us on **020 7456 0916** (Monday-Fridays 9.30am to 12.30pm). We are grateful to Historic England for its generous financial assistance to help us run this helpline.

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