

Building Conservation Journal

OPINION

Two cheers for the legislators

T

The British heritage sector will mark two significant anniversaries in 2017, and those of us who share a passion for conservation should be celebrating both.

The first date to commemorate is 1947, when the Town and Country Planning Act enabled the government to draw up a list of buildings of special architectural or historic interest.

It was not until the Town and Country Planning Act 1968 that the necessary processes for listed building protection were eventually implemented, but this legislation was only able to do so on the firm foundations laid in 1947.

Seventy years and 376,000 listings later, we have a system that has, by most accounts, been successful at keeping our most important buildings monitored.

In 2017, it will also be 50 years since the designation of the first conservation area under the Civic Amenities Act 1967. Stamford, Lincolnshire was the first area designated by a local authority for its historic character and appearance, but since then more than 10,000 have been designated.

Arguably, the creation of the conservation area marked the arrival of citizen power in the heritage protection system; any new areas designated by local authorities need to seek public opinion in order to do so. Local civic societies and other volunteers now play an increasingly large role in the designation, management and promotion of conservation areas.

Historic England is working with partners in the heritage sector to celebrate both of these anniversaries, by explaining how successful these pieces of legislation have been and highlighting challenges that lie ahead.

Yet with the numbers of local authority heritage staffing falling by a third in the past few years, those who remain are finding

it increasingly difficult to provide a service across the full range of archaeological and building conservation work.

Bureaucracy always comes in for a bashing, but the 1947 and 1967 acts have, in my view, had an immeasurably positive impact on heritage in this country. The planning system as a whole is undergoing close scrutiny – after all, who can argue with the reduction of unnecessary red-tape? But we must not end up throwing the baby out with the bathwater.

When we examine the proposals in the coming rounds of planning reform, we would do well to make sure that we do not inadvertently begin to lose the protection for which so many of our predecessors fought, whether through the push against pre-commencement conditions or through the introduction of planning permission in principle.

But above all, we should each take some time to shout about what has been achieved, and what could be lost if we do not continue to be vigilant. ●



Duncan McCallum is Policy Director at Historic England

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Understanding how any traditional building was designed to work rather than just reaching for the retrofit is essential if we want to ensure or improve its energy efficiency, writes **John Edwards**

Back to basics

Energy efficiency in any building depends on its design, the materials from which it is made, its location, condition and the way it is used. If we are to make a building more energy efficient, then we need to understand all of these factors, taking an holistic approach. Understanding the difference between older and newer buildings is also essential. The former are normally vapour-permeable, in that moisture is let in and then evaporates, whereas the latter rely on vapour barriers and air gaps to keep moisture out.

First principles

Although solid masonry walls are common in older buildings, there are also many variations between one property and the next. Recognising a building type is also very important: by understanding its design, how it is constructed and the materials from which it is made, we can assess both how it performs and what affects that performance.

The basic steps to take to ensure energy efficiency are as follows.

- **Lifestyle changes:** the energy hierarchy lists those simple things that building occupants can do to improve energy performance, such as using a shower rather than a bath or a washing line rather than a tumble dryer.

- **Maintaining buildings properly:** a poorly maintained building is less likely to be energy efficient.
- **Condition survey:** a detailed analysis will involve building pathology and understanding the materials and methods of construction.
- **Maintaining or reinstating vapour permeability characteristics.**

While these provide a very good starting point, it is normal for a recognised means of assessing energy performance to be adopted as well, such as the Reduced Standard Assessment Procedure (RdSAP), which is used for all existing buildings. This assessment method involves many standard assumptions that are integrated into the software, and it produces an energy performance certificate (EPC) that categorises a property into a band according to SAP points, with band A being the most energy efficient and G the least.

RdSAP also generates a recommendation of the works required to improve energy efficiency, and indicates what band could be achieved if these were undertaken. However, research has indicated that RdSAP is inaccurate, especially where older buildings are concerned, as it normally underestimates their energy efficiency; neither does it take into account the condition of the building. The recommendations generated by RdSAP should therefore be treated with caution.

Moisture is the biggest problem in an older building and, as indicated in BS 7913: 2013: Guide to the Conservation of Historic Buildings, building fabric that is damp could be 30% less energy efficient than dry building fabric. The control of moisture is therefore key to both energy efficiency and sustainability. This is where using building pathology is essential.

Getting an older building into good repair in a way that maintains or reinstates vapour permeability should be prioritised over energy efficiency measures, and it is important to understand that installing elements and materials that are impermeable could have a devastating effect on an older building.

Guidance and its limitations

When it comes to deciding what measures to install, it is important to continue thinking about vapour permeability and its overall effect on the hygrothermal performance of the building. Installing one measure could have consequences for many other

different elements and aspects of an older building.

One useful tool is the retrofit guidance wheel, which is freely available online (www.stbauk.org). This points towards measures that are most likely to work and carry least risk, and away from riskier, less practical options. Most importantly though, it highlights how different measures affect each other. Again, a condition survey should be carried out first.

Bear in mind that it takes someone with building expertise to use the wheel, otherwise the answers to the questions that it poses may not be correct. This online tool is probably the best presently available but it is not perfect, and there are some measures, especially relating to work on existing building fabric, that are not included.

Another thing that neither the wheel nor most other guidance does is refer to BS 7913: 2013. This standard contains lots of excellent guidance, including the need for heritage impact assessments. When implementing any retrofit measure, a heritage impact assessment should be carried out.

The thermal coherence of the external envelope is particularly important, and thermal bridging should be reduced as much as possible, so insulation should be carefully designed. In some places this will be very difficult: for example, at floor-wall junctions, timber joists bedded into the walls will form a thermal bridge and therefore be susceptible to interstitial condensation. This can be managed, however, provided that the building fabric around the timber joists is vapour-permeable and thus allows such moisture to escape.

However, if there is cement mortar pointing or cement render on the exterior then this will inhibit evaporation and possibly put the ends of the joists at risk of becoming rotten. Another risk worth mentioning is that, if internal wall insulation is not carried through into the voids between ceilings and floors, then the whole horizontal strip could act as a thermal bridge and enable moisture to persist, with obvious consequences.

The location of the building is another critical factor. There is a huge difference between UK weather exposure zones 1 and 4, with zone 4 representing the most severe conditions. Risks of persistent, heavy, wind-driven rain have to be appreciated, especially when considering the merits of internal wall insulation, the orientation of the building, the degree of sheltering, the thickness of walls and

their construction, the materials from which they are made, and their condition.

Part L 1b of the Building Regulations in England and Wales, or Technical Handbook 6 in Scotland and F1 in Northern Ireland, calls for consequential improvements when a proportion of work is undertaken to the thermal envelope. However, such works have to be technically, functionally and economically feasible.

While there are exemptions for listed buildings and those in conservation areas, no such exemption exists for more than 90% of traditional buildings, though a "special consideration" may be sought in England and Wales if the work is not feasible, adducing BS 7913: 2013 in support. Similar provision may exist in Scotland and Northern Ireland, but is less emphatic.

Many different types of insulation materials and products are available, and all have different installation methods. Careful selection is needed, especially when only slender sections can be installed – for example around window reveals – to provide thermal cohesion as much as possible, so materials may have to provide much better thermal performance for their thickness than those in other areas where greater thicknesses are possible.

Conclusion

While a great deal of expert effort can and should go into planning and specifying work that will make an older building more energy efficient, this can all be severely compromised if it is not implemented properly. Adherence to BS 7913: 2013 on project management and supervision provides a robust approach, based on managing the risks of specification non-compliance.

Taking an holistic approach to improving the energy efficiency of older buildings need not be complex. It is initially about going back to basics and providing a building with its original performance characteristics so far as possible. It becomes complex and risky when retrofitting, and here again using vapour-permeable materials is key. However, it will not be without its risks, and by following BS 7913: 2013 management of these will be more straightforward. ●

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Anna Irwin reflects on how reminders of a troubled past can be assimilated into our cultural heritage

Conflicting accounts

There is a tendency to think of heritage as buildings or monuments that act as a focus for national pride, demonstrate skill, achievement or ingenuity, enhancing our townscapes and reinforce our sense of identity. Once heritage is officially designated by listing or scheduling, for example, it is considered a valuable asset, as a result of its cultural significance. This conception presents and promotes heritage as a positive force.

This dominant definition of heritage, which is referred to as the "authorised heritage discourse", directs our attention

towards the aesthetically pleasing and the monumental and therefore lays a greater emphasis on the value of the physical fabric, its authenticity and its quality than it places on other, more intangible associations.

Recently, there has been much press coverage of the destruction of cultural heritage. The International Criminal Court's first war crimes trial for the destruction of monuments is now in progress, concerning an individual accused of demolishing ancient mausoleums in Timbuktu.

This is not the first time heritage has been deliberately targeted: perpetrators wish to erase the identity of a people whom they do not consider to share their history, instead exerting their

power to inflict psychological injury. Yet although the historic fabric may have been destroyed, the significance of these structures or places and the meanings that have been attached to them for generations have not been lost. Rather, a new significance is added as the communities reclaim their heritage. In such circumstances, there is a desire to restore lost heritage as a means of re-establishing normality.

But as well as damaging or destroying heritage, conflict can lead to the creation of a new heritage. This can hold difficult and painful memories, representing the most violent, destructive and perhaps shameful aspects of a nation's history. These sites are referred to as "dissonant heritage" or "dark heritage".

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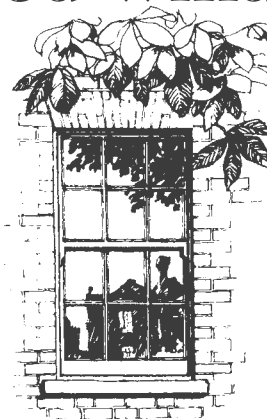
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Peace walls

The issue has particular relevance today in Northern Ireland following almost 30 years of violent conflict, known as the Troubles. The signing of the Good Friday Agreement in 1998 essentially brought an end to the conflict. However, there has been little consensus or debate on how to deal with the remnants of the period.

Some of the most visible and defining structures associated with the Troubles are the Belfast peace walls. There are estimated to be more than 90 such barriers in the city centre, dating from 1969 to the present day. The first and possibly the most famous peace wall was built in 1969 between Cupar Way and Bombay Street, separating the predominantly loyalist Shankill Road area of Belfast from the mainly nationalist Falls Road.

For nearly 50 years, this wall has been an imposing and familiar feature of the urban landscape, controlling the movements of neighbouring residents, constraining and influencing by these physical barriers. For many living very close to this and other walls, they continue to provide security amid ongoing, low-level sectarian activity. Yet for others, the retention of these structures reinforces segregation, and they are therefore considered essential in protecting cultural identity.

While the walls remain in place, they signify to the international community that attempts at peace have not been completely successful, and can act as a deterrent to inward investment. Not only do the walls control potential violence but they also create the conditions through which violence is sustained and perpetuated. The peace walls have also reshaped land-use patterns in the economic core of the city – prime development sites have been blighted for housing land and many adjacent buildings have suffered frequent damage, with some now lying abandoned.

The permanent removal of these structures would be seen by many as advantageous and there is a clear government agenda for their disposal. However, there has increasingly been discomfiture among others at the hasty removal of structures so intrinsically linked with the Troubles.

Renewal and remembrance

In a post-conflict society, there is a desire to move on and forget – to return to some sense of normality. Part of that process can include the removal of the impositions from the conflict period as quickly as



Peace wall between Cupar Way and Bombay Street, Belfast

possible, leaving only the traces of a more pleasant and proud past. But to eradicate evidence of these structures would be to make an incomplete record of history, and without them the memory of events remains intangible and more open to different narratives.

The Cupar Way–Bombay Street peace wall was constructed as a temporary response to escalating violence, but evolved in response to the intensity and changing nature of the Troubles and the recent transition to peace, and has become one of Belfast's most popular and distinctive tourist attractions. At 13.5m high and stretching more than 3km through the city, it is constructed from conventional materials and has had much of its fabric renewed, replaced, strengthened or extended over time. It is therefore seldom considered historically or aesthetically pleasing and does not fit with the ethos of minimal intervention or conservation. Despite this, the alterations and fabric are significant to our understanding of the intensity and nature of the conflict.

The wall has considerable social, cultural and economic significance, which can be expressed in both positive and negative terms: acting as a means of bringing people together but also keeping them apart; as a tourist resource but also a blight on the city's economic core; and as a site that evidences strong cultural traditions and heritage, but that can be intimidating and provocative.

“Discord value”

In considering a potential heritage of conflict, there is a need to recognise a broader range of values, particularly negative ones and to articulate these in order that dissonance can be expressed, rather than concealed or ignored.

Dubbed “discord value” by the academic Gabriele Dolf-Bonekämper, this arises where the creation, or potential creation, of heritage promotes contestation, controversy or discord. In effect, the discord value of an object or structure far exceeds its potential historical value. With the passing of time,

and as the fear and hatred associated with the structure fades, so too can such value, to be replaced with historical value in the eyes of many.

In the future the debate around its significance will itself become part of its history and add another layer of meaning. As time separates us from the events associated with a structure, our emotional engagement with it changes. Ultimately, while a structure can possess strong discord value, this concept is rarely identified or accommodated in heritage models, so a future heritage resource is in danger of being removed before its true historical value can be realised.

Conclusions

The Belfast peace walls highlight the vulnerabilities of dissonant heritage, particularly given the continued emphasis on the importance of the physical fabric, age and authenticity of heritage. Structures such as the Cupar Way–Bombay Street peace wall are ordinary structures that have developed distinctive associations. Any risk of demolition is thus contentious and discomforting in a post-conflict state.

This demonstrates the importance of viewing heritage as a social process, recognising the dynamic and changing nature of its values and meanings. This can present a significant challenge in that the values ascribed to a heritage resource can never really be fully recorded or defined. In the case of conflict heritage it is therefore necessary to draw together as wide a range of values as possible in order to expose as many narratives as possible, and prevent singular claims of heritage and disinheritance. ●



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Accommodating refurbishment

Caroline Rye underscores the importance of measurement and monitoring in refurbishing Trinity College, Cambridge

Trinity College Cambridge's New Court is a grade I listed Tudor–Gothic building designed in 1823 and used as accommodation for students and fellows. In 2009, the college identified the need for refurbishment to meet contemporary expectations of comfort and utility and improve its energy efficiency.

But there was little precedent for ensuring energy efficiency in such a highly protected building. A principal concern was avoiding moisture build-up in the refurbished fabric: if building elements were cooled by the installation of insulation and buildings were made more airtight, would infiltration, ventilation and evaporation cease to remove moisture effectively? It might accumulate on internal surfaces, or, less visibly, in structural elements, leading to damp and even

mould, jeopardising health and leading to structural decay and rot. ArchiMetrics was charged with undertaking detailed building fabric performance monitoring to help identify areas of risk and inform effective design decisions. Its monitoring would work alongside modelling that was carried out by Max Fordham Engineers as directed by 5th Studio Architects, which was responsible for the refurbishment.

The first round of assessment included in situ U-value measurements and air pressure testing in eight sample walls. Moisture itself was assessed by interstitial hygrothermal gradient monitoring (IHGM), a technique that ArchiMetrics has developed specifically for looking at vapour in building elements. The findings from the U-value, air pressure testing and IHGM measurements were then fed into the design process.

Measurement of U-values for solid walls, or walls of indeterminate make-up, is important when refurbishing buildings of significance. ArchiMetrics' previous work had identified a large discrepancy between U-values taken from traditional solid walls and those calculated for the same walls using standard

New Court, Trinity College,
Cambridge

industry protocols, which exaggerate heat loss, artificially inflating estimates of the energy, carbon and money to be saved if wall insulation is installed. This could encourage the use of excessive insulation and result in overcooling of fabric and an increased potential for interstitial condensation in the wall.

U-values measured from the eight walls at New Court ranged from 0.59 W/m²K to 0.78W/m²K, giving an average of 0.69W/m²K, a 25% lower heat loss than that suggested by the standard calculated U-value of 0.94 W/m²K. Similarly, an air permeability figure for the structure, of 11.0m³/h/m² at 50Pa, was provided by an on-site pressure test, measured from the building itself rather than selected from a set of default assumptions.

IHGM was performed in the coldest part of the year; this is when walls are likely to be at their wettest, largely due to wind and rain but also fewer opportunities for evaporation coupled with low dewpoint temperatures. The findings were analysed in a number of ways, including the calculation of a saturation margin, which uses measurements of relative humidity and temperature to determine how close parts of the wall are to dewpoint. From a broadly representative sample, all walls performed well; no examples of persistent dewpoint conditions were found in any wall over winter, suggesting that some degree of internal wall insulation could be tolerated.

Further data from the monitoring was used to calibrate hygrothermal modelling software WUFI Pro 5.0. As with the energy models, customised input data for its simulations was used to reflect the actual materials in the walls and the influence of site-specific weather conditions. Materials testing was carried out by Glasgow Caledonian University to determine the properties of brick and mortar samples, rather than relying on database defaults. The hygrothermal behaviour of a virtual sample wall was compared with responses recorded over time

from one of the monitored walls, and by altering the WUFI parameters, the engineers made the virtual wall's responses closer to those measured on site. This was then used to run scenarios for a variety of wall insulation options.

The model found that the addition of 60mm of Pavadentro woodfibre board was broadly acceptable for the walls at New Court, with a slight increase in moisture risk for south- and west-facing walls. These risk assessments varied depending on the selection of different brick material properties for the modelled wall; the variety of types used had been an additional finding of the IHGM work.

Cores were removed from the wall to install sensors, and were then tested for moisture content and density. Because of the variety of brick types involved, it was decided that the best way to manage any remaining uncertainty would be via long-term on-site monitoring of the building fabric after refurbishment. This measures the thermal performance, hygrothermal conditions and material moisture content of the walls in study bedrooms, bathrooms, kitchens and service rooms. It also measures indoor air quality and hygrothermal conditions in rooms now fitted with mechanical ventilation with heat recovery systems.

Vulnerable materials such as built-in timber elements – lintels, bearers and joist ends, where high humidity or liquid moisture could represent a potential starting point for decay – were thought to be at the greatest risk from moisture build-up. Therefore, a network of resistivity probes were installed in specific embedded timbers exposed during the refurbishment to measure material moisture conditions.

Results from monitoring are incorporated into an online service allowing for real-time reporting of potentially adverse conditions. Data from the material moisture monitoring of both timber and masonry elements is stored locally and collected on a quarterly basis on site visits that also allow visual inspection, and an update on room conditions and building fabric is then provided to the design team. A more comprehensive observations report, including weather and U-value data, is submitted annually.

This monitoring programme is accompanied by a mitigation strategy, which sets out various interventions designed to ameliorate potential harm to the building or occupants, principally, persistent high humidity levels. Early U-value measurements from nine walls at New Court gave an average of 0.36W/m²K, very close to the 0.38W/m²K modelled figure. The interstitial hygrothermal analysis has largely shown walls reducing in humidity as the lime parge coat, which is applied to the wall before insulation, has dried.

Monitoring of New Court will continue for seven years, a time frame subject to ongoing review. The project could serve as a precedent for quantifying and managing the risks posed by the refurbishment of older buildings.

Historic buildings are often regarded as too complicated for energy efficiency refurbishment. However, they cannot be ignored. Monitoring is a means by which we can inform the refurbishment of even our most highly valued historic buildings to ensure their continued use. ●



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UPDATE

Heritage Agenda is compiled by Henry Russell OBE FRICS, School of Real Estate and Planning, University of Reading and chair of the Heritage Alliance's Spatial Planning Advocacy Group
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Historic Wales

The Welsh Government is proposing a new organisation, Historic Wales, which will bring together the commercial functions of Cadw: Welsh Historic Monuments and the National Museum of Wales. It follows a report by PricewaterhouseCoopers on heritage services in Wales, *Investing in the future to protect the past*.



Ken Skates, the Welsh Assembly Cabinet Secretary with responsibility for culture, said: "With competing demands for limited resources and a need to promote Wales better than ever, it is crucial that we evaluate whether the structures underpinning the sector are fit for purpose and whether they could be improved."

- [Welsh Government announcement on Historic Wales](http://bit.ly/2ehgf9N) <http://bit.ly/2ehgf9N>
- *Investing in the future to protect the past* is available at <http://bit.ly/2ekkSPN>

Digital data

Historic England is planning a new strategy for its own digital heritage data and that held by local authorities. According to the public body, the Heritage Information Access strategy aims to resolve "long-standing issues of complexity and duplication of effort in the management of and access to heritage data nationally".

The object is to create a shared heritage record that is more coherent and integrated than the existing Historic England and local authority resources, and can thereby provide much better support for the planning system.

- <http://bit.ly/2dNwRUm>

Heritage Trust Network

The Heritage Trust Network is the new name for UK Association of Building Preservation Trusts (UKAPT), originally established in 1989 to offer guidance and support to building preservation trusts. The new organisation is the result of a recent and significant period of transition, supported by the Heritage Lottery Fund. It will have a broader remit, supporting all forms of not-for-profit groups that are breathing life and enterprise into the UK's threatened historic places.

Network Chair Sarah McLeod said: "The change to Heritage Trust Network is more than just a name change; it's an exciting new chapter in our organisation's history, which will bring greater benefits to everyone involved in tackling historic buildings and heritage assets at risk."

- [Heritage Trust Network](http://www.heritagetrustnetwork.org.uk)
www.heritagetrustnetwork.org.uk



Hand-drawn records

New guidance from Historic England describes techniques that have a long tradition of being used to aid understanding by observation and close contact with building fabric. They can be used by all involved in making records of buildings of all types and ages, but are particularly useful for vernacular buildings and architectural details that are crucial to the history of a building or site.

- [Guidance is available to download at:](http://bit.ly/2dmKap2)
<http://bit.ly/2dmKap2>

European Cultural Heritage Year 2018

The European Commission has announced that 2018 will be European Cultural Heritage Year and it will have three main objectives:

- to promote the role of European cultural heritage as a pivotal component of cultural diversity and intercultural dialogue
- to enhance the contribution of European cultural heritage to the economy and society, through its direct and indirect economic potential
- to promote cultural heritage as an important element of the EU's international dimension.

The last such significant event was European Architectural Heritage Year in 1975 – a pivotal year, which saw the creation of a number of campaigning organisations such as SAVE Britain's Heritage as well as influential conferences and exhibitions.

- <http://bit.ly/2byvNFg>

Places of Worship Security

The Home Office has introduced funding to improve security to places of worship following incidents in the summer. The funding covers security equipment but not the cost of recruiting security personnel.

Examples of eligible security equipment are CCTV, perimeter fencing, access control gates, bollards, door and window locks, intruder alarms, and external lighting. Funding would also include the labour cost to install the equipment.

- <http://bit.ly/2aaUHqJ>

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