Maintenance for historic buildings: a current perspective

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Abstract

Purpose – It is well understood that maintenance is critical to the survival and in-service use of any building. Despite recognition that the best way of protecting and maintaining historic buildings is to undertake a combination of proactive and reactive maintenance, it is rarely adopted or implemented, and when it is undertaken it often results in varying degrees of success. Maintenance theory currently exists, but fails to be realised in practical application and implementation. It is the purpose of this paper to ask why this failure is occurring.

Design/methodology/approach – The paper is composed of a critical review of existing literature, highlighting some of the major issues affecting maintenance implementation. It also reports the early stages of proposed research ongoing at Heriot-Watt University.

Findings – Despite recognition in the literature of the need to maintain historic buildings, this review suggests that the ways in which maintenance is organised and financed often mitigates against its implementation. In addition, advice to owners of historic buildings could be improved and there is a shortage of skilled operatives.

Originality/value – Unless this situation is improved, much of our culturally significant buildings will be lost to future generations.

Keywords Building conservation, Maintenance, Heritage

Paper type General review

Introduction

The survival of any building is underpinned by regular maintenance, with recognition of this made as early as the mid-nineteenth century by John Ruskin and William Morris. William Morris, founder of the Society for the Protection of Ancient Buildings (SPAB), had specifically identified maintenance as a method of retaining the value embodied in the historic fabric, stating “stave off decay by daily care” (Society for the Protection of Ancient Buildings, 2008, p. 1). Almost a century and a half later, maintenance is still accepted as the most sustainable and suitable way to conserve buildings (Dann and Cantell, 2007, p. 185).

Internationally the importance of building maintenance is well recognised and has been embedded into principal building conservation legislative frameworks and charters. The Venice Charter states: “It is essential to the conservation of monuments that they be maintained on a permanent basis” (International Council on Monuments and Sites, 1964, p. 1). The Burra Charter (International Council on Monuments and Sites, 1999: 6) clearly concurs with this stating that, maintenance “is fundamental to conservation and should be undertaken where fabric is of cultural significance and its maintenance is necessary to retain that cultural significance”. Other international
charters also concur that maintenance is fundamental to conservation (Worthing et al., 2002).

On a national level, English Heritage (Brereton, 1995, p. 7) suggests that “the best means of ensuring the continued preservation of a building is to carry out regular maintenance”. Planning Policy Guidance Note 15 (PPG 15) also makes the case, claiming that regular maintenance is the “key to the preservation of historic buildings” (Worthing et al., 2002, p. 295). BS 7913: 1998, The Principles of the Conservation of Historic Buildings, concurs, stating: “systematic care based on good maintenance and housekeeping is both cost effective and fundamental to good conservation” (British Standards Institution, 1998).

Benefits of proactive maintenance
The relationship between proactive building maintenance and long term cost saving has been clearly established by English Heritage in Power of Place (English Heritage, 2001). This is reflected in comments by Maintain Our Heritage (2004, p. 3) indicating that “much of the need for capital expenditure on the historic environments is the result of poor maintenance”. This statement recognises that reactive maintenance is not cost-effective when measured against expenditure for proactive (preventative) maintenance. This relationship is represented graphically in Figure 1, illustrating the cost between planned and unplanned maintenance.

Maintain Our Heritage claimed that maintenance is “all too often responsive, not pro-active, sporadic, not systematic, a low, not a high priority and in many cases it did not happen at all” (Maintain Our Heritage, 2004, p. 3), whilst Worthing et al. (2002, p. 292) suggest that “very little has been written specifically dealing with systematic maintenance of or for historic buildings conservation” and that “there is no well established academic study or research to ascertain why maintenance is not widely practised, disseminated and developed” (Dann and Cantell, 2005, p. 42).

The government clearly accepts that a need to increase awareness is required to shift emphasis in maintenance from cure to prevention and is reflected in various

![Figure 1. Cost relationship between planned and unplanned systems](image-url)
recent publications (Department for Culture, Media and Sport, 2004; Worthing et al., 2002; Johns, 2007a; Maintain Our Heritage, 2004, p. 3). The government’s support is further emphasised in the following statement:

The Government fully endorses the increasing importance attached to the preventive maintenance of historic fabric. In discussion with English Heritage about future funding priorities, it will explore how a shift of emphasis towards preventive maintenance might be reflected in grant programmes (Maintain Our Heritage, 2004, p. 3).

In facilitating this change, the government indicates that this shift would require lead bodies and local authorities to “set an example in the conservation of its own extensive historic estate”, by completing asset management audits within the context of best-value systems. The aim of this would be to bring their existing building stock up to an acceptable condition. The Heritage Lottery Fund (HLF) aims to encourage this by “increasing its efforts in supporting maintenance regimes” (Maintain Our Heritage, 2004, p. 3).

Wider benefits of preventative maintenance include conservation of historic materials, avoidance of disruption to surrounding building fabric and occupiers and the minimisation of uncertainty associated with irregular inspection. However, Maintain Our Heritage (2004) claim that the most significant benefit of systematic and preventative maintenance is the retention of cultural value, by prolonging the life of its components as well as minimising the loss of fabric.

**Definition of maintenance and conservation principles**

The importance of building maintenance is embedded into nearly all principal documentation and legislation for conservation, yet a consensus for a definition of maintenance has not been fully achieved.

Seeley (1993, p. 1) cites BS 8311, which defines maintenance as “the combination of all technical and associated administrative actions to retain an item in, or restore it to, a state in which it can perform its required function”. A broader definition of maintenance has been adopted by Feilden and Jokilehto (1993, p. 3) as “all practical and technical measures to keep the building or site at a standard that permits enjoyment of their cultural significance and resources without damage”. The Burra Charter (International Council on Monuments and Sites, 1999, p. 2), also utilises broader interpretation for the definition “as a continuous protective care of the fabric, contents and setting of a place”, while Dann et al. (1999, p. 143) suggest that it is purposely to “retain an item or restore to acceptable standard”.

It is clear that various definitions have been utilised to describe maintenance, with some minor levels of variation. In addition, the various terms utilised are also relatively nebulous, making objective assessment difficult.

**Minimal intervention as a tool for maintenance**

It is clear that retaining historic fabric leads to the retention of cultural significance, with the most appropriate method to achieve this being to undertake maintenance on a minimal intervention basis. The primary aim of minimal intervention is to restrain decay without damaging the building character. Minimal intervention aims to avoid unsympathetic alteration of important features or prevention of unnecessary disruption or destruction of the fabric that gives the significance to the buildings. Minimal intervention can be considered as “as much as is necessary” (Brereton, 1995,
p. 7; Watt, 1999, p. 234) and “as little as possible” (Feilden, 2003, p. 235). Monumentenwacht (a subsidised proactive maintenance scheme), which was established and implemented in Flanders, strongly believes that minimal intervention provides higher survival rates of the fabric due to reduced deterioration. This in turn supports the materials’ authenticity and “may reduce the need for restoration” (Monumentenwacht Flanders, 2000).

Various authors (Feilden, 2003, p. 235; Feilden and Jokilehto, 1993; Worthing and Bond, 2008, p. 95) have indicated that minimal intervention based on maintenance is not only cost-effective, but it is also the least destructive approach to conservation. However, Feilden (2003) has argued that “minimal intervention can only work by utilising regular inspection” (p. 236), and therefore raises questions about the cost associated with survey and inspection, market viability or subsidy.

**Distinction between repair and maintenance**

The Burra Charter suggests that maintenance should be the first priority and must “be distinguished from repair because repair involves restoration or reconstruction” (International Council on Monuments and Sites, 1999, p. 2). This important distinction has been discussed by Worthing *et al.* (2002), who argue that while repair work is effective at “prolonging the life of the element and the building; it will also involve damage to the fabric (p. 296). Brereton (1995, p. 2) suggests that in repair works “unnecessary replacement of historic fabric” may take place, potentially significantly reducing the value of the building as a source of historical information. Feilden (2003) believes that a minimum intervention approach creates least harm to the fabric, and also clearly enables the distinction between maintenance and repair to be made. It is evident that repair works pose philosophical questions, such as no matter how carefully the repair works are carried out there is always the potential to seriously diminish the building’s authenticity.

In addition, budgetary pressures can often conflict with minimal intervention principles, with the motivation to spend budget allocation resulting in unnecessary works being undertaken. The nature of annual budgetary bidding processes in most organisations makes planned maintenance difficult to administer and the resulting repair works uneconomical (Mills, 1994; Smith, 2005).

**Problems with maintenance for historic buildings**

The following section will investigate problems that affect current practice for maintenance discussing the main factors in greater depth.

**Maintenance policy and procedures**

Although maintenance is fundamentally good for conservation, it is not reflected in current policy. Maintenance policy is generally poorly integrated, with a lack of leadership and/or deviations from procedural systems being a major problem (University of the West of England, 2003; Dann and Cantell, 2007).

As Maintain Our Heritage (2004, p. 9) highlighted, “there has been lack of leadership and direction in the promotion of maintenance”. In fact, there is no clearly established policy to advise building owners, with much of the maintenance guidance and inspection work being led by non-governmental organisations (NGOs) (Devlin, 2005).
National policies that are supportive of maintenance have been implemented in Denmark and The Netherlands with a great deal of success, with the integration of a national strategic maintenance framework clearly paying dividends. That being said, within the UK, maintenance as a tool for retaining cultural significance appears not to be highly regarded by conservation organisations, resulting in problems in the promotion of new innovative systems. By comparison, the Dutch have accepted maintenance as being the most effective approach to conservation (Maintain Our Heritage, 2000; Monumentenwacht Nederland, 2008), and have had considerable success in its implementation.

Heritage bodies that claimed to place maintenance at the centre of their conservation strategy have generally failed to implement this for their own listed buildings and it is the authors’ view that heritage bodies within the UK should be setting an example of best practice planned maintenance by implementing this to their building stock. Although maintenance is perceived as being simple it is evidently complex at a strategic level and has led to continuingly unclear policy and advice and ultimately to confusion.

*Buildings at Risk registers*

Although there are various Buildings at Risk Registers in the UK their coverage and accuracy is somewhat patchy and disparate. These systems are fragmented and therefore their efficacy is diminished (Maintain Our Heritage, 2004; English Heritage, 2003). This contrasts with Italy and The Netherlands that have one database system, which is utilised to provide evidence to support the case for maintenance (Maintain Our Heritage, 2004, p. 14).

*Conservation plans*

Maintenance for historic buildings has begun to receive more attention with the promotion of “conservation plans”. These were introduced in the late 1990s (Dann and Cantell, 2007) and are implemented as part of the regulatory framework for grant aided projects. A conservation plan’s primary objective is to highlight the significance of a building or place via an assessment of analysis of conservation needs. This is determined by a condition survey, which then forms the basis for a routine building maintenance schedule (Dann et al., 2002; Royal Institution of Chartered Surveyors, 2008a, b; Historic Scotland, 2000).

Clark (2001, p. 56) highlights that “the sensitive repair and maintenance of an historic building and its landscape is not just a matter of specifying traditional materials and techniques. It requires an appreciation of why the site is significant, how this significance is embodied in the fabric and what impact potential repairs might have on it”.

It is clear from this statement that repair works may in fact ultimately diminish the significance of a building if inadequately or over-zealously undertaken. For this reason, several authors (Kerr, 2000; Miele, 2005; Gard’ner, 2007) have proposed that an alternative strategy be adopted in which condition surveys form the basis of early identification of defects and thereby reduce the need for physical interventions. However, critics of conservation plans question whether these maintenance regimes are implemented, and a cynical view could be that these reports are only produced to enable the satisfaction of grant funding and after the project has been completed there is no ability to check that the suggested works are regularly undertaken.
Current and best practice maintenance

To date, efforts to promote and develop best practice maintenance systems for historic building conservation appear to be wanting (Dann and Cantell, 2005), with all too often cost-ineffective reactive maintenance being undertaken. Exacerbating this situation is an absence of accessible and rigorous literature, (Dann and Wood, 2004) specifically targeted at maintenance in conservation. One possible exception to this is English Heritage, which appears to recognise some of the main issues in its publication *Power of Place* (Dann and Cantell, 2007).

Though there is increasing awareness about the relationship between maintenance and the retention of cultural significance, this does not seem to be mirrored in the form of effective action. Policies developed by organisations do not link conservation aims and maintenance activity. According to Maintain Our Heritage (2004, p. 12) most current maintenance strategies are merely “activity plans” rather than long-term plans. In addition, a lack of clear systematic and preventative maintenance strategy is exacerbated by regionalism in national organisations, and as mentioned, to date very few national heritage organisations have an integrated database for managing maintenance information and none of them use performance indicators for maintenance management.

Current practice within organisations does not appear to have developed specific procedures for implementing systematic preventative maintenance approaches. Tools that are commonly used in the main industry, such as cost-benefit analysis, risk assessment and programme reviews for maintenance, are rarely considered for historic buildings. Pricing for conservation maintenance is further complicated as no handbooks, manuals or lifecycle data exists in any meaningful sense, as opposed to the main industry, which has a long tradition of the use of these sorts of publication.

Significant gaps in knowledge, unclear communications and conflicts in procedures appear to be prevalent (Hutton and Lloyd, 1993) as maintenance is “rarely covered” by formal contract, supervision and monitoring (Šarišský, 2000, p. 1). The limited consideration (Shen, 1997) of these issues creates tension between experts (Pendlebury and Townshend, 1999; Dann and Wood, 2004) and potentially reduces public participation (Mynors, 2006; Wood, 2006) in interventions to historic buildings.

In addition to the aforementioned, various authors (Šarišský, 2000; Orbašli and Whitbourn, 2002; Dann and Worthing, 2005) have highlighted the problems associated with inappropriate repair strategies for maintenance works. The inadequacies in repair strategy is a reflection of the lack of understanding of both professional and contractors alike at undertaking traditional repairs that must conform to a philosophical framework.

The literature review has also revealed issues relating to medium and long-term cost allocation of maintenance projects and associated administration for historic building conservation. A lack of interest and poor financial allocation of money by local authorities and conservation bodies fails to accommodate the actual maintenance needs of their buildings, with local authorities having budgets that are significantly less (Chanter and Swallow, 2007) than what is required to implement proactive systems (Dann and Cantell, 2007). In addition, maintenance or property management departments do not have the appropriate status and power to enable redirection of funds to implement these proactive systems. This view is shared by Shen (1997) and Dann and Steel (1999) who highlight that maintenance budget allocations always face a “cut-off line” and in reality, maintenance “falls” somewhere in the middle of budget priority.
In reality, maintenance is rarely regarded as an important approach to conserving historic buildings, with a considerable number of authors claiming that maintenance receives negatively biased judgements. It is believed (Dann and Cantell, 2007, p. 189) that maintenance of historic buildings is always understated and is considered as a “low-status professional” operation which “does not gain the attention” that it deserves (Dann and Cantell, 2005, p. 44; Seeley, 1993; Son and Yuen, 1993; Milne, 1985, p. 2; Wood, 2003a, p. 75; Wood, 2003b). In addition, building owners have negative perceptions associated with maintenance as they do not clearly see the benefits of this activity. All too often, maintenance has been described as the “Cinderella” sector of the construction industry (Wood, 2005, p. 291) and, as Feilden (2003, p. 238) highlights, has been perceived as a “difficult burden”. Other commentators (Dann and Cantell, 2005; Seeley, 1993; Son and Yuen, 1993; Wood, 2003a, p. 75) believe that maintenance is unpopular due to its unglamorous nature and for that reason is often considered as being a slightly inferior activity. It has been shown that a building’s significance and vulnerability is key to underpinning decisions for the prioritising of finance and the development of a maintenance strategy, yet this rarely appears to be a focus of decisions made.

Maintenance grants and fiscal incentives
Expense of repairs is believed by Mynors (2006) and Swallow (1997) to be putting buildings at risk (English Heritage, 1992), with the high cost of building maintenance being regarded as a universal issue (Hutton and Lloyd, 1993; Blanc, 1994; Shen, 1997; Andreasen, 2000). Subsidy or grant aid for building maintenance for historic buildings is clearly required to increase uptake and therefore reduce neglect (Dann et al., 2000).

Very little practical or financial assistance is available to owners of historic buildings, with current grants being aimed at repairs (or restoration) to listed buildings rather than on maintenance. It is well recognised that repair grants are necessary; however, it negates the financial needs for systematic and preventative maintenance requirements for historic buildings. The traditional system of grant aid for historic buildings fails to clearly clarify what type of works are fundable, causing confusion. In addition, grant-aided projects are always heavily oversubscribed (Dann et al., 2000) as the general public rely heavily upon them to enable works to the fabric (Pickard and Pickerill, 2002a, b).

According to Dann and Cantell (2005), the most significant disincentive to systematic and preventative maintenance and repairs, is value added tax (VAT, currently 15 per cent in the UK) on repairs and maintenance works. In contrast, VAT is zero-rated on demolition and alteration work to listed buildings (Dann and Cantell, 2005). This apparently paradoxical situation is inconsistent with conservation principles as it encourages deterioration. In response to this situation, the Department for Culture, Media and Sport (2004) has recommended relief against income tax for the maintenance of historic buildings that are open to the public. This is common practice in many European countries (Maintain Our Heritage, 2000), but unfortunately the UK government has not yet accepted this recommendation. By comparison, a considerable number of European countries have a maintenance-focused grants system for individual owners of listed buildings, providing necessary and welcome fiscal breaks (Dann and Cantell, 2007; Maintain Our Heritage, 2000). Maintain Our Heritage was formed to develop and promote a similar local service as that offered by
Monumentenwacht (Maintain Our Heritage, 2000); however, this project ran into problems as the current UK culture does not seem to value maintenance as a primary approach to facilitate conservation.

In addition other European countries have incentives, including maintenance grants, rate rebates and standardised, subsidised building inspection. For example, in 2005 The Netherlands introduced Monumentenwacht, and reduced VAT from 19 per cent to 6 per cent for maintenance works (Devlin, 2005). The Monumentenwacht initiative has succeed in increasing the uptake of annual inspections and maintenance for all 51,000 listed buildings in The Netherlands from 24 per cent in 2005 (Devlin, 2005) to 30 per cent in 2007 (Dann and Cantell, 2007). When placed in this context, Monumentenwacht has clearly been effective. It is evident that for this form of scheme to work in a UK context, governmentally driven financial incentives are still required to subsidise inspection. Devlin (2005) concurs with this view believing that in order to sustain a Monumentenwacht-type scheme, government sponsorship is required. This may initially support a public campaign to encourage maintenance of all buildings regardless of their ownership, age or status (Devlin, 2005).

Motivation for owners to undertake maintenance
Most building owners wish to protect the function and appearance of their building but unfortunately take a short-term approach to maintenance, with an absence of understanding of the benefit of regular minor interventions. Various authors believe that financial and economic short-termism has always been one of the problems with the “deferment of cyclical maintenance being common” (Dann and Cantell, 2005, p. 44), and an attitude that “if it’s not broke, why fix it?” (Dann and Cantell, 2007). Monumentenwacht Nederland (2000) highlights that, in some cases, historic building owners did not know when and how to make the necessary repairs. In addition, owners often believed that repair and replacement was the correct course of action to enable the retention of cultural significance. It is clear that the message that “less can be more”, meaning to do little retains a higher degree of original fabric, while reducing cost, is clearly failing to be understood by owners.

Current drivers for maintenance tends to focus on reducing costly and inconvenient repairs rather than to fulfil conservation objectives. According to Maintain Our Heritage (2004), there is lack of engagement between owners and those attempting to satisfy the key conservation principles, one of which is regular maintenance (Maintain Our Heritage, 2004). Too often, owners see “repairs” and maintenance as interchangeable concepts. It is therefore clear that the public need better advice on the principles of building conservation philosophy that underpins the practical aspirations of heritage bodies.

Advice and information for owners
When an owner attempts to implement maintenance, the advice given is often incorrect, or calls for unnecessary and/or inappropriate repairs (Dann and Cantell, 2005). This has a debasing effect on perception of professional bodies and has a negative influence on consumer confidence. As Blanc (1994) has suggested, professional advice is not highly valued and sought after and when it is taken it is often delivered in an informal manner.
Compounding the problem, to date, there is no single source of information relating to maintenance. Dann and Cantell (2007) claim that information to keep the public well informed about maintenance services is not well developed and is not readily accessible. These services may encourage owners of historic buildings to undertake appropriate, systematic and preventative maintenance programmes were they available.

In addition, information highlighting the responsibilities of the listed building owners is inconsistent, with no automatic mechanism to ensure owners are briefed on the importance of maintenance for their building. Maintain Our Heritage (2004) highlight that a considerable number of local authorities have succeeded in producing their own maintenance guide for owners of listed buildings, which focus on issues such as statutory conservation obligations and responsibilities, for example Newcastle City Council, King’s Lynn and West Norfolk Borough Council and Vale Royal Borough Council (Maintain Our Heritage, 2004).

The conservation sector provides insufficient information about maintenance protocol, and data relating to longevity of traditional materials, creating problems for many maintenance functions, such as maintenance profiling. It has been suggested that the assessment of existing records of works could potentially give better data on performance.

Duty of care
The concept of custodianship or a duty of care is not a new idea. William Morris (1877) stated in the SPAB manifesto that “we are only the trustees for those who come after us” (Society for the Protection of Ancient Buildings, 2008, p. 1), believing that regular maintenance was paramount to fulfil his idea of conservative repair, and put protection in place of restoration.

Research suggests that only when owners have a duty of care imposed upon them, do they undertake maintenance (University of the West of England, 2003). The current system of listing buildings only enacts a duty of care in situations where the changes to a building affect the character. It is evident that the present legislative framework does not promote or encourage maintenance among building owners, leaving lead bodies and local authorities to intervene only after serious deterioration has occurred. This situation increases the risk of demolition due to neglect and has been used by unscrupulous owner/developers to enable de-listing of their building. An extreme example of abuse of the system has been highlighted by (Hutton and Lloyd, 1993; Monumentenwacht Flanders, 2000) in which a building owner may be tempted to let their building decay and therefore enable it to be demolished, bypassing the system.

Neglect of historic buildings due to an absence of maintenance is not only costly to the owners, but is also expensive for local authorities to administer. This view is supported in PPG 15 (Dann and Cantell, 2005, p. 44): “there is no specific duty on owners to keep their buildings in a good state of repair (though it will normally be in their interest to do so), but local authorities have powers to take action where historic building has deteriorated to the extent that its preservation may be at risk”. This appears to send out the wrong message, i.e. that systematic and preventative maintenance is not very important and rewards deterioration. Additionally, Dann and Cantell (2007) also suggest that advice given to owners may be misguided or scant, giving the owners the feeling that they are left on their own.
The cultural value of a historic building is emphasised if the structure is listed and may go some way to highlight the importance that society places upon a building. The protection offered by Listed Building status and by the Conservation Areas Act 1990 is almost entirely reactive (Johns, 2007a, b) and does not therefore lend itself to supporting proactive maintenance. Devlin (2005, p. 34) also argues that “the owners do not have a duty of care regarding the condition of the building, therefore, statutory duty of care does not seem to make much difference [...] compounded by extremely limited recourse to any financial aid”.

On the continent, and more specifically in The Netherlands, Belgium and Denmark, the system differs from that of the UK in that there is a clear duty of care imposed upon the owner and it is legally enforced. In addition, the use of inspection services is also compulsory, enabling a higher degree of planned maintenance to be established (Dann and Cantell, 2007).

The drive to educate owners of historic buildings and the public alike is undertaken by various organisations, including, the SPAB and National Trust for Scotland which organise events forming part of National Maintenance week. The efficacy of these events is difficult to measure.

Factors affecting the implementation of practical maintenance
It is clear that in theory maintenance is highly valued, but despite this, implementation of both strategic and practical procedures may be poor or non-existent.

Arranging and managing maintenance
The practical issues of arranging and managing maintenance could delay an owner’s decision to undertake works. As with most home delivery and construction operations, the homeowner needs to take time off work to enable access to the building. This can be costly in terms of lost wages or holidays, but can also cause great frustration if operatives are late or do not show up.

Mortgages, insurance and maintenance
The importance of maintenance does not appear to be sufficiently prevalent or given enough emphasis in mortgage and house insurance policies. As Maintain Our Heritage (2004, p. 16) highlights, “there is no steer from the conservation sector for owners on how to deal with the practical issues of insurance, health and safety and access”. If these clauses were highlighted with greater effect, a higher uptake of maintenance would potentially be achieved.

Shortage of skilled operatives for historic buildings
There is currently a shortage of properly trained and qualified builders able to undertake maintenance on historic properties (Feilden, 2003) and when maintenance is carried out it is often undertaken with unsuitable materials (Horner et al., 1997) (see Plate 1). According to Maintain Our Heritage (2004), the issue of skills shortage for general builders who are competent to undertake work to historic properties is a major issue. Dann and Cantell (2005) suggest that traditional uptake in training related to maintenance and conservation has been generally low. Devlin (2005) suggests that other countries have provided much better technical training via traditional skills
education. This fact has been recognised with the development of the National Heritage Training Group (2007).

It is all too easy to focus on a lack of training for the contractors and fail to look at professional training. Various authors (Earl, 1994; Swallow, 1997; Wood, 2005) have highlighted inadequacies in professional training for specialised maintenance activities. This is also reflected in the low number of building professionals becoming accredited in conservation under the various schemes, namely RICS and Royal Incorporation of Architects in Scotland, ICE, etc. This problem was highlighted in the recently published work by the National Heritage Training Group (2008), entitled *Built Heritage Sector Professionals, Current Skills, Future Training*. In addition, willingness to undertake maintenance work by building professionals may be lower than expected. Dann and Cantell (2007, p. 189) give one possible explanation for this problem, as “maintenance may be less interesting than an alteration and less attractive than a major restoration of historic buildings”.

**Longevity of materials and maintenance**

Evidence exists in many very old buildings where original components continue to provide satisfactory performance, and are far outliving estimated values. Brereton (1995, p. 7) correlates maintenance and longevity of materials, insisting that “the best means of ensuring longer survival and authenticity of the traditional materials is through regular maintenance”. However, the ability to assess the longevity of traditional building materials is considered difficult due to a shortage of accurate information sources.

Ashworth (1996) concurs with Brereton (1995), suggesting that information is often scant, leading to inaccuracy in performance indicators and consequent predictions made. These indicators can also have inherent inaccuracies within their “make-up”, with past performance being no guarantee for future projections. While reliance may be placed on actual recorded performance data for the life expectancies of building
components, it has been shown that such data are also based upon insufficiently rigorously information. Traditional data are derived from maintenance policies, and logged causes of component failure; however, other problems with these forms of information include time-lag delays in data collection, hidden cost associated with repairs, timing distortions and the effects of delays in the implementation of life-cycle cost analysis (Ashworth, 1996). Little evidence exists to support the view that previous life cycle cost assessments have produced reliable forecasting of building component life expectancy. When attempting to derive an estimate of component and material life expectancy, it is very likely to be incorrect, as the data bears little resemblance to the actual values of building component life expectancy (Ashworth, 1996). Douglas (1994) and Ashworth (1996) highlights some of the traditional sources of data for the longevity of buildings components, as being Building Maintenance Information (BMI), the former National Building Agency (NBA), the Housing Association Property Manual (HAPM), the former Property Services Agency (PSA), the Building Research Establishment (BRE), and more recently information developed from a survey of building surveyors. An important and useful source of data for those involved in lifecycle costing is their own accumulated research and expertise. This clearly causes problems in terms of a lack of transferability and commonality of data.

Supply of traditional materials
The sourcing and procurement of appropriate materials that attempt to implement “like for like” material replacement can be a major problem. This has ramifications for the cost of materials due to relative unavailability and additional haulage. An example of this problem is the supply of Scottish slate with no quarries being in operation, making salvaged materials the primary source.

Market- and state-driven solutions
So far, systematic and preventative maintenance services have not been developed specifically for historic buildings due to an apparent lack of demand or the cost being prohibitive. That being said, the aforementioned Monumentenwacht scheme has significantly increased demand and has managed to move the government’s policy away from subsidising repair in favour of regular systematic maintenance. This has been shown to have clear benefits (Maintain Our Heritage, 2000; Monumentenwacht Nederland, 2008).

According to Dann and Cantell (2007), other schemes emulating this service have been used such as Bygningsbevaring in Denmark and Denkmalwacht in Germany. This has worked particularly well in Denmark, with private organisations and government cooperating to develop successful maintenance services that complement existing strategies (Dann and Cantell, 2007). Maintain Our Heritage (2000) indicate that there were efforts to introduce this type of service into UK in the late 1990s, but unfortunately it had limited success due to an absence of subsidy for survey work.

The development of an independent scheme with the sole purpose of undertaking proactive and reactive maintenance operations would have benefits. Recently, a pilot service set up by Maintain our Heritage in the Bath area showed that it is possible to establish a monument watch type service that was valued by building owners. However, this pilot service was costly and was only made possible by external funding. Dann et al. (2000) suggest that the market would not have been capable of supporting
the survey work under full economic costing, and it therefore requires subsidy. One potential solution would be to simultaneously incorporate other forms of survey to broaden the scope of inspection and thereby reduce cost. That said, Maintain Our Heritage (2004, p. 19) suggests that organisations are “not prepared to pay anything or would only be willing to pay unrealistically low amounts” for these services. However, some success has been achieved in locally run maintenance services in which costs can be reduced. In addition, sharing cost between neighbouring owners can deliver maintenance services with greater effect. This has been undertaken by Edinburgh City Council’s Stair Partnership Scheme (Maintain Our Heritage, 2004) in which materials are bulk purchased with corresponding economies of scale being made. There does, however, appear to be scope for not-for profit maintenance inspection, targeting particular sectors such as places of worship (Dann and Cantell, 2007).

Commercial maintenance and inspection services
Systematic building inspection is aimed at preventing (Watt, 1999, p. 230) and ultimately obviating (Asselbergs, 2000, p. 1; Czedik-Eysenberg, 2000; Maxwell, 2000, p. 1; Monumentenwacht Nederland, 2000) decay or loss of original fabric. According to Maintain Our Heritage (2004), nearly 450,000 listed buildings and 10.6 million pre-1944 buildings exist within the UK market. In 2002, £30 billion was calculated to be the output for the repair, maintenance and improvement of UK buildings. In addition, 40,000 firms have an interest in or the ability to offer maintenance schemes to this sector, with over 1,400 companies offering specialist conservation services (an average 3 per cent of the maintenance sector). It is clear that there is commercial potential for maintenance services given the substantial nature of the market. However, maintenance work accounts for a very small proportion of the overall workload of both building professionals and contractors. Contractors perceive that demand is low and feel that to tender for the work is not cost effective given the time spent on pricing. In addition, small quotes are time consuming and do not often materialise into winning the project, making this situation off-putting. In addition, an unsupportive and reluctant attitude of professionals and skilled craftsmen towards maintenance work is also a problem (Maintain Our Heritage, 2004, p. 18). All too often, contractors prefer to get involved in “low volume and low value” maintenance work (Maxwell, 2000, p. 1; Dann and Cantell, 2005, p. 44) that is counter-productive to the interests of conservation work. The lack of supply of maintenance services, for both listed and non-listed buildings, appears paradoxical as demand appears high.

Building inspection services for maintenance planning face barriers to its uptake in the UK market and as Dann and Cantell (2007) highlight, the “conservation industry has shown little interest” (Dann and Cantell, 2007, p. 195) in these types of survey in their current form. This view is alarming as it has been recognised that “regular systematic condition surveys and maintenance are essential if the money spent on major repairs is not to be wasted” (English Heritage, 2001, p. 20). Regular building inspection has additional benefits such as it creates time for decision-making processes and offers a chance to identify the rate of deterioration of elements and components.

Owner-based inspection
Research estimated that 9.1 per cent of owners had tried to anticipate the maintenance needs of their building (Maintain Our Heritage, 2004, p. 19). This type of intervention is
generally welcomed and according to Dann and Cantell (2007) is becoming more popular. Owner-based inspection that is ostensibly reactive in nature has been discussed by Smyth and Wood (1995) who believe that it can be considered as a “just in time” (JIT) inspection system, and they believe that this type of system has its place but is obviously difficult to reconcile with the concept of long term proactive maintenance planning.

Various schemes have proposed and build upon this concept, including MOTs for buildings (McKinney, 2007), and the SPAB “ten minute” home MOT.

It is heartening that building owners may attempt to evaluate problems; however, it is of concern to professional bodies who fear mis-diagnosis of defects by those undertaking the assessment and an inability to identify potentially dangerous problems such as falling masonry.

Recommendations for the future of building maintenance

**Government bodies**

In the future, the differences between public policy and conservation practice need to be reconciled to enable effective conservation maintenance. Leadership from government is also seen as being wanting, with the motivation to highlight schemes apparently being implemented by amenity bodies that have begun the process of promoting maintenance practice (e.g. English Heritage, Environment and Heritage Service of Northern Ireland, Cadw of Wales and Historic Scotland) (English Heritage, 2003). There are, however, positive signs that maintenance is increasing in importance on the heritage sector agenda (e.g. Heritage Forum) with a statutory duty of care or minimum maintenance code being suggested.

Other relatively recent changes in policy include the Heritage Protection Review (Department for Culture, Media and Sport, 2004), which links the designation of work and a duty of care of the owner. This fed into a government White Paper in 2007.

**Financial subsidies and incentives**

The UK is the only European country that does not offer tax relief for maintaining heritage property (Maintain Our Heritage, 2004, p. 23). Comparatively, Holland has a range of incentives such as low interest loans and tax breaks for maintaining heritage property. Since 2003, English Heritage has consistently called for the introduction of tax relief on VAT, with this plea being made to the Treasury and European Union (EU), but with little success.

To motivate owners to undertake maintenance, effective ways of communicating the importance and value of this activity must be sought. This must be targeted with a focus being specific to the different type of owner, demonstrating that good maintenance practice could improve the assets value of owners’ property. One such proposed scheme is to reduce the interest rate on mortgages and insurance premiums for those who sign up to relevant maintenance services. However, to be effective the government and lead bodies need to work collaboratively with the insurance and banking industry to enable solutions. A report published by the University of the West of England (2003) has proposed different financial models for maintenance that are ostensibly based on predicting the value and cost of maintenance over time.
Inspection, monitoring and innovative maintenance schemes

In general, regular inspection is fundamental for a systematic and preventative maintenance programme, with the frequency of inspections being tailored to the significance and vulnerability of the building elements and materials (Maintain Our Heritage, 2004, p. 11).

In the future, it may be possible to attain a relatively consistent monitoring system of historic buildings based on condition by using Building at Risk registers. For example, Vale Royal Borough has undertaken a trial of rapid visual surveys of listed properties and requesting feedback from the owners (Maintain Our Heritage, 2004, p. 23). An additional benefit of this exercise is that, the level of communication might improve between the owners and council.

Innovation in technology is also being suggested as one possible tool for helping deliver effective maintenance with the use of remote monitoring via CCTV of vital building elements, such as roof and rainwater goods. This could also have secondary benefits of providing better real time information on material performance and of reducing costly and disruptive inspection.

According to Maintain Our Heritage (2004), access and health and safety issues for maintenance are an issue of concern. Awkward access to vital components is common to many different types of architecture, with certain periods being synonymous with poor accessibility. English Heritage has suggested developing guidelines for accessing certain types of architecture.

Practical proposals for access have been put forward such as sharing access equipment between owners of similar buildings, within the same locality. Additionally, proposals for the formation of local maintenance co-operatives, encouraged by local heritage bodies and local authorities, may also be plausible. This would have clear benefits in “pooling” resources such as hiring discounts, economy of scale on materials purchase, shared experience and shared training in building inspection techniques. Other innovations may be helpful with the Gas HomeCare service by British Gas being broadened into traditional maintenance services (Maintain Our Heritage, 2004).

Maintenance literature and advice

The Review of Heritage Protection by DCMS in collaboration with English Heritage (2003) produced information packs for newly listed buildings to encourage owners to be proud of their assets and therefore take responsibility. Similar information packs could be supplied to all existing listed building owners, not just newly designated ones. In addition, SPAB, in conjunction with the Institute of Historic Building Conservation (IHBC) and Historic Scotland (2003) have published booklets promoting good maintenance practice for listed building owners (Maintain Our Heritage, 2004).

Efforts to produce Home Information Packs that may be later upgraded into logbooks has started. This approach has been further developed in Bedford Park, West London, with an attempt to link information included in Home Information Packs with other maintenance data. Ipswich Borough Council (1999) included a simple but clear explanation of the implications of historic building ownership with a Local Land Charges Search. This aims to indicate the future responsibilities of owners who cannot claim ignorance of their duty of care (Maintain Our Heritage, 2004).
Professional and contracting services
As has been previously shown, professionals and contractors alike appear reluctant to undertake maintenance, due to a lack of financial viability of services offered. The current economic down turn in the new build sector appears to be forcing contractors to re-evaluate their business model and therefore, reassess the importance of maintenance and stimulating creative thinking for innovative hybrid schemes. Discounts could be attained on professional and contractors services for maintenance works if collectively taken. Innovation in maintenance and procurement could help and cooperative schemes could have benefits for both professional and contractors alike as block bookings of maintenance work would generate a degree of continuity of employment.

Recently introduced accreditation schemes for building professionals working on grant-aided historic buildings aims to reassure customer confidence and to enhance the understanding of traditional materials and technology employed on historic buildings.

Building owners wishing to employ a contractor or professional to undertake work would benefit from a “one stop shop” that could disseminate details of certified and accredited operatives. However, previously established schemes have been criticised as being biased by those omitted from approved contractor/professional list and the main heritage bodies have been unwilling to produce them due to the potential for legal ramifications. A similar scheme could be utilised to look at availability of traditional materials and craft skills, with local lists.

Conclusions
It is well recognised that the best way of protecting and maintaining historic buildings is to undertake systematic maintenance. Despite this recognition, a systematic maintenance approach is rarely adopted or implemented. This review suggests that the ways in which maintenance is organised and financed often mitigates against its implementation. In addition advice to owners of historic buildings could be improved and there is a shortage of skilled operatives. Conversely, when it is undertaken, the results are often variable. It is clear that problems exist in this field and the proposed research by the authors at Heriot-Watt University will attempt to review this phenomenon holistically.

The proposed research will be carried out to review maintenance procedures critical for the survival of historic buildings. Additionally, the work attempts to investigate barriers affecting its implementation. This investigation will be undertaken collaboratively with the National Trust for Scotland (NTS), Historic Scotland, The City of Edinburgh Council (CEC) and other industrial partners in an attempt to evaluate strategic goals, maintenance operation and critical conservation activities. It is hoped that the research will enable the development of new methods of maintenance protocol, creating an environment that is conducive to conservation needs.

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