

The Challenge of Managing Health and Safety when Conserving Historic Buildings.

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ABSTRACT

Last November the Palace of the Gladiators in Pompeii collapsed. It was 2,000 years old and had survived the eruption of Vesuvius and nearly 200 years of tourism. Neglect and unseasonably heavy rains were blamed for the loss of the building (despite its rather grand name it was only forty square metres in area). This is a dramatic example of loss of heritage.

The difficulty facing conservation experts charged with salvaging damaged heritage like this is to balance the need to save heritage and the hazard to workers who will carry out the work. The example above is extreme but this dilemma is repeated every day as professionals attempt to look after our built heritage and at the same time be mindful of hazards inherent in the work. Structural collapse is one thing but there are other less obvious hazards in the conservation sector. Falls, health and the dangers from diseases are the less obvious hazards.

The paper explores this dilemma, the concern for heritage and the risk to workers. Surprisingly, there is very little literature that examines this issue. Health and Safety literature, legislation and practice do not appear to take any account of the particular difficulties of working on heritage buildings. Likewise very little conservation literature takes account of Safety and Health issues.

There are other pressures on heritage buildings. Legislation to do with energy conservation and access for the disabled has been introduced and often with very little reference to each other. This has made the task of ensuring safety in conservation works all the more difficult. It is this milieu that this research explores. In this paper these questions will be dealt with in the Irish context, in particular the conservation of Ireland's capital, the Viking, Norman and Anglo-Irish city of Dublin. The question to be answered is complex and contains elements of history, culture, technology, law and safety in construction. It is; how can conservation works be safely completed and how appropriate are the standard documents and procedures in achieving this?

To answer this question a review of literature was completed. Informed by this, research in the field was undertaken. This consisted of interviews with experts in health and safety, administration and conservation, contractors and their quantity surveyor. It would seem, on the balance of evidence from the literature review, that conservation works are part of the most risky sector of the construction industry, however the field research cast some doubt on that view.

This research attempts to deal with a tricky part of the construction industry. The research challenges the ethos of the health and safety project, equally it asks difficult questions of the heritage and conservation sector, it remains to be seen how all this is to be resolved.

Key words, Conservation, Historic Buildings, Health and Safety, Heritage, Standard Documents.

INTRODUCTION

Heritage, cultural inheritance passed through the generations takes many forms, literature, music, legend and myth. This paper is concerned with buildings and the context in which they stand, be that a village, a walled town or a city. Most of this paper is concerned with the authors' native city, the Viking, Norman and Anglo-Irish city of Dublin.

Dublin is most famously celebrated by James Joyce in his masterpiece "Ulysses". This novel re-tells the Odysseus story in the context of early 20th century Dublin. It follows Homers text and structure while at the same time gives an almost forensic account of the Edwardian city. Exiled (or self-exiled) from his native city, Joyce wrote the book in Paris, Trieste and Zurich. Distanced from the texture and grain of his home town he pestered his relatives for descriptions of each street corner and building in Dublin to ensure the accuracy of his text; he didn't trust his ten year old memories of the city [1]. Joyce's relatives would struggle to provide all of that information today, Dublin, like most cities, has changed in the last hundred years and lot of what is in "Ulysses" is gone forever.

All the same enough remains and this built heritage, so important to Joyce, is important to us too, it tells us something of our past. When we conserve our heritage and pass it on to the next generation we acknowledge both past and future. We recognize the past by conserving our heritage as faithfully as we can and in doing this we also look to the future, we say to those who follow us, here is your past, look after it and learn from it what you can.

Well, that's the idea anyway. Like all attractive ideas it is riven by difficulties and contradictions. This paper explores one of these difficulties; how to conserve buildings and structures and at the same time ensure that this is done as safely as possible and in accordance with Health and Safety legislation. This legislation is onerous and exacting and demands a lot of those conserving buildings. Penalties include fines and even prison sentences for those who breach the law. Heritage too has the law on its side, recent planning legislation in Ireland has introduced the idea of Protected Structures, and similar fines and criminal convictions can be meted out to those who by neglect or wilful destruction cause damage to Protected Structures.

Despite Ireland's current economic woes Dublin is thronged with visitors. They come for many reasons, the legendary conviviality of the Dublin pub, for sports or cultural events or for many other attractions. A recent study has shown that 62% of visitors to Ireland visit historic houses and castles, monuments and historic sites with, surprisingly, only 5% listing golf as an attraction [2].

What is certain is that they enjoy their visit in a city that, despite the neglect and decay over the years has retained a lot of its 18th and 19th century character and heritage and that this character and heritage is increasingly valued by its citizens.

This was not always the case. Roy Foster, writing in 1988, describes the prevalent mood toward older buildings in the post war era:

Though the national monuments legislation of 1952-4 protected some ancient buildings, the unique streetscapes of Georgian Dublin were torn down by “developers” with the tacit encouragement of Fianna Fail governments. [3]

When 18th century houses on Fenian Street in Dublin collapsed in the early 1960s, killing unfortunate residents, the Irish Government rushed through emergency legislation on Dangerous Buildings (Sanitary Services Act 1964). This event increased antipathy to older buildings. Gradually public perceptions changed, there were lengthy and bitter disputes over the demolition of Georgian houses in Hume Street in the late 1960s and in the 1970s over Dublin Corporation’s new headquarters on Wood Quay.

Subsequent pressure by groups such as An Taisce (the Irish equivalent of Britain’s National Trust) and The Irish Georgian Society further changed attitudes and by end of the 1980s massive conservation projects such as the Custom House on Dublin’s quays were taking place. Temple Bar, which had been earmarked for demolition, was rejuvenated and is now a vibrant cultural quarter and tourist attraction. Even former villains like Dublin Corporation faithfully conserved their own 18th century masterpiece, City Hall [4].

Formal recognition of the importance of historic buildings and structures followed shortly after with the adoption of Part IV of the Planning and Development Act of 2000 and S.I. No.600/2001. This introduced comprehensive legislation that identifies and protects Historic Buildings and Structures. This legislation was prompted partly through pressure from the conservation groups mentioned earlier and also through European initiatives such as the Granada Convention of 1985 which in turn derived from international agreements such as the Venice Charter of 1964 [5].

These European and international initiatives and agreements were, in the most part, a response to the appalling destruction of cities and buildings in the World Wars and their aftermath. The doleful litany of destruction could go on for pages, Verdun, Smyrna, Rotterdam, Coventry, Nanking, Warsaw, Berlin, Dresden, Hiroshima, Nagasaki and Tokyo must serve for now as representatives. In response to this destruction and in a desire that no more heritage would be lost these agreements and the laws that emanate from them say that Historic Buildings should be conserved as faithfully as possible; therefore works carried out to Historic Buildings and Structures must be as authentic as they can be, using techniques and materials which were in use at the time the building was made or constructed [6].

Works to historic buildings may be needed to ensure that they do not further decay or works may be required to modify a historic building for a new use or to bring it up to modern standards of fire protection, to make it accessible to the disabled or to reduce

energy consumption. These too are legal requirements and are enshrined in further Acts and Regulations such as the Building Regulations and the Fire Services Acts [7].

THEORETICAL BACKGROUND

A conservation project is quite different from one involving a new building. Extreme care must be taken to ensure that the correct materials and techniques are used; these must be researched carefully before works start. Other research on the age of the building and its history must also be completed before works commence. Once the job starts so do the problems. For example, if a church spire is to be re-slatted it is only when the slates are removed that it will be possible to see the extent of repairs necessary to the structure of the spire, timbers, battens, iron ties and other components. Estimates can be made from selective removals and demolitions but these can only be approximate [8].

A project can be well under way when the full extent of the condition of the building to be conserved is fully known. It may be much worse than estimated and may require much more extensive and complex works to ensure that it is conserved properly. The late Sir Bernard Feilden's *magnum opus*, the conservation of York Minster, started over 40 years ago and is not finished yet. It is this unknown and almost unforeseeable quality that poses great difficulties for those embarking on a conservation project.

Readers may already see the quandary facing owners of historic structures. It is difficult enough to identify the hazards and risks in constructing a new building but the unknown and unforeseeable quality of conservation work would make any sort of hazard identification, risk assessment and safety management of the project extremely difficult.

Health and Safety law in Ireland and all through Europe is rigorous and comprehensive, the recent Act and the subsequent Construction Regulations (SI 504 of 2006) have made it more so.

Conservation Law is equally rigorous and this leaves very little room for manoeuvre for an owner of a historic structure and his or her architect, engineer or builder. They must satisfy two often conflicting pieces of legislation and also be mindful of the other legal requirements attached to the ownership of a building, be it a shop, a hotel, a school, a place of worship or even your own home.

Literature in both health and safety and conservation is not especially helpful in resolving this dilemma. Conservationist Sir Bernard Feilden [9] almost ignores the topic of Health and Safety in his otherwise magisterial book and other conservation texts are not much more informative on the health and safety aspects of a conservation project. On the other side no direct reference could be found to any sort of conservation or repair work in health and safety texts. Even a book on building maintenance "Safe Access for Maintenance and Repair"[10] shies away from discussing older buildings.

Other sources produced some disquieting results. The Health and Safety Commissions' Construction Advisory Committee (CONIAC) has found that in the U.K:

60% of all fatal accidents in construction take place during refurbishment/repair/maintenance and related activities yet this represents an average of around 47% of all construction activity.[11]

A study in Ireland gave a parallel result, smaller sites accounted for nearly half of all fatalities, 46% [12]. Conservation projects tend to be small and obviously are to do with repair and maintenance. In 2008, the HSE in the UK launched its asbestos campaign [13]. Asbestos is a perennial difficulty in older buildings, it was used as fire proofing and insulation and very few older buildings are free of it.

On the other hand absolutely no evidence could be found to show that conservation projects were actually more hazardous, on the contrary a glance around Dublin will show exemplary standards of scaffolding on conservation projects. Interestingly, a similar glance will reveal that a high proportion of conservation projects are undertaken by firms who have their roots in steeplejack companies with many generations of experience of this type of work.

The Construction Regulations themselves don't particularly help either. Reading them, and especially the Schedule of Particular Risks, would lead the unwary to assume that risk is greatest on big building projects, bridges, dams, highways and the like. There is little in them to direct a client or a conservation architect toward hazards in their sector of the industry.

1. Work which puts persons a risk of-
 - a) falling from a height
 - b) burial under earthfalls, or
 - c) engulfment in swampland,where the work is particularly aggravated by the nature of the work or processes used or the environment at the place of work or construction site.
2. Work which puts persons at risk from chemical or biological substances constituting a particular danger to the safety and health of such persons or involving a statutory requirement for health monitoring.
3. Work with ionising radiation requiring the designation of controlled or supervised areas as defined in Directive 96/29/Euratom2.
4. Work near high voltage lines.
5. Work exposing persons at work to the risk of drowning.
6. Work on wells, underground earthworks and tunnels.
7. Work carried out by divers having a system of air supply.
8. Work carried out in a caisson with a compressed-air atmosphere.
9. Work involving the use of explosives.
10. Work involving the assembly or dismantling of heavy prefabricated components. [14]

Similar Schedules appear in safety legislation across Europe, each appear to have very little to do with the day to day concerns of conservation professionals, be they architects, engineers or builders. It is unlikely that item 9, “Work involving the use of explosives” or as the German regulations have it “Arbeiten, bei denen Sprengstoff oder Sprengschnüre eingesetzt werden” would have much to do with a conservation project [15].

Standard documentation and procedures produced by the professional bodies are excellent, but are necessarily pinned to the shape and structure of the Regulations [16, 17]. This is sensible and reasonable, the point of the standard documents is to ensure architects adhere to the regulations, but because of this they give minimal guidance to the conservationist in carrying out his or her statutory duties.

Other elements of the literature review included an examination of the philosophy of both health and safety and conservation. The third paragraph of this paper owes a lot to William Morris’ “Manifesto for the Society for the Protection of Ancient Buildings”, [18], the first ideological tract of the conservation movement. Morris and other Victorians such as John Ruskin set the foundations of conservation theory. They were not without their critics. David Lowenthal [19] quotes Nietzsche and J.S. Mill who were violently opposed to this Victorian penchant for looking back. Modern conservation theory is more restrained and is carefully researched [20]. The fringes of Health and Safety theory gleaned some interesting results too, Paul Slovic [21], Kpanake et al [22] and Kone et al [23] have shown how bad we can be when assessing risk in unfamiliar surroundings.

CONSERVATION IN CONTEXT.

But what faces conservation practitioners in the real world? How do they approach this difficult task? Empirical data for this research was collected using a series of semi-structured interviews with professionals from different disciplines associated with the conservation sector. Because the potential for information overload was so great, only four questions, closely related to day to day practice were used as the basis for interviews. These questions were designed to get participants talking about hazards in the sector and how they differ to hazards in new-build work and to discuss the suitability or not of the standard documentation. In all, there were six interviews with architects, contractors and quantity surveyors, four interviews were one-on-one, one was a two person interview and the last a focus group of seven conservation practitioners, thirteen people in all. This produced over 50 pages of transcript from six hours of audio tape.

Findings were unsettling. It was anticipated that interviews would throw up some odd and unexpected hazards, what was so surprising was the extent and variety of hazards encountered. Participants described the most bizarre events:

I think this is a bit ridiculous but part of town wall bordered a cattle mart so straight away you were into brucellosis and bovine TB and all of that...

Works stopped while the wall was disinfected and rid of the offending bacteria. Another wall to be conserved had been used for burials, (a common practice in the late Middle Ages):

I'm involved with a project where the grave yard wall is falling out. Now obviously if that comes out with coffins and bones and everything...

Old walls too were used by drug abusers to dump used needles and a number of participants outlined this more modern and sinister hazard, older buildings are often derelict and attract anti-social behaviour.

One would think that ivy posed no particular hazard however one participant described how an over zealous Tidy Towns Committee removed all the ivy from a ruined church not realising that the ivy was the only thing holding the church up.

I suppose the likes of Tidy Towns committees go out to take ivy off a medieval structure, what they don't realise is the secondary stems, whatever about the primary stems of the ivy, the secondary stems of the ivy are the only thing that is holding the thing in place.

In another instance, ivy concealed an asbestos roof in poor condition. The possibility of structural collapse, involving wobbly spires, rotten floors and corroded iron, figured large in discussions:

similarly the spire of the U... Church which had this metal cross at the bottom of the spire, eh...eh...a bar running right the way up, coming right out the top and being held on by the cross...the boss of the cross at the top, now it was all rusting like mad, it was sort of stable because of the compression on the spire, we knew we put the new stainless steel on that replaced it... it would be stable at the end, but the trick was getting the one cut and getting the other one up in time...

The participant here describes how the original cast iron reinforcing to a Victorian Church spire had corroded. It had to be replaced with a new stainless steel structure but there was a period when the old one had been removed and the new one was still not in place. Added to the difficulty was the location of the spire, directly over a busy street in Dublin.

Repairs to structurally unstable elements produced graphic descriptions from all participants. Indeed there was a consistency in the descriptions from all participants and descriptions of the same hazards were repeated by different participants. For example, the hazard from rats and Weil's disease wasn't mentioned at all, but five of the participants mentioned hazards associated with pigeons, in particular psittacosis.

Discussions on working methods and safety emphasised the painstaking, incremental and slow nature of conservation work. Some of the materials used are quite hazardous:

Mixing lime mortar produces great heat and the end product is quite corrosive and we have seen how hazards can be unexpected and bizarre.

The unexpected and unpredictable nature of hazards in conservation work seemed to be beyond the experience of specialist health and safety advisors:

I think it depends on your experience of that advisor, I've been involved in a very big project on protected structures and we have health and safety...a firm of health and safety advisors on board and whether they're there or not they're totally clueless. And this is a huge project, and one we are all very aware of, and yet these consultants in my opinion...might as well not be there, in fact they are more of a danger because they are not actually highlighting the things that are at risk.

Whatever the shortfalls of specialist advisors might be, participants seemed to think this was balanced by the greater experience of those working in the conservation sector and they thought that those in the sector tended to be older and more experienced.

Standard documents, including the Regulations but especially the Schedule of Particular Risks, were felt to be a poor fit with conservation work:

But the document as you read through is very good I mean...I mean I have to produce a health and safety statement on a site like...you know and generally mine would run to two pages but the RIAI one would have 30, 40, 50 pages in it...there's very few contractors ever read through that...

This opinion was unanimous across all the disciplines. Architects felt that the standard Safety and Health Plan was cumbersome, unhelpful and not especially relevant to conservation work.

At the time the research was being completed the Irish Department of Finance was rolling out its new form of building contract. This contract, unlike previous contracts, is intended to be a lump sum, fixed price contract with no allowance for variations or re-measurement of work as the job progresses. Since participants were very concerned about the new form of contract, it was decided to allow a discussion on this and how it might affect safety management. The discussion was neatly summed up by the Quantity Surveyor who pointed out the unforeseeable and unknowable nature of conservation work, no two older buildings are the same and no reliable estimate of the work is possible and all quantities are provisional and immeasurable. If an item cannot be measured for cost purposes, then it cannot be identified for hazard identification and risk assessment.

It would be the unknowns and...I've worked on I don't know how many...a hundred Georgian buildings and every single one of them are different and from a quantity surveying point of view you can't get it right because they are all different and the exact same principle applies with the health and safety issues.

This aspect of conservation work was referred to repeatedly by all participants, the unknowable and unforeseeable nature of conservation projects affected cost estimates and Safety Plans alike.

There were pleasant surprises in this part of the research. As expected, all participants were learned, scholarly and professional but the passion and commitment they bring to their work was unexpected and refreshing. Most interviews were lively and animated and at times things got a bit heated, particularly a discussion on how to manipulate standard documents and procedures to conservation work.

Sometimes this passion can lead individuals to overlook risk to themselves, almost all described an incident when they were at risk and one architect described falling through the rotten floor of a barn he was surveying.

In those kinds of buildings you just have to be more careful, but it's your ordinary 19th century buildings, if slates have come off...and there's water penetration and suddenly you find that some of the joists have gone or the section of wall plate has gone, and I remember years ago falling through the floor of a barn...now, I'm being careful...

Pause

and that happened because I hadn't anticipated dry rot...or wet rot in one particular place, so these are the things where you learn your lesson.

This architect was the only one to complete a Health and Safety course for architects, most other conservation professionals tended to leave safety to outside consultants.

CONCLUSION.

The research showed that hazards were very different in conservation to those encountered in new-build construction. Most participants felt that their sector was more hazardous than new-build, and the literature would tend to bear this out. It has to be said though, that absolutely no evidence could be found to say that the sector is actually more hazardous. Indeed, the research in the field showed the extraordinary care that conservation contractors take. We have already seen how slow and painstaking the work can be; interviews with contractors demonstrated their great skill and experience in safety matters.

What can be reasonably said is that there is general agreement that the standard approach to health and safety in construction, the orderly transfer of responsibility and information from client to design Project Supervisors, the analysis of the project by the them, hazard identification and risk assessment and transfer of this information to the construction Project Supervisor is fundamentally undermined by the unforeseeable and unknowable elements of a conservation project. Even basic steps such as the principles of prevention are compromised by the nature of the work, the hazard can't really be avoided, it is there in the building to be conserved and can be well hidden. It would be possible to identify

all the elements of the project but the only way to do this would be to demolish or rip apart the building to be conserved. This could identify all the hazards but would rather defeat the purpose of the exercise, and destruction of a Protected Structure on this scale would invite prosecution as surely as would a breach of Health and Safety Law. The dilemma remains.

REFERENCE LIST

1. Ellman, R. 1983. *James Joyce*. Oxford: Oxford University Press.
2. Millward Brown, *Visitor Attitudes Survey 2010 Executive Summary*.
[http://www.failteireland.ie/FailteCorp/media/FailteIreland/documents/Research%20and%20Statistics/Surveys%20and%20Reports/Visitor-Attitudes-Survey-Executive-Summary-v1-2010-\(2\).pdf](http://www.failteireland.ie/FailteCorp/media/FailteIreland/documents/Research%20and%20Statistics/Surveys%20and%20Reports/Visitor-Attitudes-Survey-Executive-Summary-v1-2010-(2).pdf)
3. Foster, R. 1988. *Modern Ireland, 1600-1972*. London: Penguin, p.582.
4. McDonald, F. 1985. *The Destruction of Dublin*. Dublin: Irish Times Books.
5. Petzet, M. Ziesemer, J. 2001, *International Charters for Conservation and Restoration-Monuments and Sites*, Munich: ICOMOS.
6. Petzet, M. Ziesemer, J. 2001, *International Charters for Conservation and Restoration-Monuments and Sites*, Munich: ICOMOS.
7. Department of the Environment, 2001, *Fire Services Act (S.I. No.600/2001)*. Dublin, Stationary Office.
8. Feilden, B. 2003. *Conservation of Historic Buildings*. 3rd ed. London: Elsevier-Architectural Press.
9. Feilden, B. 2003. *Conservation of Historic Buildings*. 3rd ed. London: Elsevier-Architectural Press.
10. Iddon J and Carpenter J. 2003, *Safe access for maintenance and repair*. London: CIRIA.
11. Health and Safety Executive. 2007. *HSC-CONIAC, minutes of a meeting dated 25 June 2007, proposed CONIAC workplan 2007-2008, Annex 4*. London: Health and Safety Executive, pp. 7-8
12. Dalton, M. 2003. *An Examination of Duty holder Responsibilities: Fatal construction accidents 1997-2002*. Dublin: Health and Safety Authority.
13. HSE, *Asbestos – The Hidden Killer*. <http://hse.gov.uk/asbestos/campaign>.
14. Department of Enterprise, Trade and Employment. 2006. *The Safety Health and Welfare at Work (Construction) Regulations 2006 (SI 504 of 2006)*. Dublin, Stationery Office.
15. [http://www.juris.de/Verordnung über Sicherheit und Gesundheitschutz auf Baustellen \(Baustellenverordnung BaustellV\)](http://www.juris.de/Verordnung%20über%20Sicherheit%20und%20Gesundheitschutz%20auf%20Baustellen%20(Baustellenverordnung%20BaustellV))

16. RIAI. 2007. *Preliminary Safety and Health Plan, SHW-D1-2007*. Dublin, RIAI.
17. MacNeill, P. and Mooney C. 2008. *Project Supervisor Design Process*. Dublin, RIAI-CPD.
18. Morris, W. 1877. *Manifesto of the Society for the Protection of Ancient Buildings*. London: Society for the Protection of Ancient Buildings.
19. Lowenthal, D. 1985. *The Past is a Foreign Country*. Cambridge: Cambridge University Press.
20. Jokilhto, J. 2002. *A History of Architectural Conservation*. Oxford: Elsevier-Butterworth-Heinemann.
21. Slovic, P and Weber, E. 2002. Perception of Risk Posed by Extreme Events. *Proceedings of: Risk Management strategies in an Uncertain World*. April 2002. Palisades, New York.
22. Kpanake, L. Chauvin, B. and Mullet, E. 2008. Societal Risk Perception among African Villagers without Access to the Media. *Risk Analysis*. 28 (1) pp193-202.
23. Kone, D. and Mullet, E. 1994, Societal Risk perception and Media Coverage. *Risk Analysis*. 14 (1) pp21-24.