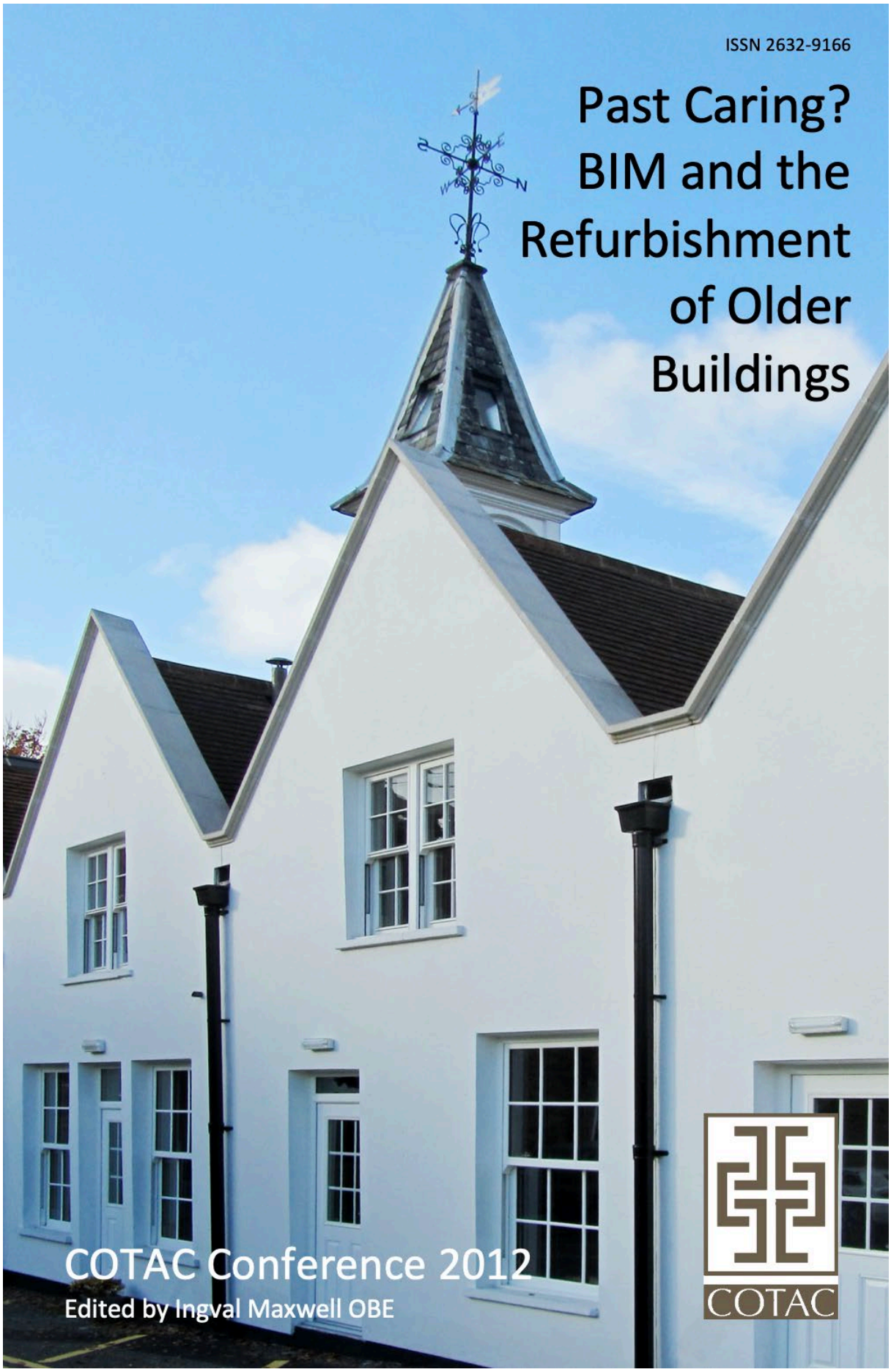
ISSN 2632-9166

Past Caring? BIM and the Refurbishment of Older Buildings



COTAC Conference 2012

Edited by Ingval Maxwell OBE

COTAC

Council on Training in Architectural Conservation (COTAC)

COTAC originated in 1959 in response to the need for training resources for practitioners in the repair and conservation of historic churches. Since its inception the Charity has consistently worked to lift standards across the UK's conservation, repair and maintenance (CRM) sector. This has involved working in partnership with national agencies, professional and standard setting bodies, educational establishments and vocational training interests.

Acknowledgments

The Conference was organized by COTAC with support from the BRE. It was sponsored by the BRE Trust; the Building Crafts College; College of Estate Management and IHBC to which COTAC offers thanks.

Thanks are also due to the various conference speakers for the information freely offered through their various presentations which also underpins the content of this report.

Cover Illustration: The Victorian Terrace, BRE, Garston © Ingval Maxwell

Past Caring? BIM and the Refurbishment of Older Buildings

COTAC International Conference Report
Building Research Establishment, Garston, Watford*:* 7 November 2012

Edited by Ingval Maxwell OBE

Conference Summary

The conference focused on whole-life initiatives that could be achieved through interdisciplinary working. It aimed to be useful to a wide variety of owners, practitioners, trainers and policy makers. On attendance, they were offered valuable experience and a broad understanding of the benefits of having relevant data and the different techniques that are available, and being developed, to help ensure the future well-being of the countries' traditional building stock.

Building upon the success of the *Conference on Training in Architectural Conservation* (COTAC) 2011 conference *'Improving Thermal Performance of Traditional Buildings',* the 2012 international event addressed the issues of how the U.K.'s traditionally constructed 6 million properties could effectively survive in continuing use into the future. With pending initiatives such as the *'Green Deal',* and the introduction of *'Building Information Modelling'* requirements, the underlying challenge was to ensure that such properties fundamentally could achieve, and remain in, a fit state of health.

There was an agreed desire to ensure that our buildings have a sustainable future. Central to achieving this was how to ensure that associated actions and developments are equally sustainable in practice.

In considering the range of topics that have to be reflected upon, the conference looked at how existing information on the physical condition could be put to best advantage in determining an integrated way forward. Building upon European experience, such as the success of the *'Monumentenwacht'* scheme, and the recently concluded *'EU-Cultural Heritage Identity Card'* FP7 research project involving a consortium of 12 partners from 11 countries*,* the conference also considered how data from the *National House Condition Surveys* could assist in determining a cohesive approach to the issues involved.

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COTAC, London: 2013
Reformatted report: July 2020

Contents

Conference Programme

Session 1: Continuing Use of the Stock: Chair John Taylor MBE

09.45 Opening Remarks:
Dr Peter Bonfield, OBE, Chief Executive of the BRE Group

10.00 Building Information Modelling in Relation to Conservation Needs
Roy Evans: BIM Implementation, Cabinet Office

10.30 Building Information and Facilities Management in Historic Buildings
Annette McGill: Charity Facilities Management

Session 2: Challenges, Gains and Experience: Chair Henry Russell OBE

11.15 The Challenge of Installing Building Services in HB's
Geraldine O'Farrell: Vice-chair of CIBSE Heritage Group

11.45 Lessons to be Learnt from the Bath Experience
George Allan: Maintain our Heritage

12.15 Lessons to be Learnt from Monumentenwacht
Jacques Akerboom: Director Monumentenwacht Noord-Brabant, Netherlands

Lunchtime Visits:
'Victorian Terrace' and ' The Prince's Natural Materials House'

Session 3: Information Gathering: Chair Richard Davies

14.00 The Purpose of Creating the English Housing Survey
Simon Nicol: Building Research Establishment

14.30 The Scottish House Condition Survey and Maintenance Needs
Jamie Robertson: Scottish House Condition Survey

Session 4: Tools for the Future: Chair Ingval Maxwell OBE

15.15 Digital Documentation and the Historic Environment - Why ?
Dr David Mitchell: Director of Conservation, Historic Scotland

15.45 EU-CHIC FP7 Project: European Union - Cultural Heritage Identity Card
Prof. Roko Žarnić: University of Ljubljana, Faculty of Civil and Geodetic Engineering

16.30 Discussion and Conference Resolution

Building Research Establishment: Garston

Peter Bonfield
Chief Executive of the BRE Group

The Building Research Establishment helps government, industry and business to meet the challenges of our built environment. Today's need to combat climate change, and the significant economic and social issues we now face, are no exceptions. BRE is an independent and impartial, research-based consultancy, testing and training organisation, offering expertise in every aspect of the built environment and associated industries. We help clients create better, safer and more sustainable products, buildings, communities and businesses - and we support the innovation needed to achieve this.

As well as our Watford Headquarters, we operate from regional offices in the North West and West Midlands of England, and in Scotland, Wales and Ireland, to provide services that include consultancy, research, testing, innovation, sustainability and training.

The BRE Trust is the largest UK charity dedicated specifically to research and education in the built environment. Set up in 2002 to advance knowledge, innovation and communication for public benefit, the Trust uses all profits made by the BRE Group to fund new research and education programmes that will help to meet its goal of 'building a better world'. The Trust commissions research into the challenges faced by the built environment and publishes project findings which act as authoritative guidance to the construction industry.

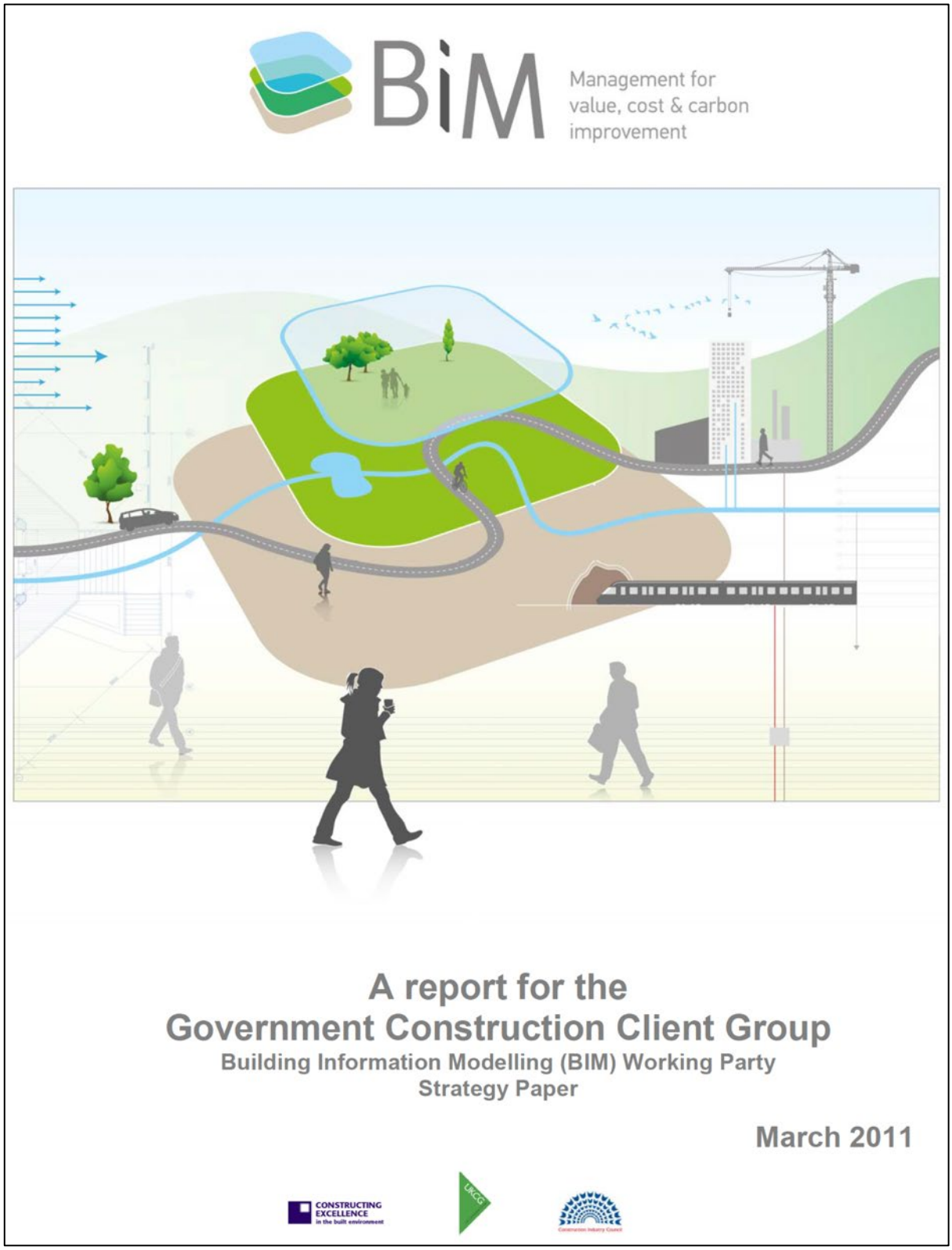
Through its activities, the Trust aims to achieve:

- A higher quality built environment
- Built facilities that offer improved functionality and value for money
- A more efficient and sustainable construction sector with a higher level of innovative practice.
- In collaboration with academia and industry, the Trust awards scholarships and bursaries to PhD and MSc students, and provides financial support to the Chairs of five University Centres of Excellence.

BRE, along with BRE Global Ltd and FBE Management Ltd are subsidiary companies of the BRE Trust. This ownership structure enables BRE to be held as a national asset on behalf of the construction industry and its clients, independent of specific commercial interests. It protects the impartiality and objectivity of the BRE Group in providing research and guidance.

Building Information Modelling in relation to Conservation Needs

Roy Evans, BIM Implementation, Cabinet Office



The Hypothesis

The working group devised a hypothesis and a number of 'tests' to guide and validate its work and to develop a strategy for the phased widespread introduction of BIM with increasing maturity (Appendix 3). This was designed with the express desire not to attempt to try and define what BIM is, rather than focus on the outputs of BIM.

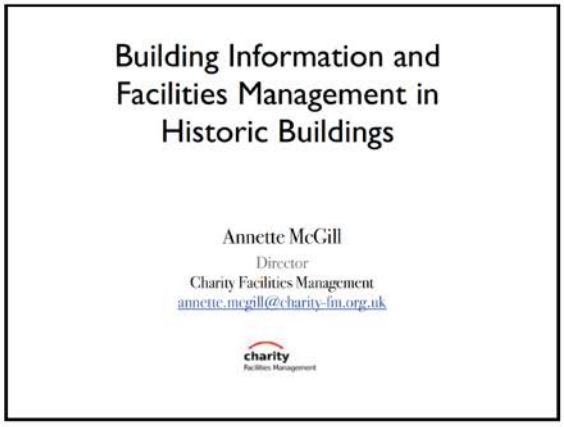
"Government as a client can derive significant improvements in cost, value and carbon performance through the use of open sharable asset information"

To ensure that the hypothesis can be robustly tested we identified the following tests.

- **Valuable:** The overall aim is to maximise client value by increasing benefits at little or no extra cost.
- **Understandable:** The approach is to be presented in an understandable learning package suitable for different types of government asset procurers.
- **General:** The approach is equally applicable to buildings and infrastructure, whether large and small new build and where possible existing structures.
- **Non Proprietary:** All requirements are non-proprietary as to applications and as to the required formats of the deliverables.
- **Competitive:** Wherever possible there are at least two solutions or methods available so as to minimise market influence in terms of anti competitive clauses.
- **Open:** Wherever possible, low-cost methods are to be made available to allow all stakeholders to participate, irrespective of size and experience, so as to minimise barriers to involvement.
- **Verifiable:** All contractual expectations are documented with transparent and testable measurement of pass / fail.
- **Compliant:** Measurement of WLC/Carbon/Sustainability/etc is published to GB, EU and ISO standards.
- **Implementation:** The approach is self funding by the client and the industry.
- **Timescale:** The approach is phased in over 5 years.

Building Information and Facilities Management in Historic Buildings

Annette McGill
Charity Facilities management



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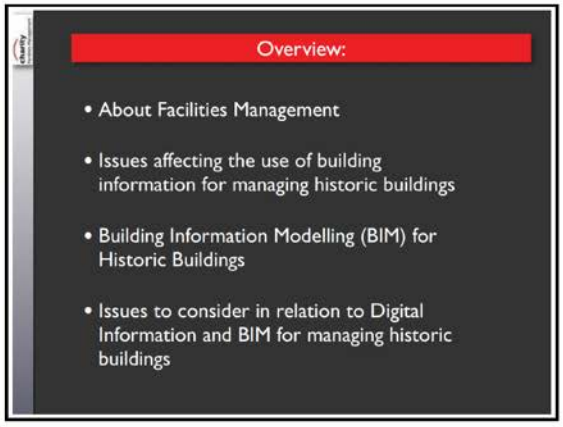

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Defining the Role:
RICS
FM Competency Guidance:
Analysis of client requirements
Conflict avoidance, management and dispute resolution procedures
Construction technology and environmental services
Consultancy services
Contract administration
Contract practice
Corporate real estate management
Design and specification
Environmental management
Fire safety
GIS
Health and safety
Landlord and tenant (including rent reviews and lease renewals)
Maintenance management
Procurement and tendering
Project audit
Project financial control and reporting
Property management
Strategic real estate consultancy
Supplier management
Sustainability
Works progress and quality management

7


Defining the Role:
BIFM
Investors in FM Excellence
Facilities Management Taxonomy
1 Business Organisation
2 FM Development and Trends
Business Management
Physical asset management
1 Land
2 Buildings/Property
3 Workplace
4 Information & Communications Technology
5 Fleet Management
6 Decommissioning & Disposal
Services Management
1 Reception
2 Post & Messengers
3 Waste Management
4 Catering
5 Cleaning
6 Laundry
7 Security
8 Information & Knowledge
9 Library & Document Archive
10 Reprographics, Printing & Stationary
11 Travel Booking
12 Stores
Process Management
1 Human Resources Management
2 Consultancy
3 Customer Service
4 Financial Management
5 Procurement, Project & Contract Management
6 Health & Safety Management
7 Quality Management
8 Performance Management
9 Risk Management

8


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Issues affecting the use and effectiveness of building information for facilities management of historic buildings

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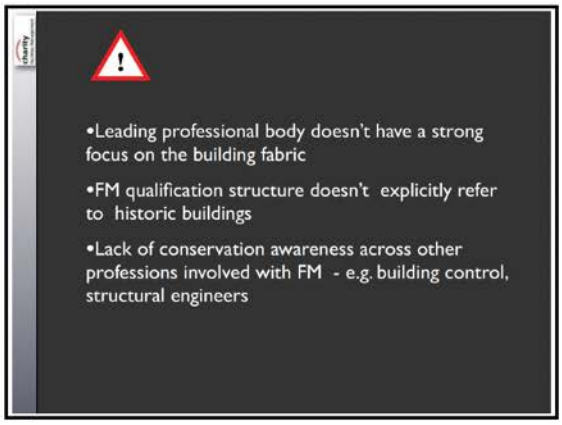
!
•Leading professional body doesn't have a strong focus on the building fabric
•FM qualification structure doesn't explicitly refer to historic buildings
•Lack of conservation awareness across other professions involved with FM - e.g. building control, structural engineers

10


!
Lack of property data
1989 study showed that:
75% of private organisations and
68% of public organisations
had a full property inventory
3% of both public and private organisations had no property inventory at all.

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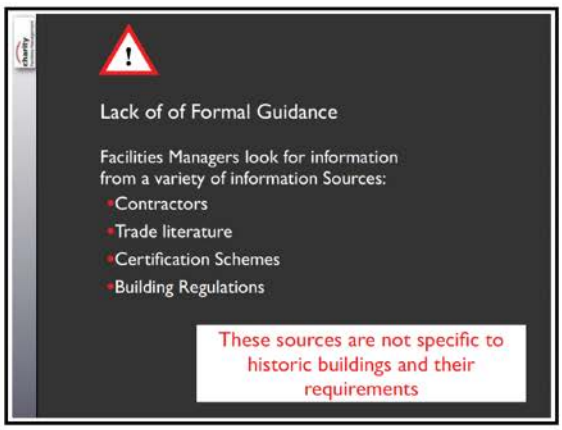
!
Lack of of Formal Guidance
Facilities Managers look for information from a variety of information Sources:
•Contractors
•Trade literature
•Certification Schemes
•Building Regulations
These sources are not specific to historic buildings and their requirements

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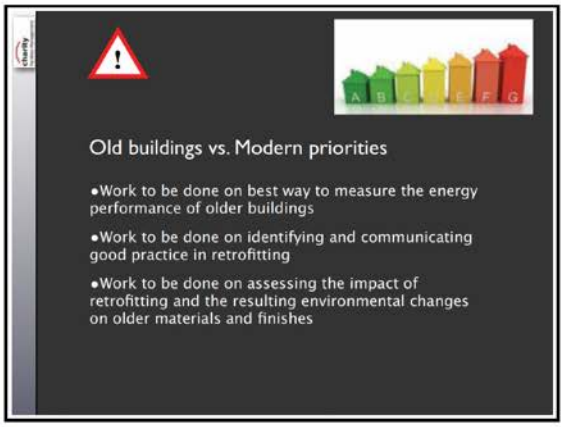

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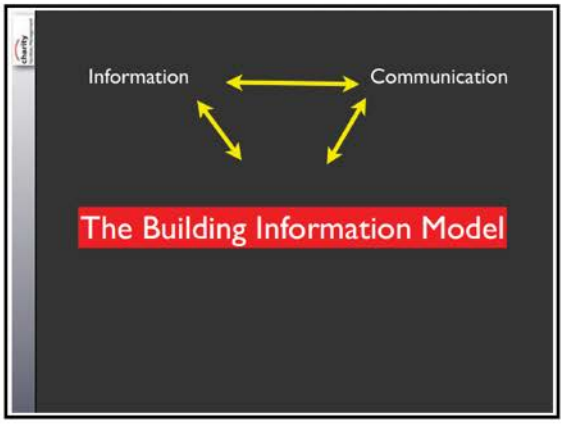

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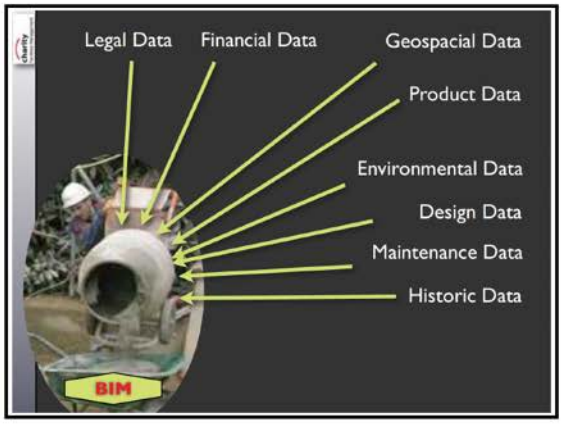

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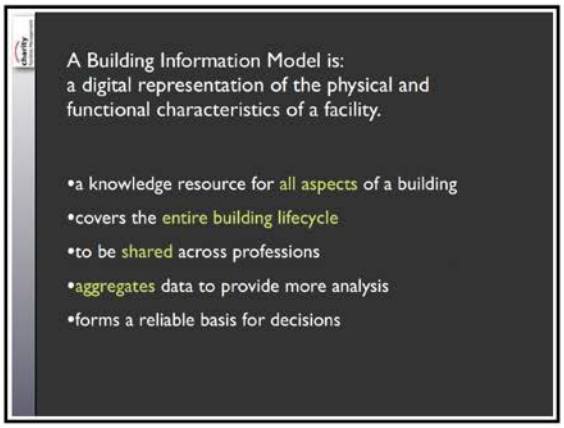

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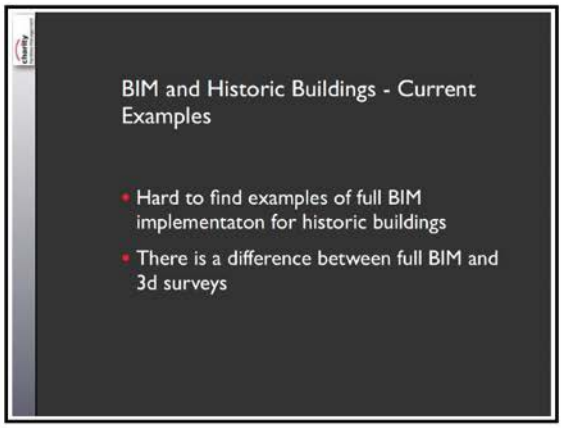

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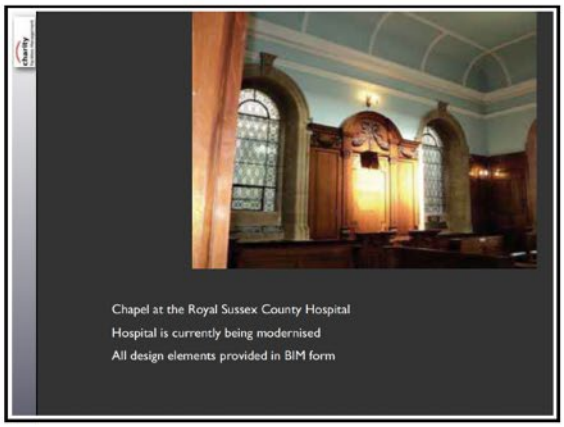

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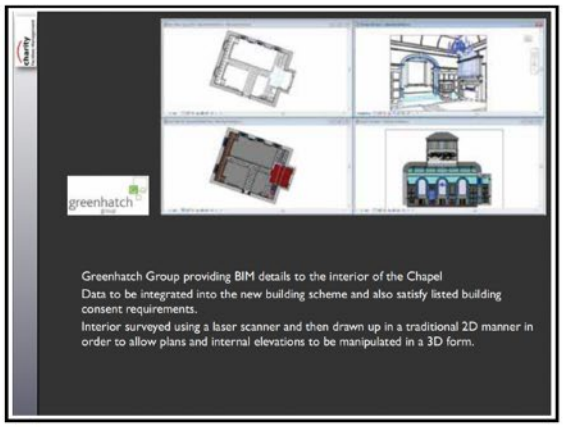

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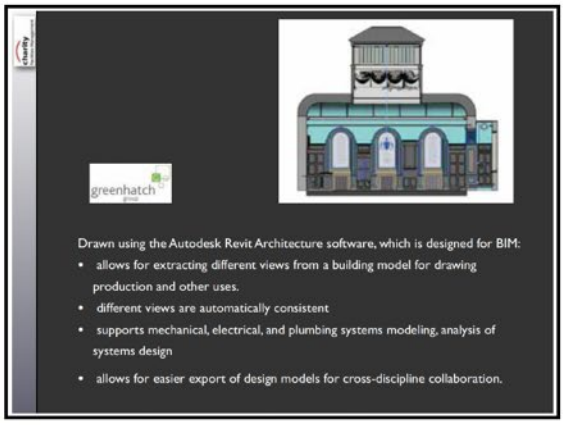

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What is the current state of play?

- Government is pushing for BIM to be implemented across the government estate.
- All professional institutes have developed BIM working parties.
- Big firms are increasingly working to BIM standards

- English Heritage:
  - not as yet done any work on how BIM might be applied across the estate
  - attempts to apply it to existing buildings at an early stage
  - EH current working on a Asset Management Planning System

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Asset Management Planning System

Will consist of:

- Database
  - survey information
  - defect information
- Maintenance Records
- Drawings & Plans
- Records of changes made

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Issues EH is dealing with:

- Finding information about buildings
- Getting information from widely distributed sources
- Time and cost - resources are limited
- Storing information in a consistent way
- Ensuring the information is accessable
- Training users
- Security issues

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Harmondsworth Barn, built in 1426

28

Sir John Betjeman: The Cathedral of Middlesex

29

English Heritage has documented a tremendous amount of historical information

SOURCES

This section includes the sources, both published and unpublished, for our current knowledge and understanding of Harmondsworth Barn.

Primary Sources (Unpublished)

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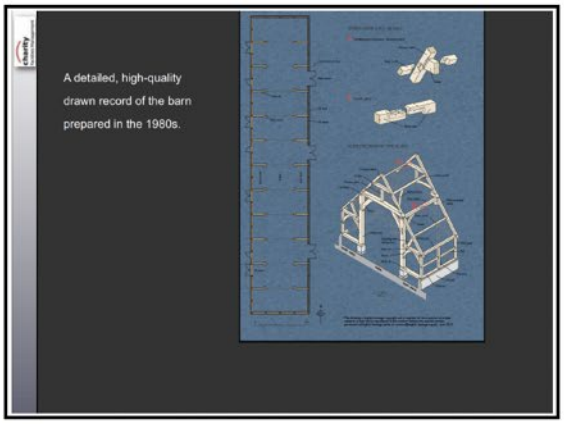

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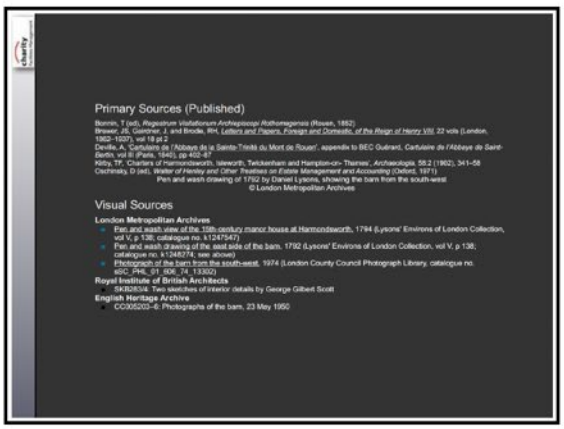

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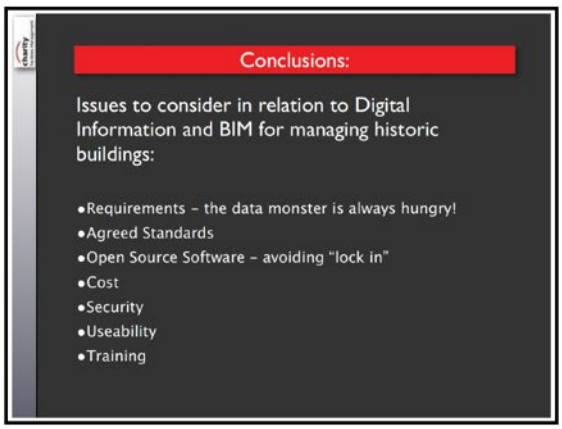

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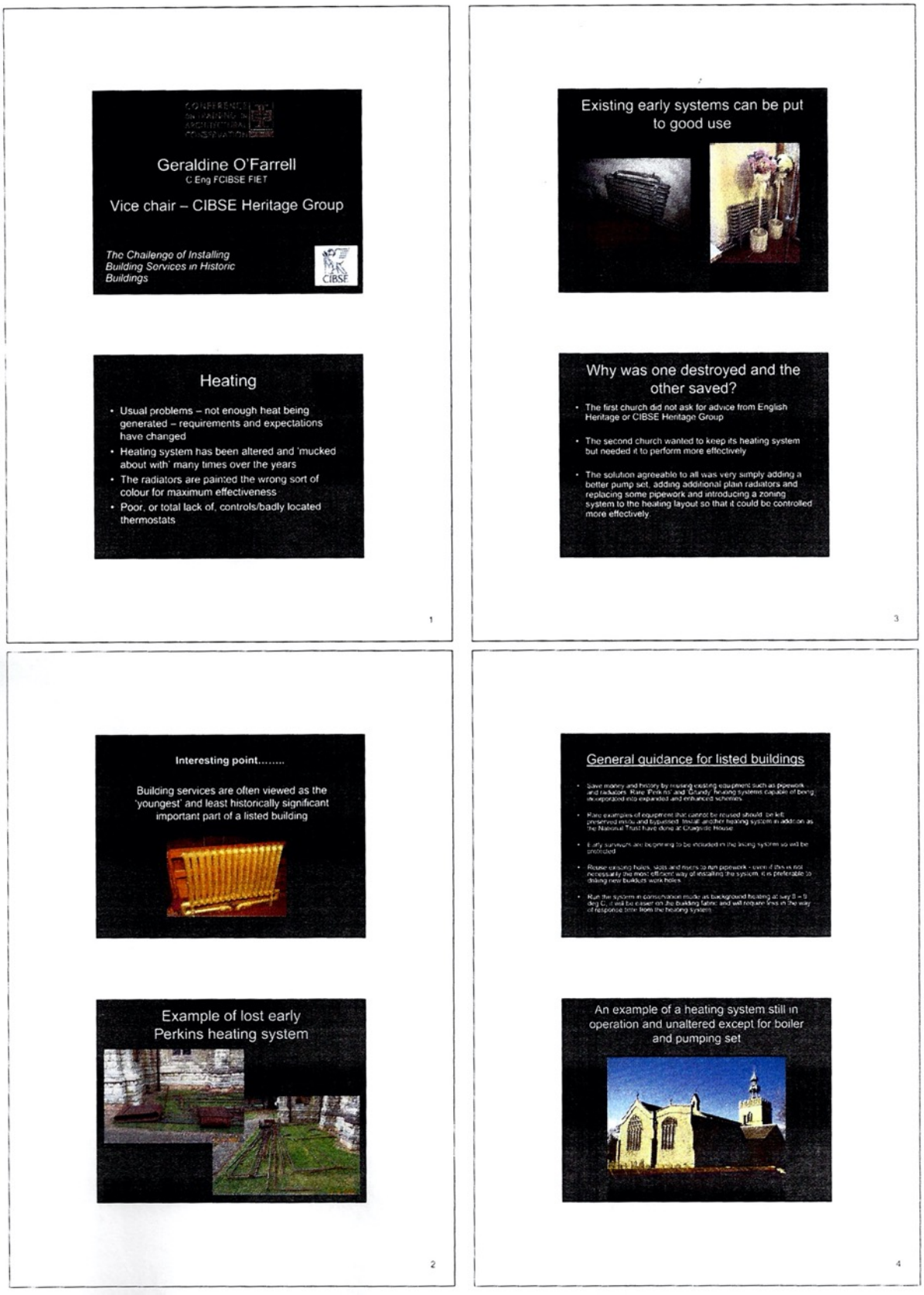
The Challenge of Installing Building Services in Historic Buildings

Geraldine O'Farrell CEng FCIBSE FIET
Senior Building Services Engineer, English Heritage



Shipdam, Norfolk

Other examples

5

Lighting

- If a listed building has no use then it will fall into decay, modern building use requires modern lighting standards
- This does not necessarily cause conflict, the two can sit in harmony
- Let the new or additional lighting follow the rhythm of the building and the existing lighting – in some cases the heritage light fittings can be upgraded with modern lamps

Lighting has developed more quickly than heating

We have come from candles and oil to gas and electric light

Now we are in the age of the LED which actually could be the listed buildings friend

They operate at lower temperatures and emit no UV. Now they are available in a range of colour temperatures and last up to 35,000 - 50,000 hours

They also come in shapes and sizes that mimic their predecessor the 'light bulb'

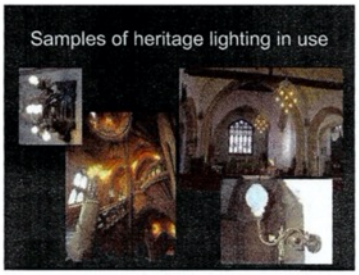
6

LED replacements for tungsten candle lamps

LED replacements for GLS lamps

7

Samples of heritage lighting in use



Supplementing existing lighting

8

Available guidance

Rules of engagement

- Minimum intervention – unless this is followed irreplaceable historic fabric loss will occur
- Where routes for services already exist they must be reused even if they do not provide the optimum route
- Traditional installation methods may have to abandoned and a little lateral thinking take place before solution may be found
- You may find that small items such as light fittings may have to mounted on a pattress to ensure that fixings can be obtained in mortar joints rather than into brick or stonework, making all fixings totally reversible and therefore leaving no permanent scarring
- When carrying out work in a heritage building use this as an opportunity for a survey of the as often there are no records plans

9

Thank you

Any questions??

11

Decision making flow chart

My Alter-ego?

I am Senior Building Services Engineer for

English Heritage

I am part of a small team, expressly employed to help you with any issues concerning building services and your heritage building stock

10

Lessons to be Learnt from the Bath Experience, Maintain our Heritage

George Allan MA(Cantab) GradDiplCons(AA)
Maintain our Heritage

Abstract

Between June 2002 and October 2003, Maintain our Heritage piloted a preventive maintenance and inspection service for listed buildings in Bath, Somerset, funded by charities and EH. This was inspired by the "Monumentenwacht" in the Netherlands. The intention was to establish whether a similar service could work in the UK. Craftsmen and building surveyors visited a total of 72 buildings and gave close attention to all aspects of their external envelope. Gutter-clearing and minor, urgent repairs were carried out on the spot, when feasible. The inspectors wrote a detailed report with photographs which was then reviewed by a chartered surveyor and later explained in person to the owner. The lessons from this scheme are that:

a) There are no insuperable technical issues in providing such a system, although access was a constant problem;
b) Routine inspection and maintenance can realise major savings in fabric and cost;
c) Few owners of listed buildings are willing to pay the economic cost of such visits;
d) Concerns about professional qualifications and indemnity insurance were overcome but might not be again now.

Maintain's subsequent research programme, "Maintaining Value" (2002-2004) fully explored these issues at a national level and set out an agenda for action. This (and an assessment) is available on the organisation's web site at: www.maintainourheritage.co.uk

The Bath scheme nevertheless discovered a level of demand for preventive maintenance among Churches in the nearby Diocese of Gloucester, and this led directly to the creation of Maintain's significantly more basic "GutterClear" scheme, which has now been running successfully (and now without subsidy) since 2007. This concentrates on inspecting, clearing and testing all above-ground rainwater goods and the reporting of obvious defects. Digital before and after photos are taken and a checklist-style report supplied to the parish and its architect. Maintain is now developing this model with a view to extending it to other Dioceses, and perhaps other building types such as Museums and Galleries which should in principle be aware of the importance of preventive maintenance. Rolling this out to historic buildings in general clearly awaits changes in leadership, culture and taxation of which there are no signs from Government or grant-giving bodies.

Bath © Ingval Maxwell

1

Britain – a nation of building neglecters

- Historic buildings, Schools
- Hospitals, housing
- private homes

Backlogs:

- Schools: £22bn (2011)
- Museums & Galleries: £150m (2004)
- Central Edinburgh: £1.4bn (2010)
- EH: £50m (2010)

Maintain our Heritage

2

The Maintain response

- 1999: Maintain formed
- 2000 – studies of *Monumentenwacht & visit to Bath*
- 2002-03: pilot scheme in Bath

Maintain our Heritage

3

The Bath Pilot Maintenance scheme

- critical areas inspected – notably external envelope, rainwater roofs, roof spaces
- craftsman-led
- gutters cleared; limited on-the-spot repairs
- illustrated report vetted by chartered surveyor, explained in person to building owner
- gave priorities for maintenance work
- 72 buildings inspected
- cost £100-£350

Maintain our Heritage

4

What we learned from Bath

- no insuperable technical issues, though access was a major problem
- routine inspection realises major savings in fabric and cost
- inspections and reports were appreciated by owners but were too detailed
- professional indemnity cover was obtained but might not be available again
- few owners were prepared to pay the economic cost of the inspections
- we needed to find a different approach
- Churches in the area were given a special £50 deal and were keen

Maintain our Heritage

5

What we did Next

- Putting it Off: research 2004
- market research with churchwardens revealed supply & demand side issues
- rainwater: the main issue

Maintain our Heritage

6

GutterClear

- GutterClear:
  - accredits contractors;
  - standardised spec, terms & conditions
  - markets service to parishes & other denominations
- Contractor:
  - quotes price to parish
  - clears all gutters & downpipes
  - reports obvious defects
  - invites architect
- Church:
  - pays contractor ie £300 & VAT

Maintain our Heritage

7

GutterClear in action

- Launched 2007
- 3 contractors; 1 builder
- Approx 25% churches; other DIY or other contractors
- "early bird" grant scheme 2008
- Special measures

Maintain our Heritage

8

Why GutterClear Works

- Makes *preventive* maintenance easier
- Promotes but doesn't subsidise
- Scaleable
- low startup & management costs
- Uses marketing techniques

Maintain our Heritage

9

GutterClear & other schemes

- Diocese of London
- Diocese of St Edmonsbury & Ipswich: Elix Scheme
- Diocese of Norwich
- Diocese of Chelmsford
- SPAB Maintenance Co-operative scheme

Maintain our Heritage

10

The Future

- change the culture!
- more collective maintenance schemes
- enforce existing rules
- recognition schemes
- early-bird grants
- other ideas:
  - bigger EH/HLF repair grants for well-maintained buildings
  - a duty of care
  - US- style minimum maintenance codes

Maintain our Heritage

11

A Reminder from History?

"Rain is always prepared to wreak mischief, and never fails to exploit even the least opening to do some harm:

by its subtlety it infiltrates, by softening it corrupts,

and by its persistence it undermines the whole strength of the building, until it eventually brings ruin and destruction on the entire work."

Maintain our Heritage

12

Lessons to be Learnt from Monumentenwacht

Mr Jacques Akerboom
Managing Director, Monumentenwacht Noord-Brabant
Chairman, National Management Board of Monumentenwacht Nederland.

Abstract

The Dutch Monumentenwacht was founded in 1973.

The organisation's key objective is to prevent the decay of the cultural fabric through the implementation of preventive measures. Every year, more than 24,000 listed buildings in the Netherlands are inspected by professionals of the Monumentenwacht. For each inspection a detailed report is issued on the basis of which future maintenance of the historic building by the owner can be facilitated. During these inspections, small-scale repair work might also be carried out by inspectors. Larger-scale maintenance, however, is only carried out by building contractors.

Monumentenwacht has since developed into the largest organisation of its kind in the Netherlands. A great deal of international interest has been shown in the concept over the last few years. In June 2004 Monumentenwacht received the European Nostra / European Union Award for cultural heritage.

Monumentenwacht vehicle, Utrecht © Ingval Maxwell

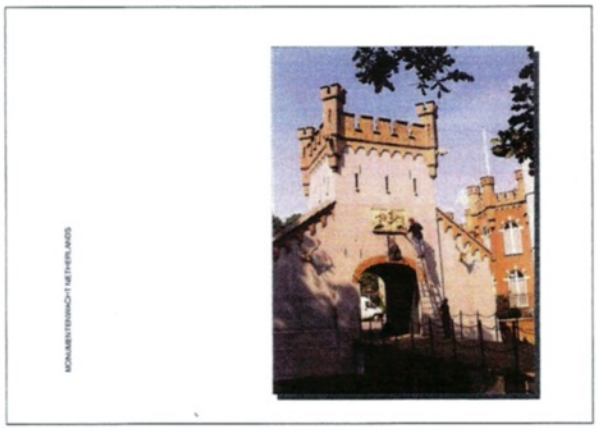
MONUMENTENWACHT IN THE NETHERLANDS

FROM RESTORATION TO PREVENTIVE MAINTENANCE

- THE PROTECTION OF CULTURAL HERITAGE IN THE NETHERLANDS
- MONUMENTENWACHT: DEVELOPMENT, METHOD, POSITION, ECONOMIC IMPORTANCE

zvefier RIJKSBOUWMEESTER

Nationaal Restauratiefonds

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UTRECHT
GELDERLAND
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ARNHEM
DUITSLAND
Rotterdam
Nijmegen
ZEELAND
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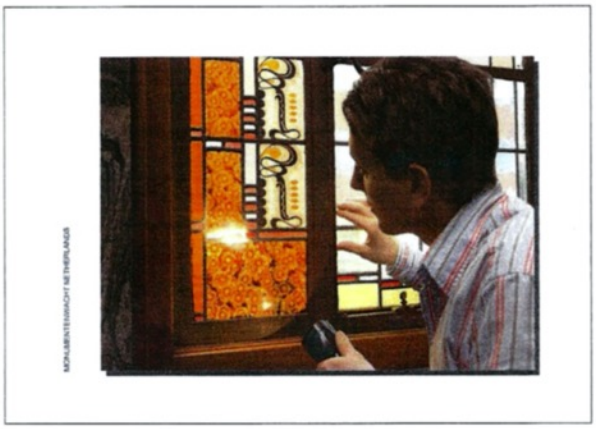
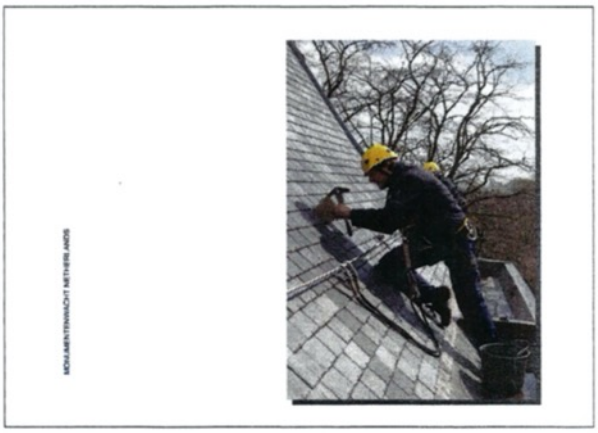
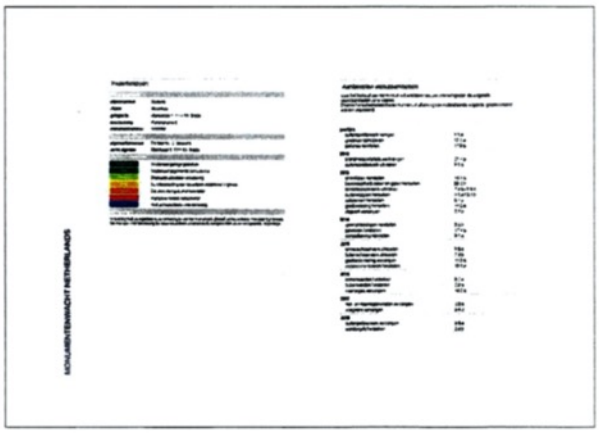
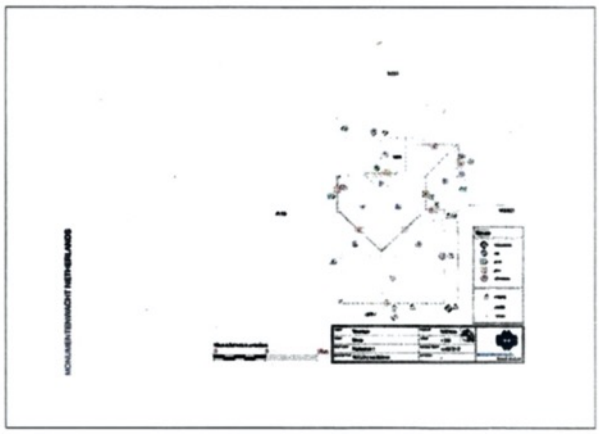
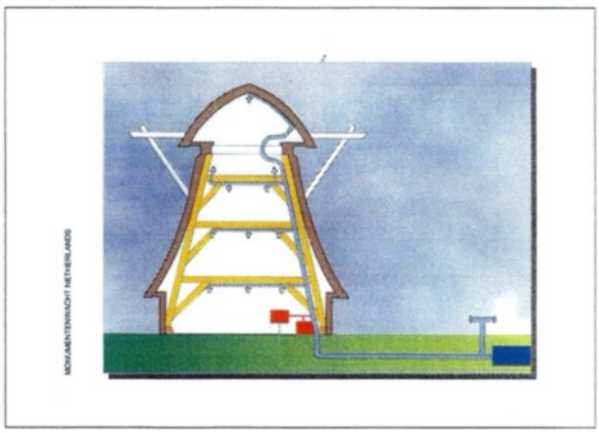
Breda
Tilburg
Eindhoven
Venlo
LIMBURG
BELGIE
FRANKRIJK
MAASTRICHT
50 km

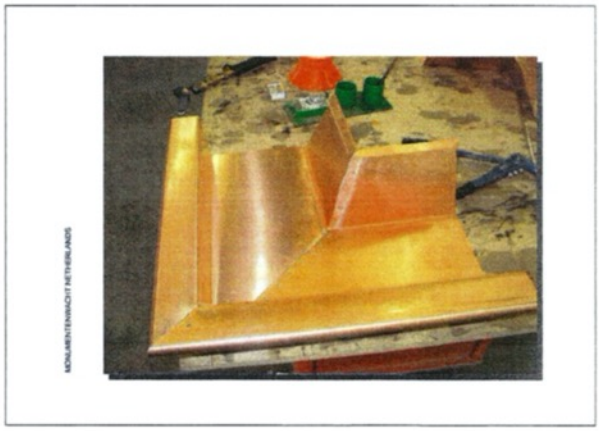




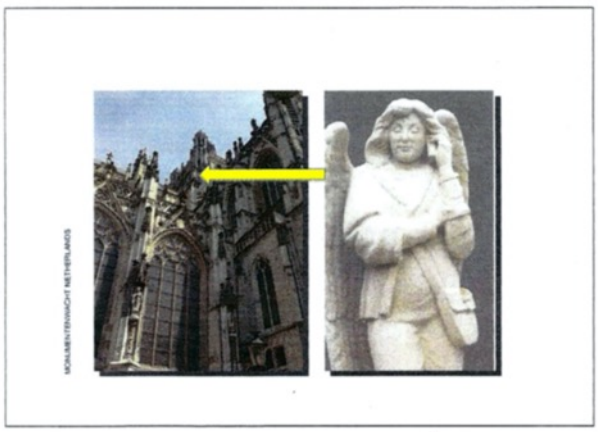


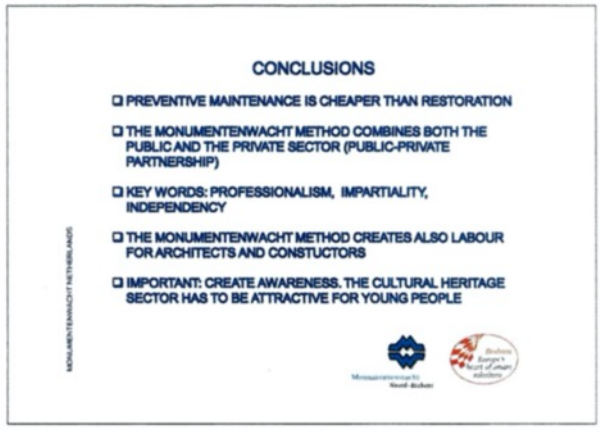


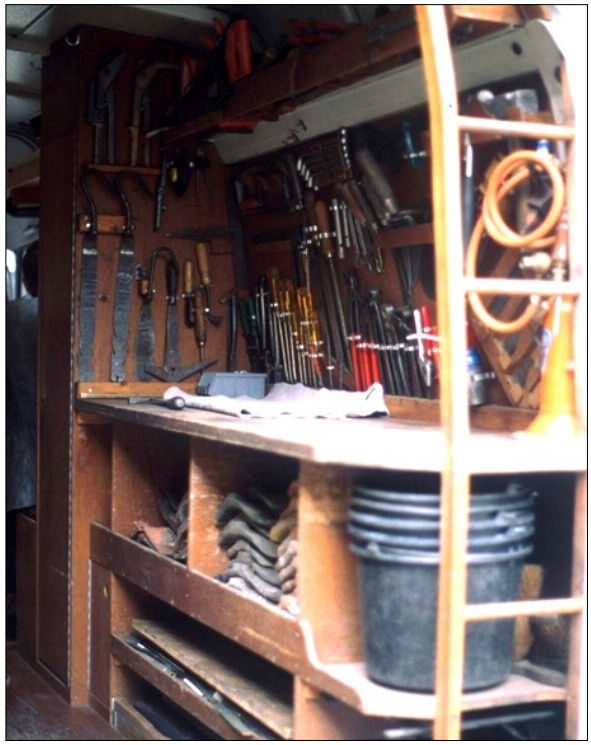





Monumentenwacht
Noord-Brabant







Monumentenwacht vehicle: interior equipment and supplies, Utrecht © Ingval Maxwell

COTAC Conference Visits BRE Garston

The Victorian Terrace

Transforming a Victorian stable block into three energy-efficient terraced homes.

The Victorian Terrace, Garston © Ingval Maxwell

As part of the *rethinking housing refurbishment* project, a disused Victorian stable block at the BRE Watford site has been transformed into three energy efficient terraced homes fit for 21st century living. Now a part of the BRE Innovation Park at Watford, visitors are able to learn about best practice refurbishment including the latest processes, materials and technological advances.

The original stable block, built in 1855 alongside the country house 'Bucknalls' at the centre the site, exhibited all of the problems associated with pre-1919 housing. It had solid (non-cavity) brick walls, rattling single-glazed sash windows, a clay tile roof in poor condition, dampness, disrepair, poor thermal performance - even resident bats (which under changed legislation now require special care and attention).

The design and renovation specification set tough performance targets whilst requiring the original character of the building to be retained. Low carbon materials and intelligent products were incorporated along with a digital communication infrastructure that monitors the condition and performance of the building and provides tele-assisted care for those needing it. The aim is to transform the Energy Performance Certificate rating of the solid wall stable block from a band F building into three separate band A/B units, using the latest innovative products and show how refurbishment can play a major part in reducing the UK's carbon emissions.
The refurbishment energy target is:

- SAP - minimum of 80
- CO2 - ≤35 kg/m2/yr

- Air permeability 7 m3/hour/m2 at 50 pascals or below *(current best practice is 5 m3/hour/m2 at 50 Pascals or below)*
- Energy saving - greater than 60% improvement
- Energy production (conventional) - high efficiency gas condensing boiler with state of the art zone controls
- Energy production (renewables) - at least 10% of energy demand

To provide a convincing demonstration of what can be achieved through refurbishment, it is vital that improvements made to the design, structure, environmental conditions and comfort levels of the Victorian Terrace are measured and documented. In addition to the mandatory investigations required for planning and legal compliance, BRE is undertaking a series of tests that will quantify the difference between pre- and post-refurbishment performance. The Victorian Terrace has been undergoing the first part of a programme of testing. The second phase will include the construction of an extension to the north of the building as well as the development of a dwelling in the existing building to address climate change issues such as flooding, overheating and water resources.

The products and systems being trialled and tested by BRE and its partners will provide evidence of the most efficient and cost effective retrofit solutions. The results will be shared with government, industry and consumers to help drive forward a best-practice retrofit across the country.

The Prince's Natural House

The Prince's House, Garston © Ingval Maxwell

Design:
The Prince's Natural House demonstrates a simple, low-tech and easy to build alternative for volume housebuilders seeking to meet increasingly stringent low carbon targets for new homes. Built in 2011 by The Prince's Foundation for Building Community, the Prince's House is a highly energy efficient structure that nonetheless reflects people's preference for traditionally designed buildings. It is constructed from natural materials, is simple and quick to build and is designed to appeal to an increasingly eco-aware homebuyer.

Key features of The Prince's House include:

- **Natural materials**: the solid walls of the house are made from strong, lightweight clay blocks that have high levels of thermal insulation, but lower embodied energy than conventional bricks. The walls are a single skin of aerated clay blocks with external lime render and internal wood-fibre board providing good insulation. The roof tiles are clay and floors and windows made from FSC certified timber.
- **Ease of manufacture**: the simple construction can be realised with conventional skills but is quicker than traditional brick & block.
- **Versatility and adaptability**: the house can be constructed in a range of architectural forms including paired dwellings, squares and terraces. It can be subdivided to configure a family home, maisonette or smaller flat, reflecting changing demographics and people's needs over the long term.
- **Health and wellbeing**: the use of natural, non-toxic materials provides a healthy environment, promoting air movement without mechanical air-conditioning. A research project is examining the impact of natural materials on air quality, on allergy resistance and on general wellbeing.
- **Materials & Technologies:**
    - Simple construction which can be realised with conventional skills and more quickly than traditional brick and block
    - Solid walls made from strong, lightweight clay blocks by NBT with external lime render, high levels of thermal insulation and lower embodied energy than conventional bricks
    - Wood fibre and sheep wool roof insulation
    - Use of natural, non-toxic materials providing a healthy indoor environment
    - Passive ventilation system that modulates airflow according to the local relative humidity levels
    - Materials sourced with view to maximising end of life recyclability – includes floors and windows made from FSC certified timber and clay roof tiles
    - Organic garden featuring native wildflowers and grasses, fruiting shrubs and trees, herbs, vegetables and horticultural plants that provide amenity, food and medicinal value
    - Wood burning stove with gas boiler

Replica of the Mohne Dam: Scheduled Monument

Mohne Dam Model, Garston © Ingval Maxwell

Constructed in December 1940, the replica of the Mohne Dam in the grounds of the Building Research Establishment at Garston is a unique survival; it is the only test dam to survive from a small number built for the dam destruction experiments at Garston and as such is not only of national but also international importance. It gives testimony to the exhaustive nature of the top secret experimental bombing trials prior to the Dambuster Raid on the Ruhr river dams in Germany. It also illustrates the multiplicity of tasks for which local construction companies as well as national scientific staff could be conscripted into during the course of World War II. The Dambuster Raid is a world famous event. The secret trials prior to the event are, however, not so well known and the Garston replica gives graphic testimony to this lesser known side of the story.

The 1:50 scale replica is some 14 m long and 1 m high with a maximum thickness of 0.6 m at its base. The dam wall holds back a body of water forming a D-shaped pond with a maximum width of 15 m; the stream feeding the dam overflows through the centre of the dam wall into a small drainage channel. The dam wall itself is constructed of over 600,000 miniature mortar cubes with a concrete core; this copies the construction technique used in the real Mohne dam which is made of massive granite blocks with puddled clay to seal the join at its foundations.

The Purpose of Creating the English Housing Survey

Simon Nicol
Group Director Housing, BRE

Abstract

The English Housing Survey is the world's first and longest running survey of housing conditions. The first surveys of 1967 and 1971 were designed to identify the potential for demolition, repair and improvement in England's older, privately owned housing stock. Out of these surveys grew Government policies and programmes towards the Slum Clearance, General Improvement Areas and Housing Action Areas of the 1970's.

The surveys of the 1980's informed the development of Neighbourhood Renewal and Estates Action initiatives, while those of the 1990's informed the Housing Health and Safety Rating System and the Decent Homes standard. The survey was undertaken every 5 years between 1971 and 2001 but has since this time been continuous, now providing annual National Statistics on the housing stock and the people who live in it.

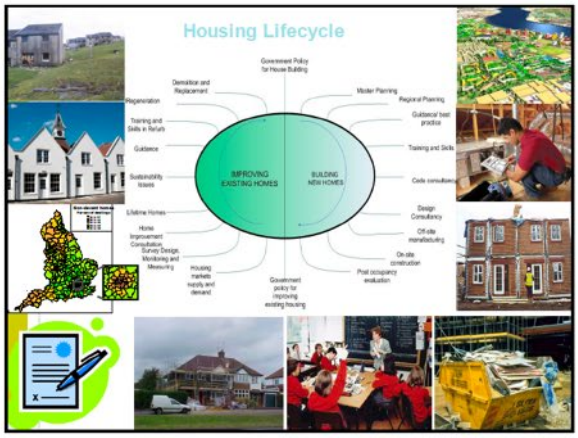
The presentation will discuss some of the latest findings from the survey, show how housing conditions have changed over time, and highlight the substantial amount of work that needs to be undertaken to improve our older housing if we are to make it sustainable for the future.

Newcastle © Ingval Maxwell

bre

BRE: The Purpose of Creating the English Housing Survey

SIMON NICOL
GROUP DIRECTOR
HOUSING



bre The English Housing Survey (EHS)

- Longest running national housing survey (since 1967)
- Owned by **DCLG**, delivered by BRE, ONS, NatCen and MMBL
- **BRE** provides: methodology; survey tools; training; complex data modelling and analysis; reporting; policy support to Government.
- **ONS/NatCen** provides 13,300 household interviews pa.
- **MMBL** provide 6,200 physical inspections pa.

- Key results published annually (DCLG web site)
- Dataset used within and outside government.
- BRE provides similar support to Scottish, Welsh and Northern Ireland surveys.
- **Purpose:** EHS provides the Government with information for the development of housing policies directed at the repair, improvement, and energy efficiency of the housing stock of all tenures.

bre History of the English Housing Survey

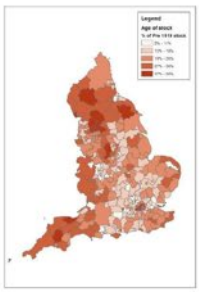
- **1967/1971** EHS – the first audit of conditions in the private sector. Used to inform Slum Clearance potential, unfit homes, Intermediate Grants.
- **1976/1981** – informed private sector renewal programmes, including Group Repair, Enveloping, Housing Action Areas
- **1986/1991** – informed Neighbourhood Renewal Assessment methodology, Mandatory Grants for unfit homes, Estates Renewal.
- **1996/2001** – Informed development of new HHSRS PSR and HRA budgets for local authorities.
- **2002-2012** – New focus on monitoring Decent Homes programme in social housing, Energy Efficiency and Fuel Poverty
- **2012** + Increased focus on performance against energy efficiency targets, carbon emissions, Green Deal

bre Information collected in the EHS

- Age, type, tenure, size, storeys, material, construction
- Amenities and services
- Repair costs
- Improvement costs
- Health, safety and security
- Heating and energy efficiency
- Local environment
- Household composition
- Household income
- Value and equity

bre The English housing stock

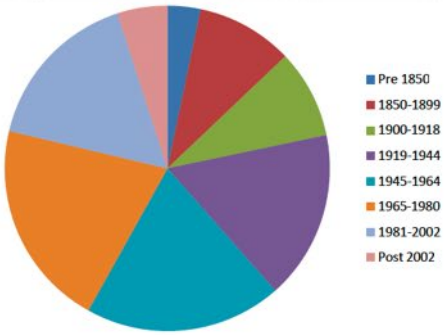
- 22 million homes
- 52 million people
- 50%+ of homes over 50 years old, 22% over 100 years old
- 100,000 new homes provided each year, just 20,000 demolished.
- Homes will have to last 1,000 years at current rates of clearance.
- 99.9% are around from one year to the next



WE ARE STUCK WITH THE HOUSING STOCK WE HAVE GOT SO WE HAD BETTER MAKE THE BEST OF IT!

The English housing stock

Dwelling age: England 2010



5 million pre 1919 homes in England (22% of stock)

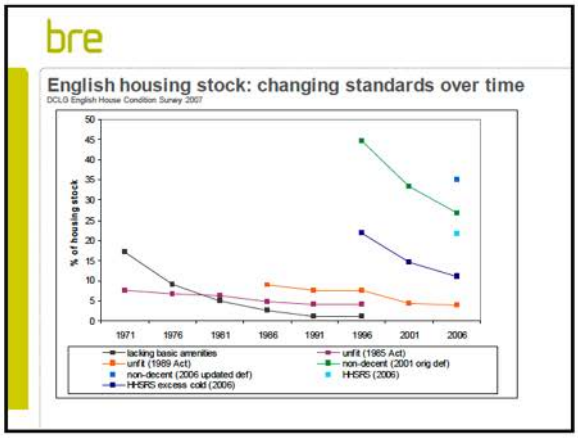
- There are 750,000 historic (pre 1850) homes in England
- Another 2.2 million Victorian homes (1850-1899)
- Another 2.0 million Edwardian homes (1900-1918)

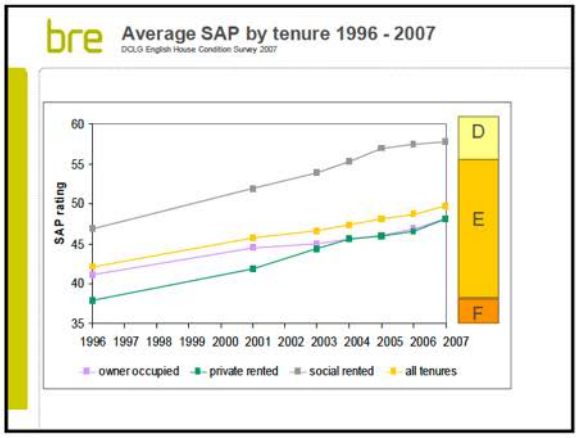
Housing of the future?

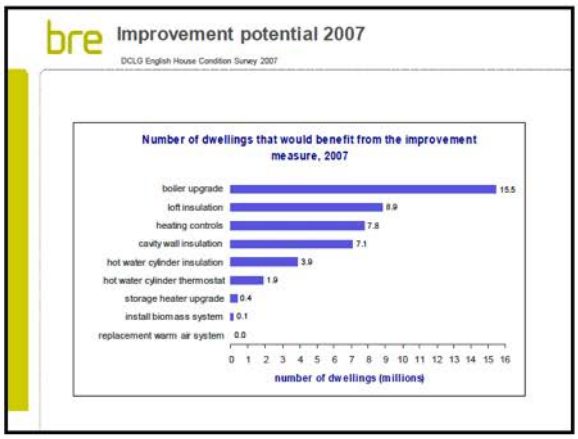


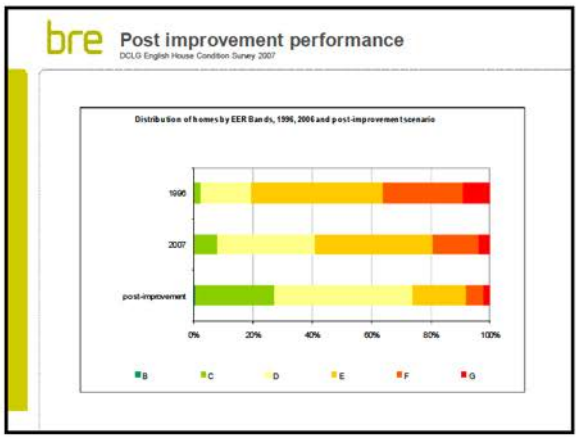

Typical semi' – the house of the future?

Victorian terraced housing


bre
English housing stock: changing standards over time
DCLG English House Condition Survey 2007
% of housing stock
1971 1976 1981 1986 1991 1996 2001 2006
lacking basic amenities
unfit (1989 Act)
non-decent (2006 updated def)
HHSRS excess cold (2006)
unfit (1985 Act)
non-decent (2001 orig def)
HHSRS (2006)


bre
Average SAP by tenure 1996 - 2007
DCLG English House Condition Survey 2007
SAP rating
D
E
F
1996 1997 1998 1999 2000 2001 2002 2003 2004 2005 2006 2007
owner occupied
private rented
social rented
all tenures


bre
Improvement potential 2007
DCLG English House Condition Survey 2007
Number of dwellings that would benefit from the improvement measure, 2007
boiler upgrade 15.5
loft insulation 8.9
heating controls 7.8
cavity wall insulation 7.1
hot water cylinder insulation 3.9
hot water cylinder thermostat 1.9
storage heater upgrade 0.4
install biomass system 0.1
replacement warm air system 0.0
number of dwellings (millions)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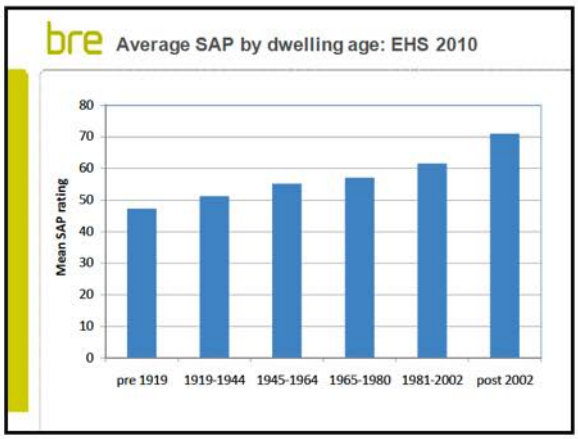
Post improvement performance
DCLG English House Condition Survey 2007
Distribution of homes by EER Bands, 1996, 2006 and post-improvement scenario
1996
2007
post-improvement
B C D E F G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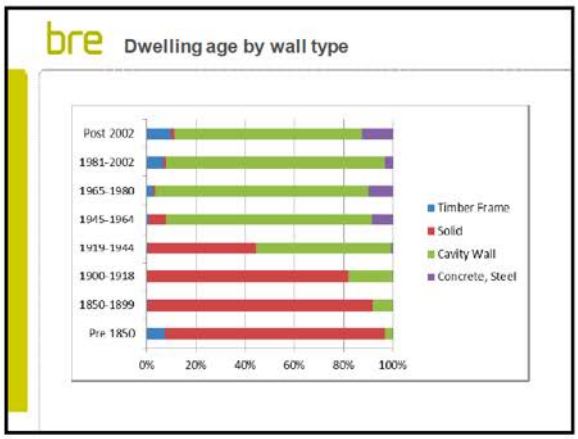
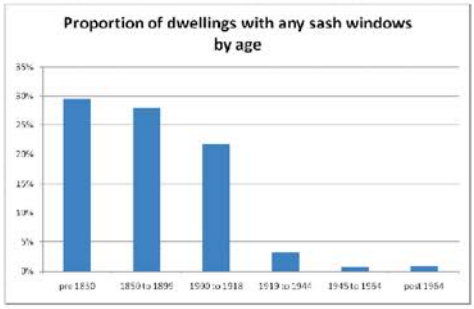
Average SAP by dwelling age: EHS 2010
Mean SAP rating
pre 1919
1919-1944
1945-1964
1965-1980
1981-2002
post 2002


bre
Dwelling age by wall type
Post 2002
1981-2002
1965-1980
1945-1964
1919-1944
1900-1918
1850-1899
Pre 1850
Timber Frame
Solid
Cavity Wall
Concrete, Steel

bre

Proportion of dwellings with any sash windows by age



bre

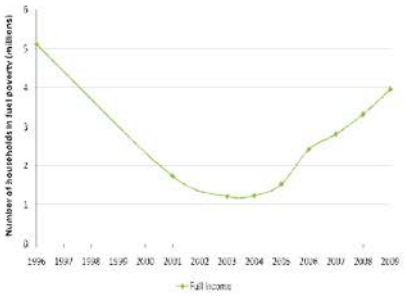
Average basic repair costs by age 2010

Mean basic repairs £

- Pre 1850 £4,208
- 1850-1899 £2,549
- 1900-1918 £2,543
- 1919-1944 £1,847
- 1945-1964 £1,333
- 1965-1980 £757
- 1981-2002 £469
- 2002-2010 £123
- **All ages £1,418**

bre

Fuel Poverty time series



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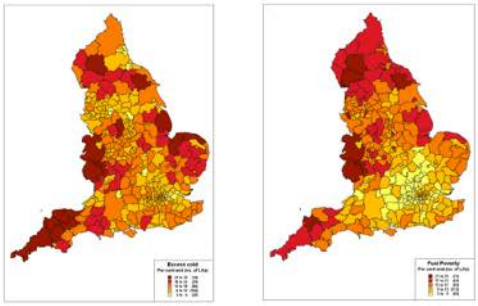
England – energy efficiency vs fuel poverty 2007



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Poor Housing: estimates of costs of remedial work (2006 EHCS)

	No. Cat 1 HHSRS	mean cost	total cost £
falls between levels	332,000	£1,276	£423,715,000
excess cold	2,346,500	£4,994	£11,717,151,475
carbon monoxide	12,000	£1,000	£12,000,000
overcrowding	23,000	£700	£16,100,000
dampness	99,000	£5,000	£495,000,000
electrical problems	15,000	£4,000	£60,000,000
fire	210,000	£1,756	£368,900,000
flames and hot surfaces	98,000	£2,200	£215,551,000
lead	154,000	£8,000	£1,232,000,000
noise	9,000	£4,000	£36,000,000
falls on the level	607,000	£1,050	£634,673,130
domestic hygiene	82,000	£1,400	£114,800,000
radon	96,000	£800	£76,800,000
falls on stairs	1,755,000	£1,084	£1,902,420,000
Personal hygiene	9,000	£1,300	12,000,000
Any	4,752,000	£3,710	£17,644,252,905

- Poor housing (HHSRS Cat 1) is costing the NHS ~£600m pa in treatment costs
- If we include homes with a SAP of <41 in our definition of poor housing, it is costing the NHS ~£1.3bn pa
- Total cost to society could be ~ £3bn pa.

bre

Case study: the cost-benefit of energy improvements

Before: solid, un-insulated stone walls, partial double glazing, small amount of roof insulation, off peak storage radiators, electric immersion heater. Occupied by pensioner.

- Cost of upgrade = £0
- SAP = 22
- Annual fuel cost = £965
- Household in fuel poverty
- CO2 emissions = 8,972 kg pa
- HHSRS Band = A

After: condensing gas boiler and radiators for space and water heating, top-up loft insulation, full double glazing. Same occupant.

- Cost of upgrade = £3,528
- SAP = 59
- Annual fuel cost = £461
- Household not in fuel poverty
- CO2 emissions = 4,666 kg pa
- HHSRS Band F
- Cost savings to NHS pa = £528
- Payback to NHS = 5.1 years

bre

BRE Victorian Terrace (House 2)

SAP before = **41**

SAP after = **83**

Work includes:

- Internal insulation (front)
- External insulation (rear)
- Floor insulation
- Loft insulation
- MVHR unit
- Condensing boiler
- Double glazing

The Scottish House Condition Survey and Maintenance Needs

Jamie Robertson
Sustainable Place and Housing Analysis Team, The Scottish Government

The Scottish House Condition Survey (SHCS) collects detailed information on the state of repair of most aspects of surveyed buildings. This includes the extent of disrepair and urgency for elements critical to the building's continued weather-proofing. Failure of these elements can lead to continued degradation of the building fabric and lead to escalating costs for householders.

The Housing Quality Analysis Team at the Scottish Government, working with Historic Scotland, set out to condense detailed information from disrepair into a meaningful metric and index identifying danger and extent of critical element disrepair. In this presentation we set out the formation of the metric, the building elements examined and patterns uncovered in the Scottish housing stock.

Lower Largo, Fife © Ingval Maxwell

Dwelling Hazard from Disrepair

Jamie Robertson
Sustainable Place and Housing Quality Analysis
Communities Analytical Services

The Scottish Government

1

Dwelling Hazard Assessment

Scottish Government National Outcomes

*"We value and enjoy our built and natural environment and **protect it and enhance it for future generations**"*

The Scottish Government

2

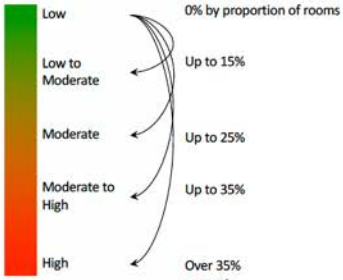
Scottish House Conditions Survey

Surveyed Element	Critical Element	Hazardous Element
hall floor structure		
hall floor finish		
dry/wet rot		
internal walls/partition		
(common) party wall(s)		
(common) access balcony etc		
(common) doors,screens etc		
roof structure		
roof covering		
chimney stacks		
flashings and edges		
roof gutters/downpipes		
external wall structure/finish		
foundations		
damp proof course		
dwelling external doors		
windows to dwelling		
TS: dwelling structurally stable?		

The Scottish Government

3

Dwelling Hazard Indicator



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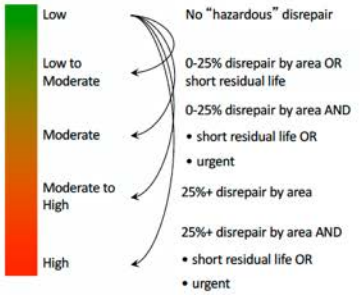
Dwelling Hazard Indicator



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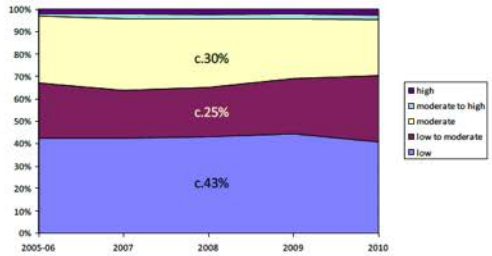
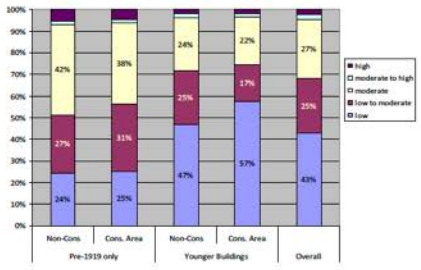
Dwelling Hazard Over Time



The Scottish Government

6

Stock Profile - Age Dependence



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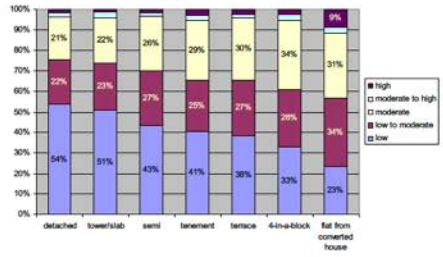
Stock Profile - Dwelling Types



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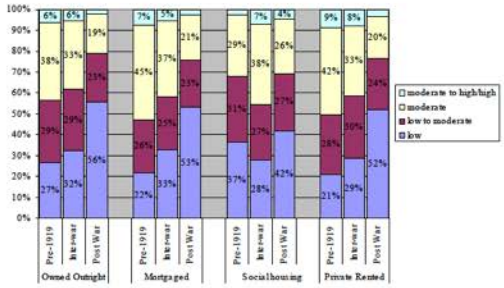
8

Stock Profile - Tenure

The Scottish Government

9

Stock Profile - Tenure



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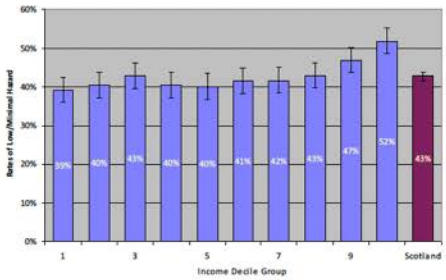
10

Stock Profile - Income Groups



The Scottish Government

11

Repairs – Types & Spending

Critical	Other fabric	Home Improvements	Energy
Foundations Structure Repair/replace roof Timber treatments (damp/rot/woodworm) Wall structure/render External timber Gutters/downpipes Damp proof course Chimney stack Replace windows/doors Floor joists or boards	Basic internal repairs Internal plasterwork Service connections Partial demolition/ remove storeys	Loft or attic conversion Refit bathroom Refit kitchen Conservatory/porch or extension Install additional bathroom Repaint doors/windows Other miscellaneous	Install/improve loft insulation Install/improve wall insulation Install/replace CH system Install/replace secondary heating system

Repairs Made	Average Spend	Share of Households
None (maintenance)	£1,000 +/- £150	58%
Critical Element Repair Only	£2,600 +/- £350	8%
Critical Element and Other Repair or Improvement	£12,500 +/- £2,100	11%
Other Repair or Improvement	£4,200 +/- £350	24%

The Scottish Government

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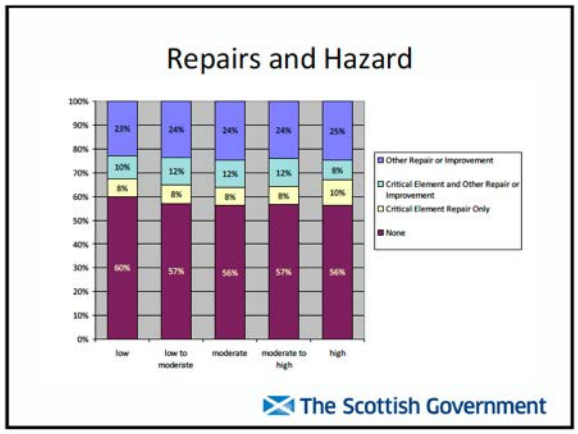

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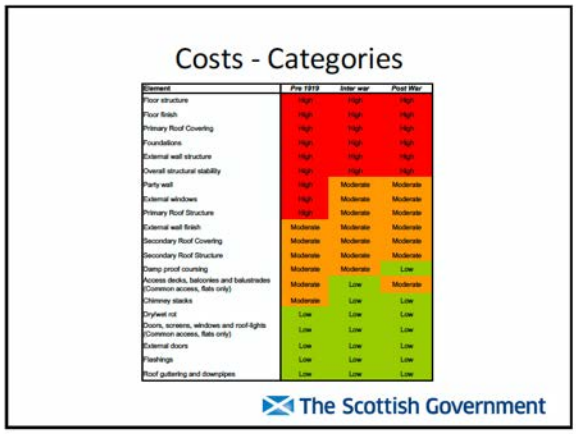

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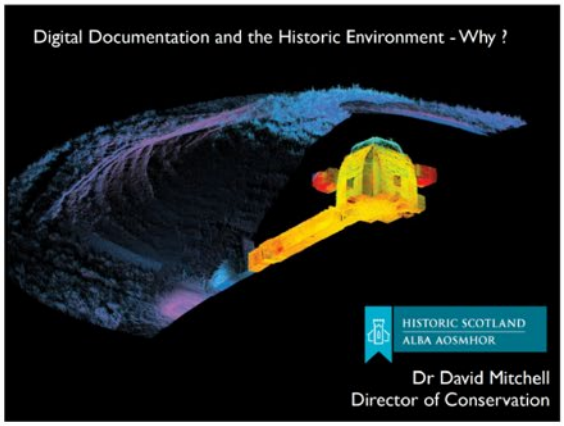
Stomness, Orkney © Ingval Maxwell

Digital Documentation and the Historic Environment - Why?

David Mitchell
Director of Conservation, Historic Scotland



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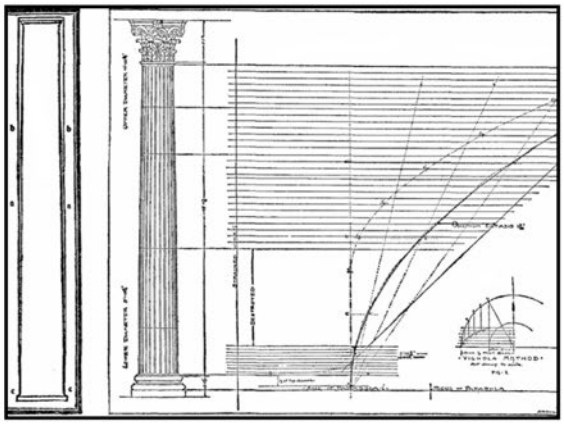

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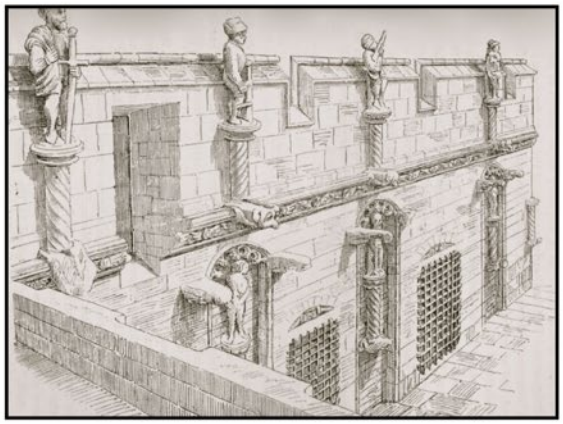

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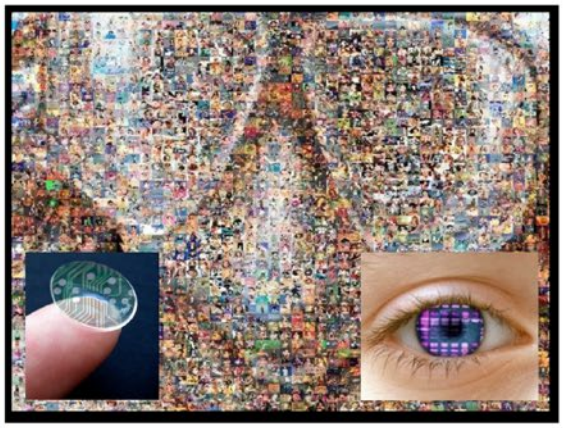

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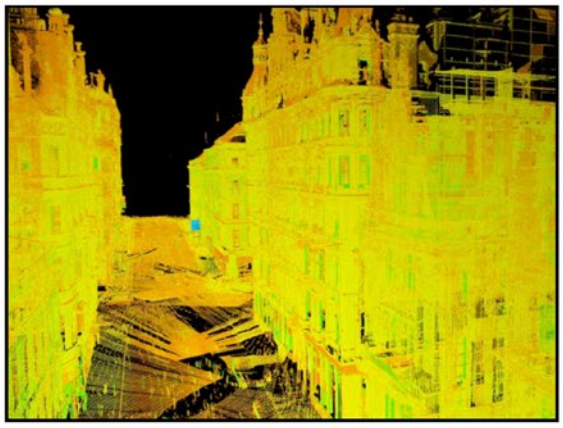

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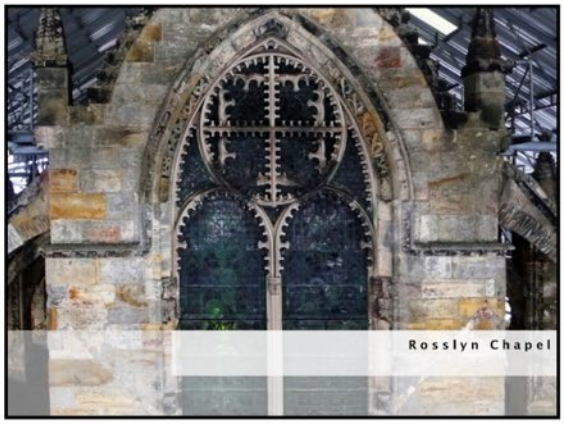

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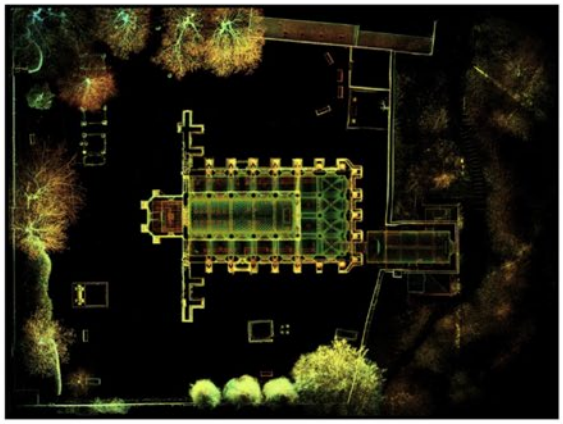

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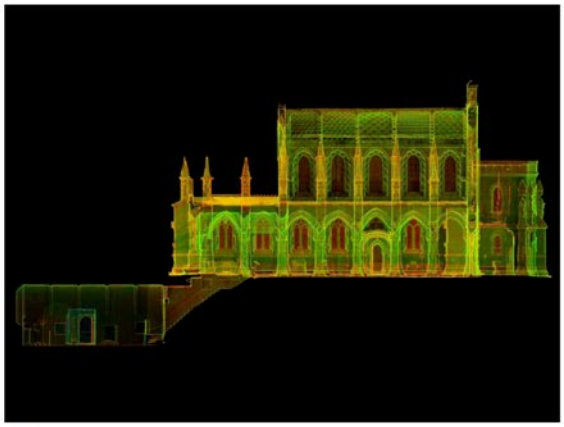

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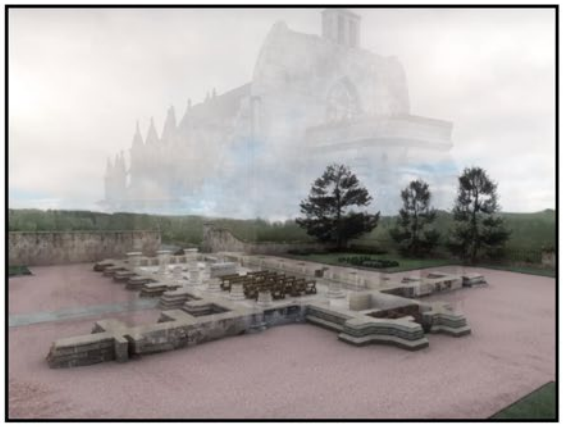

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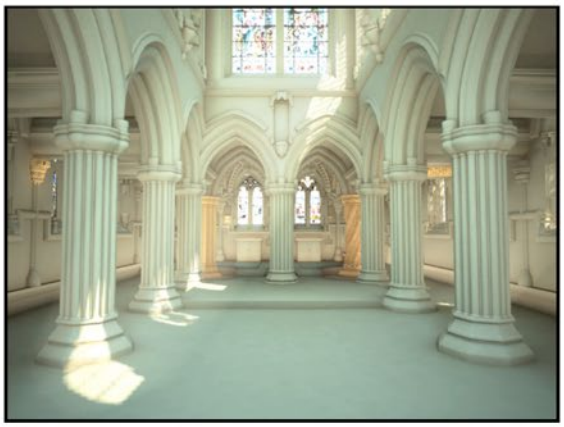

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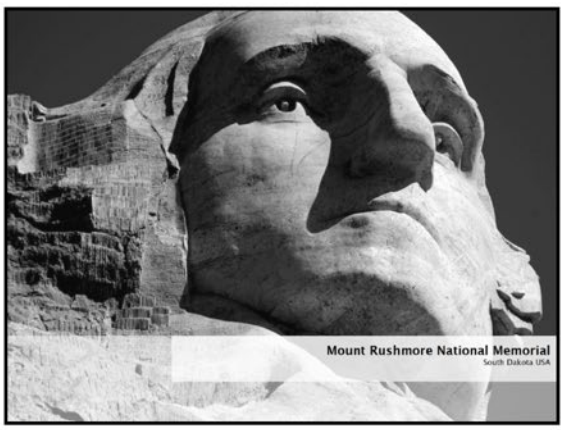

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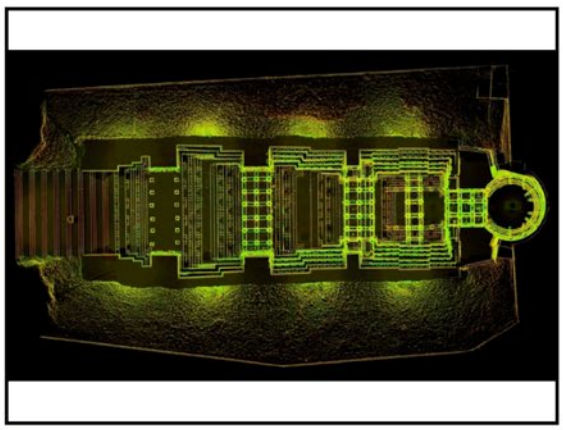

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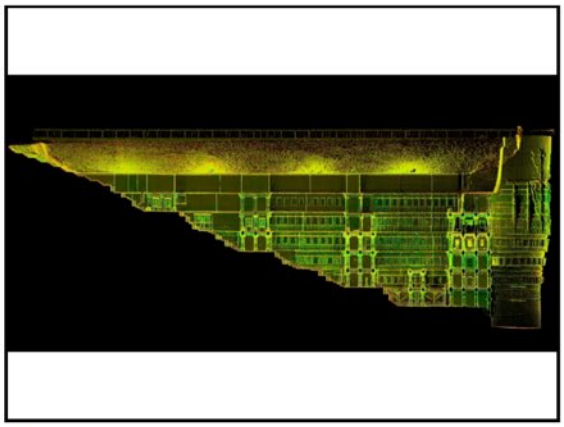

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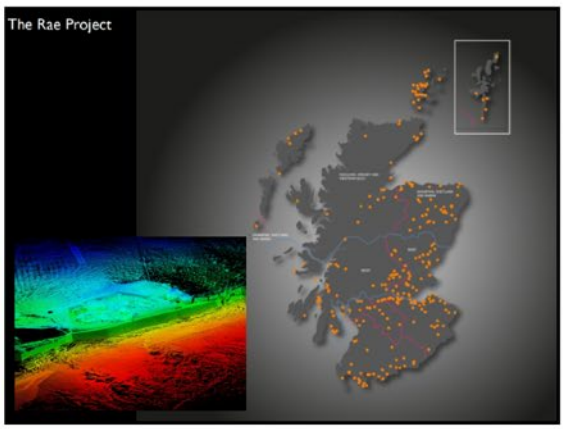

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EU-CHIC FP7 Project: European Union - Cultural Heritage Identity Card

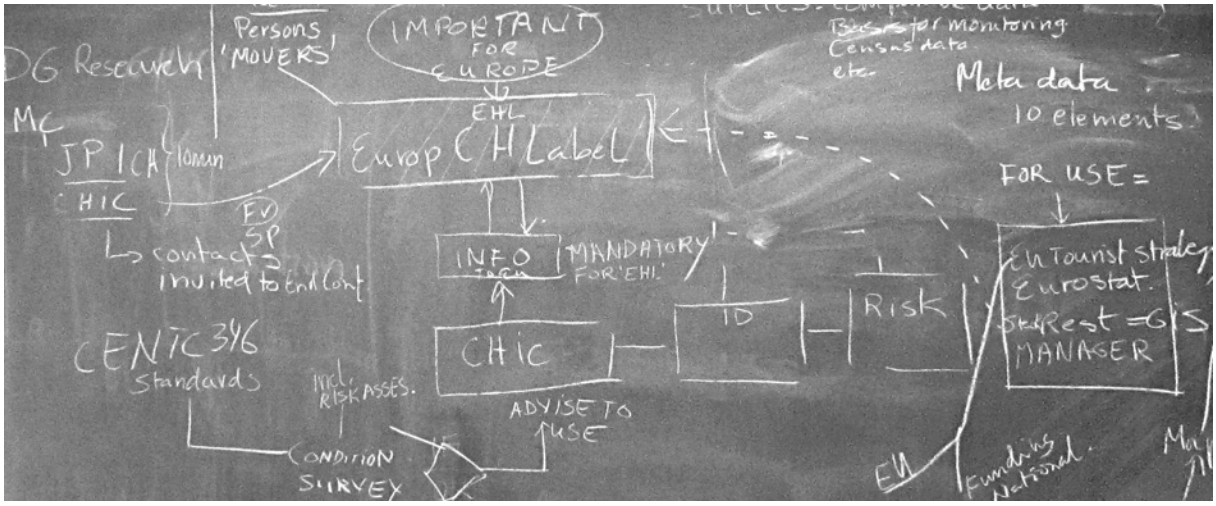
Professor Roko Žarnić
Faculty of Civil and Geodetic Engineering, University of Ljubljana, Slovenia

Abstract
The Coordinated Action EU Cultural Heritage Identity Card« (EU-CHIC) proposes a strategy and most efficient methods and tools for harmonisation of criteria and indicators to be addressed for tracking environmental changes and human interventions on the tangible cultural heritage buildings and assets across European and neighbouring countries. Main objective of the EU-CHIC is to develop and test guidelines, needed for efficient compilation and storage of data, pertinent to each monument under observation. The system of EU-CHIC supports sustainable maintenance, preventive conservation and rehabilitation of historic sites and monuments.

Main tasks of the action are to:

- Review and document current methodologies and tools for data collection and assessment,
- Support development of criteria and indicators for risk assessment,
- Develop guidelines for future development of methods and tools for collection and storing of data, required for evaluation of time-varying changes of heritage assets, and
- Consolidate recommendations and strategies, adjusted to the particular needs and heritage preservation strategies in different European and neighbouring countries.

The consortium consists of 12 partners from 11 countries, which are: Slovenia, Austria, Belgium, Croatia, Czech Republic, Germany, Greece, Israel, Italy, Poland, and Spain. It coordinates activities at national and international level. A significant aim of the EU-CHIC action is to stimulate and/or assist the creation of new initiatives for regular monitoring and inspections of historic buildings and monuments, which could be in a way similar to those implemented by the organisation “Monumentenwacht” in the Netherlands and in the Flanders Region of Belgium. Initiatives are to be set up in countries and regions of the project beneficiaries, with guidance and support of the project Advisory Network and Advisory Committee.



Protection of Cultural Heritage from Natural and Man-made Disasters

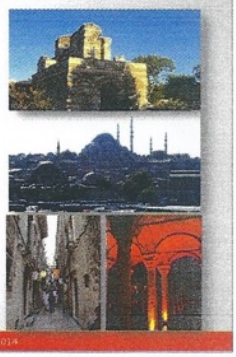
EU-CHIC - EUROPEAN CULTURAL HERITAGE IDENTITY CARD

Roko Žarnić,
University of Ljubljana, Slovenia

Protection of Cultural Heritage from Natural and Man-made Disasters

Challenges of Cultural Heritage

- Preservation
- Rehabilitation
- Integration in urban and natural environment
- Increase of life quality
- Economic promotion
- Multicultural tolerance
- Spreading of awareness
- Knowledge transfer
- .....



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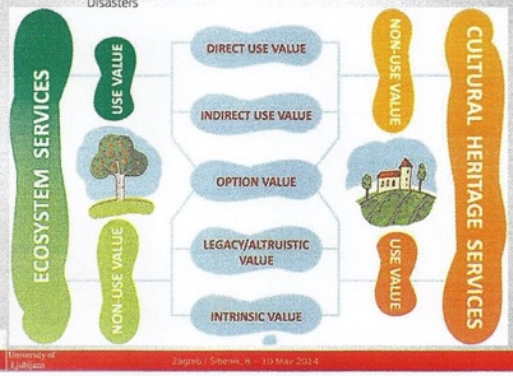
Cultural Heritage Services



Protection of Cultural Heritage from Natural and Man-made Disasters

Ecosystem vs. CH Services

DIRECT USE VALUE		USE VALUE
Market value resulting from direct usability of environment products such as raw materials and food	Economic value resulting from direct exploitation of cultural heritage asset such as touristic destination and event site	
INDIRECT USE VALUE		
Value derived from direct ecosystem services such as environmental self-regulation and flood control	Value derived from cultural heritage as a basis for development of economy in wider sense (creative industry, etc.)	
OPTION VALUE		NON-USE VALUE
Future value derived from a complete, healthy environment such as genetic resources.	Future value derived from preserved cultural heritage as a basis for development of society learning from the historic experiences.	
LEGACY/ALTRUISTIC VALUE		
Value of leaving the environment for the rest of humanity and future generations	Value for preserving heritage as a bearer of collective memory and knowledge for the future generations.	
INTRINSIC VALUE		
Satisfaction derived from the existence of nature	Satisfaction derived from the existence of cultural heritage assets and their integration in contemporary cultural landscape.	

Protection of Cultural Heritage from Natural and Man-made Disasters

Major Risks to Heritage Assets (1)

Environmental Risks	
Long-term influences	**Sudden events**
Bio attack	Wind-storm
Climate conditions fluctuations	Fire
Aeolic impact	Flood
Water impact (ground, atmospheric)	Earthquake
Solar radiation	Landslide
Particle matter and aerosols	Avalanche
Long term influences	Tsunami
Geological conditions (global, local)	Volcano

Protection of Cultural Heritage from Natural and Man-made Disasters

Major Risks to Heritage Assets (2)

Anthropogenic - social Risks	
Unintentional influences	**Intentional events**
Economic activities	Vandalism
Accidents	Riots
Improper decisions	Wars

Protection of Cultural Heritage from Natural and Man-made Disasters

Do we have well founded arguments for the implementation of an unified pan-European approach to cultural heritage data management; including the collection, presentation and storage of tangible and intangible material data on each location under observation?

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Better information leads to better cultural heritage management. So...

- How are data currently managed?
- Who are the potential users?

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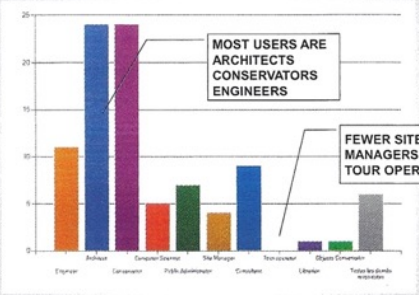
The Potential Users

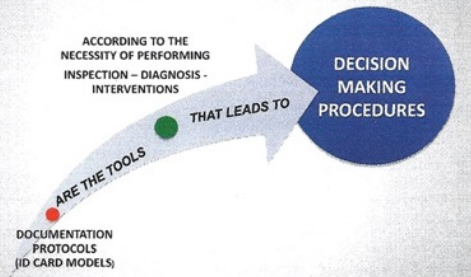


Protection of Cultural Heritage from Natural and Man-made Disasters

- What do governments currently use?
- Who are the professionals and what do they want?
- What are the current research trends?

Protection of Cultural Heritage from Natural and Man-made Disasters

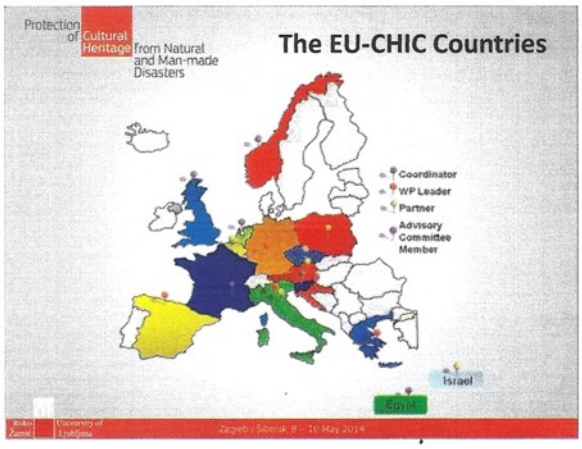
Needs for International Documentation Protocols



Protection of Cultural Heritage from Natural and Man-made Disasters

eu chic
Cultural Heritage
Identity Card

Coordinated Action Call: ENV 2008 3.2.1.
EU Cultural Heritage Identity Card
Starting date: 1. September 2009
Duration 36 months
Coordinator: University of Ljubljana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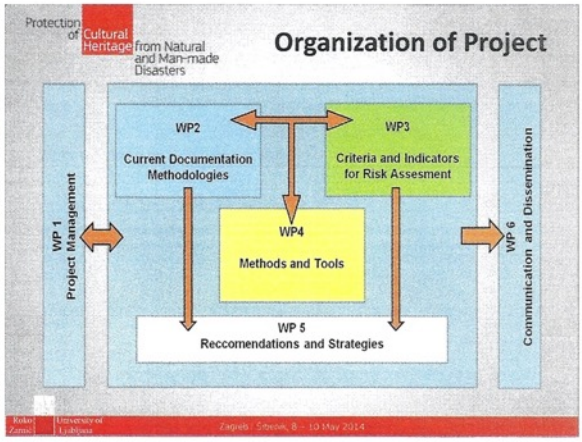
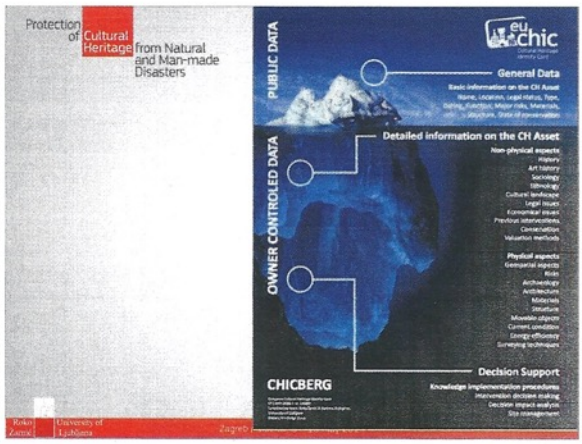
The EU-CHIC Countries
Coordinator
WP Leader
Partner
Advisory Committee Member
Israel
Egypt


Protection of Cultural Heritage from Natural and Man-made Disasters
The Idea of EU CHIC
The »European Cultural Heritage Identity Card« (EU CHIC) will introduce a proposal for systematic collection and storage of data on the immovable heritage objects across European and neighboring countries. The main objective is to develop and test the guidelines needed for the efficient compilation of the data pertinent to each monument under observation


Protection of Cultural Heritage from Natural and Man-made Disasters
Initial EU CHIC Topics
PHOTOGRAPHIC SURVEY
Relevant for the state of the art, it enables easy reconnaissance of heritage and follow its evolution during the time
HISTORY
A complete overview of the whole history of the building, from its naissance till nowadays
STRUCTURE
Investigation of the structure, including structural problems
LEVEL OF CONSERVATION
Indication of the current state, including the analysis of pathologies
KNOWLEDGE MANAGEMENT
A correct knowledge of the monument to have a clear idea of the whole fields in order to choose the correct intervention and preservation strategies
RISKS
Risks analysis relevant for safe and security aspects by monitoring the heritage
GUIDELINES
Protocol to follow the correct analysis and interventions that should be made for its proper maintenance
MATERIALS
Characteristics of the materials and typologies, strictly related to history
RESTORATION WORKS
All the interventions, to easily identify the previous works and the additions


Protection of Cultural Heritage from Natural and Man-made Disasters
Organization of Project
WP 1
Project Management
WP2
Current Documentation Methodologies
WP3
Criteria and Indicators for Risk Assesment
WP4
Methods and Tools
WP 5
Reccomendations and Strategies
WP 6
Communication and Dissemination


Protection of Cultural Heritage from Natural and Man-made Disasters
Clustering: Synergy of Research Efforts and Results
SHOOWS
perpetuate
3encult
COOPERATION
Climate for Culture
eu chic
Cultural Heritage Identity Card


Protection of Cultural Heritage from Natural and Man-made Disasters
PUBLIC DATA
eu chic
General Data
OWNER CONTROLED DATA
Detailed information on the CH Asset
CHICBERG
Decision Support

Protection of Cultural Heritage from Natural and Man-made Disasters

CHICBERG Levels

General Data: Basic information o cultural heritage asset

Name, location, legal status, type, dating, function, major risks, materials, structure, state of conservation

Detailed Information on the Cultural Heritage Asset

Non-physical Aspects		Physical Aspects	
History	Legal issues	Geospatial aspects	Structure
Art history	Economical issues	Risks	Movable objects
Sociology	Previous interventions	Archaeology	Current condition
Ethnology	Conservation	Architecture	Energy efficiency
Cultural landscape	Valuation methods	Materials	Surveying techniques

Decision Support: Knowledge implementation procedures

Intervention decision making
Decision impact analysis
Site management

Protection of Cultural Heritage from Natural and Man-made Disasters

Implementation of EU CHIC

- Due to high cost of cultural heritage preservation lack of available funds is permanent
- Investments need to be prioritized
- Multi-criteria assessment is a possible approach for decision making

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Cultural Heritage Asset Significance

STATE OF CONSERVATION
Materials
Structure
Previous interventions

RISKS
Social anthropogenic impacts
Long term environmental impacts
Short-term environmental impacts

AESTHETIC
Architectural significance
Integrity
Rarity

SOCIAL
Educational significance
Management significance
Scientific significance

HISTORICAL
Archaeological significance
Authenticity
Technological significance

CULTURAL-SYMBOLIC
Spiritual-religious significance
Novelty
Secular significance

ECONOMIC
Non-use significance
Use significance
Investment significance

ENVIRONMENTAL
Energy efficiency
Landscape significance
Spatial significance

Protection of Cultural Heritage from Natural and Man-made Disasters

Criteria Importance Ranking

- Criteria importance ranking is based on the Analytic Hierarchy Process (AHP method).
- The ongoing research brings together tangible and intangible aspects of cultural heritage.
- Rational determination of relative importance of individual criteria for the assessment of architectural heritage can help decision-makers to identify buildings with higher refurbishment priority.

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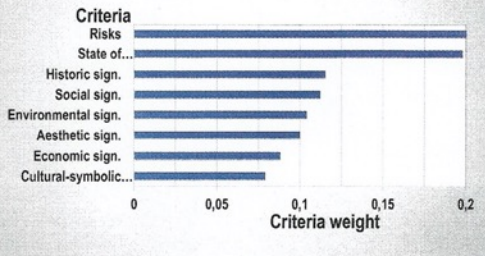
Opinion of Experts

Interviewed 47 experts, 20 disciplines



Protection of Cultural Heritage from Natural and Man-made Disasters

Current and Future Development of EU CHIC

- HISTCAPE - implementation of idea of Cultural Heritage Services
- Marie Curie ITN-DCH - Initial Training Network for Digital Cultural Heritage: Projecting our Past to the Future
- Development of European system for inspection of CH assets (following the Dutch Monumentenwacht model)

Protection of Cultural Heritage from Natural and Man-made Disasters

European Union
European Regional Development Fund

INTERREG IVC

HISTCAPE

HISTorical assets and related landsCAPE

HISTCAPE aims to arrest the decline of historical assets in rural areas. It plans to do this by developing sustainable management solutions to help responsible bodies develop a more dynamic view of cultural heritage assets.

Roko Zarnić | University of Ljubljana | Zagreb / Sisak, 8 – 10 May 2014

Protection of Cultural Heritage from Natural and Man-made Disasters

EU CHIC and Cultural Landscape

- Application of EU CHIC to Cultural Landscape and introduction of idea of integration of Ecosystem Services and Cultural Heritage Services
- Case study of Kozjansko Regional Park

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European System for Inspection of CH Assets

Following the EU-CHIC model and experiences of Dutch inspection system Monumentenwacht, the European network for development of European System taking into account needs and specific of every partnering country will be developed.

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Active Portal www.eu-chic.eu

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Public Deliverables

- "EU CHIC" Portal www.eu-chic.eu
- "EU CHIC" Introduction Leaflet
- Printed publication containing
  - Proceedings of Workshop 1 (May 2010)
  - Proceedings of Workshop 2 (July 2011)
  - Proceedings of Final Conference (September 2012)
- "EU CHIC" guidelines in 13 languages (available on web)
- "EU CHIC" 1st level Data Sheet template (in English)
- Final "EU CHIC" Report (available on web)
- "EU CHIC" Final Leaflet
- Set of papers in Journals and Conference Proceedings

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Protection of Cultural Heritage from Natural and Man-made Disasters

Current State of Data Collecting

- Guidelines in 13 languages
  - Arab, Croatian, Czech, English, French, German, Greek, Hebrew, Italian, Polish, Russian, Slovenian, Spanish
- Data collection template for Level 1 in English
- General Data of 14 cases from CHIC countries
- Open call for joining to data collecting through EU CHIC administrating

Roko Zarnić | University of Ljubljana | Zagreb / Sisak, 8 – 10 May 2014

COTAC Conference Resolution

Emerging from the concluding discussion session, and with regard to the traditional building stock, COTAC welcomes the Resolution need for:

- Wider recognition of the need for comprehensive information as the basis for improving the health of the UK's stock of 6 million properties
- Initiatives leading to an integrated approach to information gathering, storage and usage as espoused by the BIM initiative
- The potential to extrapolate that information into determining future building material and craft skill requirements
- The potential of modern recording technologies to assist in the training and education needs of the professions and industry

A plethora of basic and various craft needs requiring attention © Ingval Maxwell

Participant Biographies in Programme Order

Speakers

Annette McGill

buildings and facilities issues in the voluntary sector. She specialises in developing educational materials, training and resources for people involved in building care. After working in publishing and journalism, she joined the Building Conservation Trust at Hampton Court Palace as Training Director. In 1996 she became Chief Executive of the charity Upkeep, where she developed teaching materials and training courses about property care, including a City & Guilds Certificate for Repairs which has been completed by over 1,000 people.

In 2000 she founded the Charities Facilities Management Group, the first national network for people looking after buildings and facilities issues in the voluntary sector. She writes a monthly newsletter for Charity Facilities Management which goes out to 250 member-organisations and is currently managing a comparative study of members' procurement costs.

Geraldine O'Farrell CEng FCIBSE FIET

Originally a contracting engineer, turned design consultant I am a member of a small team of highly-specialised, chartered building services engineers working in the field of historic listed buildings and scheduled monuments for English Heritage. Also I am an associate tutor with the College of Estate Management at Reading, involved in teaching and supervising MSc students studying on the Conservation of the Historic Environment course. In addition I am a board member of The Chartered Institution of Building Services Engineers and services advisor to the Oxford Diocesan Advisory Committee and the Fabric Committees of both Gloucester and Liverpool Anglican Cathedrals.

George Allan MA(Cantab) GradDiplCons(AA)

George Allan was one of the founder members of the campaign group Maintain our Heritage, which he now chairs. He is a commercial solicitor, but a campaigning conservationist from student days in Kent and in London, where he lives, George particularly likes hands-on maintenance activities and is a volunteer maintenance helper at the massive Union Chapel in Islington and has a close interest in all aspects of rainwater management, and his Architectural Association thesis was on 'Rainwater and the Conservation of Historic Buildings'. He is also a councillor in Islington and serves on its planning committees.

Maintain our Heritage is a non-profit organisation formed in 1998 by a group of conservation campaigners to try to reverse the culture of neglect that surrounds our historic buildings and to learn from experience elsewhere. Since then it has devoted itself to research and practical demonstration projects designed to test new approaches. The Bath pilot scheme was the first and George has been actively involved in the setting up and operation of the subsequent 'GutterClear' scheme in the Diocese of Gloucester.

Jacques Akerboom

Jacques is the director of Monumentenwacht Noord-Brabant and represents the Netherlands Monumentenwacht organization in international affairs. He studied Public Policy in Tilburg. Prior to being appointed to his current position he worked as building conservation policy officer for the provincial authorities in Noord-Brabant. He also participates in many national and international organizations and working groups involved in the protection of cultural heritage. He has published books and articles about cultural heritage and is editor-in-chief of Monumenten, the largest Dutch language circulation magazine on the subject.

Internationally, he is a member of the secretariat of EHLF (European Heritage Legal Forum), the successor of the ECHO working group. He was coordinator of working group 1 of FACH (Focus Area Cultural Heritage) of the ECTP (European Construction Technology Platform). He was Dutch representative in the COST action C17 (Build Heritage: Fire Loss to Historic Buildings). He was member of the Council of Europa Nostra and also member of the scientific committee of the Como conference 2009: 'Planned Conservation of XXth century architectural heritage: a review of policies and practices. He is also member of the Advisory Committee of the European project EU CHIC (European Heritage Identity Card) and a member of the secretariat of the working group for EU legislation and cultural heritage.

Simon Nicol

Simon Nicol is Director of the Housing and Energy Group at BRE. The Group has some 60 professional staff who undertake research and consultancy on the condition, performance and energy efficiency of the building stock. Simon first joined BRE in 1978 as a scientific civil servant in what was then the Urban Planning Division.

He moved to the former DOE in 1987 where he spent 11 years as a senior/principal research officer supporting the development and implementation of government housing policy. He re-joined the newly privatised BRE in 1998 to head the Housing Stock Research team, which has continued to grow in size and capability.

Simon is perhaps best known for his work on the English Housing Survey, for which BRE has been the development partner to the government (currently DCLG) for over 30 years, and which provides data on decent homes, domestic energy efficiency, housing health and safety and fuel poverty, amongst other measures. Simon is a widely published expert on housing conditions, housing and health, and housing survey measurement tools.

Jamie Robertson

I have worked in the Sustainable Place and Housing Analysis Team in the Scottish Government for almost two years. I lead the analysis for the forthcoming 2011 SHCS Key Findings Report and was the co-author and analytical lead in the Scottish Government's recent Fuel Poverty Evidence Review.

David Mitchell

David joined Historic Scotland in 2002 and was appointed Director of Conservation in 2008. Previously, he was managing director of a private firm of industrial heritage consultants and contractors based in Glasgow for ten years. He is a member of the Institute of Historic Building Conservation and the Institute of Cast Metal Engineers. David has undergraduate and postgraduate degrees in earth sciences and a PhD in Architecture. He is responsible for Delivery of the Scottish Ten project and the Scottish Traditional Building Skills Strategy.

Roko Žarnic

Roko is a Professor of Building Materials at University of Ljubljana, Faculty for Civil and Geodetic Engineering, since 1993. His research background is in earthquake engineering with a particular interests for built heritage preservation, development of structural elements made of advanced materials (laminated glass and FRP) and inelastic computational models for assessment of structures. He joined the University from the position of director general of Slovenian national institute for research in materials and structures where he started his career in 1974.

In 1999 he joined the University of Colorado at Boulder, USA for 6 months as Visiting Scholar granted by the Fulbright Program. In 2006 he joined the EU JRC ELSA Laboratory in Ispra, Italy for 6 months as a national detached expert. From February 2010 until February 2012 he spent on duty of the Minister of Environment and Spatial Planning of Republic of Slovenia.

He was and still is a principal Investigator and coordinator in number of international projects (USA-Yugoslav bilateral projects, EU FP4, FP5, FP6 and FP7), member of Managing Committees of COST TC UCE, COST C5, COST C16 (vice chairman), COST C530, C26, TU 0905 and International Board of EUREKA EUROCARE. He has coordinated EU FP7 project EU CHIC: Cultural Heritage Identity Card (2009-2012) and is a member of two ongoing EU FP7 projects: Climate for Culture and PERPETUATE. He has published over 360 papers and reports. In European Construction Technology Platform he is co-leading the ECTP Focus Area Cultural Heritage and is a coordinator of the Slovenian Construction Technological Platform.

Session Chairs

Session 1: Continuing Use of the Stock

John Taylor MBE MA MSc FCGI

John Taylor is a Cambridge civil engineering graduate and served for 30 years in the Royal Engineers. He commanded the Army's Amphibious Engineer Regiment and subsequently served on the Defence Policy Staff. He was appointed MBE for operational planning in Germany. He took up a second career centred on his long-standing interests in urban planning, architectural conservation and traditional building crafts, and was Chief Executive of the British Urban Regeneration Association for five years. He was appointed by the Carpenters Company, as Director of Building Crafts College from 1997-2007, when he planned the move to its new site alongside the Channel Tunnel Rail Link at Stratford in East London, in 2001. The

College expanded rapidly and achieved national recognition as the Centre of Vocational Excellence in Traditional Building Crafts. He planned a further extension of the College, which opened in 2008.

He was awarded a Masters' Degree in Historic Building Conservation at Bath University in 2002, and appointed a Fellow of the City and Guilds of London Institute in 2003. He is a liveryman of the Carpenters' and the Masons' Companies. In retirement, he continues to serves as Chairman of the Livery Companies' Skills Council, Honorary Secretary of COTAC, and Honorary Treasurer of the National Heritage Training Group. He is a trustee of several charitable bodies, including the City & Guilds of London Arts School and the Construction Youth Trust.

Session 2: Challenges, Gains and Experiences

Henry Russell OBE MA (Cantab) DipBldgCons FRICS FSA IHBC

Henry Russell is a COTAC trustee and course leader of the Conservation of the Historic Environment programme at the College of Estate Management, Reading. Last year he was Parliamentary Liaison Officer for The Heritage Alliance in connection with the Localism Bill and the National Planning Policy Framework. He is now chair of the Alliance's Spatial Planning Advocacy Group, which is currently working on the Penfold Review heritage reforms in the Enterprise and Regulatory Reform Bill, the Green Deal and the wide heritage policy implications of the HS2 rail infrastructure project. He also chairs the Gloucester Diocesan Advisory Committee for the Care of Churches, and is a member of the Church Buildings Council.

Session 3: Information Gathering

Richard Davies DipArch (Hons) RIBA ARB AABC

Richard Davies has been involved with the care and development of the built environment throughout his 30-year architectural career. During 1976-86 he held the posts of Superintending Architect, Regional Director South, Directing Architect and Director of Technical Services in English Heritage and, from 1986-95, was a UK representative to ICCROM (the UNESCO-founded International Centre for the Study, Conservation and Restoration of Cultural Property) where he became a member of the council, and was Chairman of the Academic Advisory Board. In 1993 he established MRDA Architects

He has extensive experience in the refurbishment and redevelopment of culturally sensitive sites and buildings to meet the current and future requirements of modern operations, living and environmental standards. As a partner at MRDA, he has worked on a wide range of listed buildings and scheduled ancient monuments. He has also been appointed architectural and planning advisor in a variety of international projects in the Gambia, Mozambique, China and Nigeria. He regularly lectures, and produces articles on conservation practice and training.
In addition to his work in private practice, he is also:

Chair of the COTAC Trustees
Vice Chairman of the National Heritage Training Group (NHTG)

Principal Architect on the Register of Architects Accredited in Building Conservation (AABC) and member of the AABC assessment panel.

Session 4: Tools for the future

Ingval Maxwell OBE DADun RIBA FRIAS CAABC ACA FSAScot

Ingval Maxwell qualified as an architect in 1969, spending his entire professional career dealing with the conservation of ancient monuments and historic buildings until his retirement from Historic Scotland in 2008. He is a past Chairman of the Scottish Vernacular Buildings Working Group, and past Convener of the Scottish Stone Liaison Group, the Scottish Conservation Forum in Training and Education, and the Scottish Historic Buildings Fire Liaison Group, He represented the UK on the European Commission COST Action C5 programme 'Urban Heritage, Building Maintenance', was initiator and Chairman of the European Science Foundation's COST Action C17 'Fire Loss to Historic Buildings', and a member of the European Construction Technology Platform 'Focus Area Cultural Heritage'.

Currently, he is a member of the RIBA Conservation Register Steering Group; the AHRC/EPSRC Science and Heritage Advisory Group; the Journal of Architectural Conservation Editorial Advisory Board; and an Honorary Member of the ICOMOS International Scientific Committee on Stone. He is also a trustee of the Conference on Training in Architectural Conservation, and the Charles Wallace India Trust; an Advisory Committee Member of Learn Direct and Build, and chairs the Advisory Committee of the EC FP7 European Union Cultural Heritage Identity Card project.