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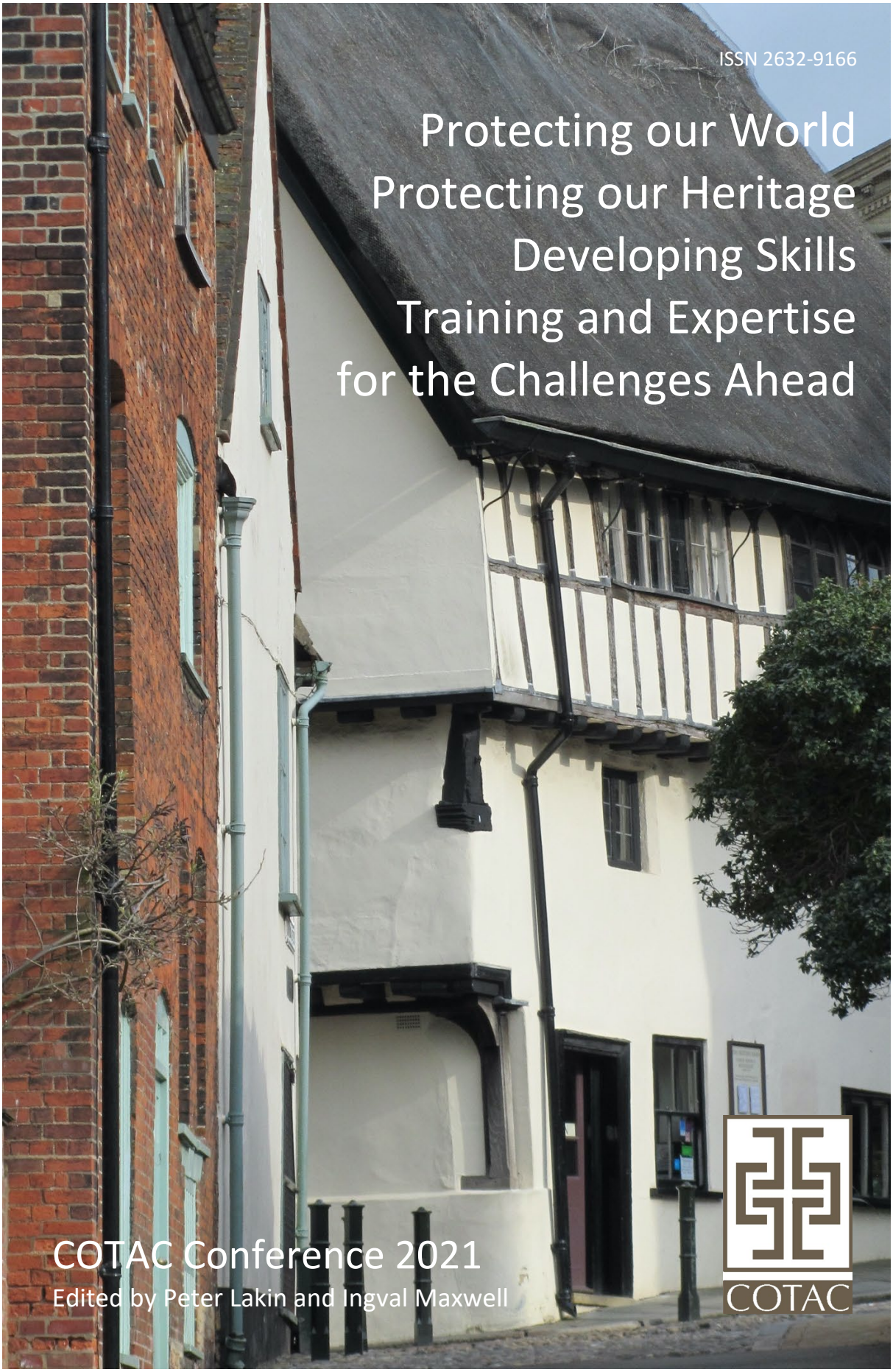
Protecting our World
Protecting our Heritage
Developing Skills
Training and Expertise
for the Challenges Ahead



COTAC Conference 2021

Edited by Peter Lakin and Ingval Maxwell

COTAC

Protecting our World, Protecting our Heritage
A COTAC Conference in collaboration with IHBC

Edited by Peter Lakin and Ingval Maxwell

Acknowledgements:
COTAC's International Conference 2021: *Protecting our World, Protecting our Heritage: Developing skills, training, and expertise for the challenges ahead* was arranged and delivered as an on-line event, with Session 1 held on 23rd and Session 2 on 24th November 2021.

The aim of the Conference was to progress some of the issues occurring during the 26th session of the *Conference of the Parties* (COP26) event, held in Glasgow from 31 October to 12 November 2021. Although no mention of protecting the heritage was included in the COP26 closing statements, several relevant workshops were held during the proceedings. In addition, there has been much related research recently carried out, especially in the Republic of Ireland and European Union, and the 2021 COTAC event offered an opportunity to catch up with some of these international developments.

The event was delivered in collaboration with, and sponsorship by IHBC who, with thanks to Michael Netter, provided all associated technical support and guidance.

Thanks are due to all speakers for granting permission and access to their presentations, upon which this report is founded, and to Tim Yates for Chairing Session 1 and to John Taylor for Chairing Session 2. The report is supported by pdf thumbnail copies of what was presented, available under the 2021 Conference Menu tab at www.cotac.global

COTAC, the 'Council on Training in Architectural Conservation'

COTAC, the 'Council on Training in Architectural Conservation', originated in 1959 as the 'Conference on Training in Architectural Conservation' in response to the need for training resources for practitioners so they could properly specify and oversee work involved in repairing and conserving historic buildings and churches. Since its inception COTAC has successfully, persistently, and influentially worked to lift standards, develop training qualifications, and build networks across the UK's conservation, repair, and maintenance (CRM) sector, estimated at over 40% of all construction industry activities. This has involved working partnership with national agencies, professional and standard setting bodies, educational establishments, and training interests.

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Contents

Day 1 - Protecting our World: Climate Change and the Built heritage

<u>Strengthening Cultural Heritage Resilience for Climate Change – from Research to Policy: The Work of the EU OMC Group</u>

Johanna Leissner: Fraunhofer Gesellschaft, EU Office Brussels
Chair of the EU OMC Group Strengthening Cultural Heritage Resilience for Climate Change

Abstract
The presentation covered climate change, extreme climate-related events, and their impact on built heritage, and how to use high resolution climate models for the prediction of future extreme climate events (precipitation, heat waves, droughts, sea level rise, and strong winds) with their bearing on the built heritage. It reported on the current German Research Project KERES; the EU Project Climate for Culture and the work of the EU OMC Group in Strengthening CH Resilience for Climate Change.

Report on the Presentation

Reference was made to Klaus Hasselmann being awarded the 2021 Nobel Prize in Physics, jointly with Syukuro Manabe and Giorgio Parisi, for ground breaking contributions to the "*physical modelling of earth's climate, quantifying variability and reliably predicting global warming*" and "*understanding of complex systems*".

In the past, the evolution of the Earth has been very dynamic with different climatic period, including glaciation and interglacial periods with humanity having had 10,000 years of grace with a stable climate since the last ice age. Offering a brief recent history of increasing concern, and on leading up to the foundation of the OMC Group, chronological references were highlit as being:

1824 Jean Baptist Fourier discovered greenhouse effect
1896 Svante Arrhenius suggested that at the current rate of coal burning, the atmosphere could begin to start warming in a few centuries
1988 Establishment of Intergovernmental Panel on Climate Change (IPCC)
2003 EU Commission DG Research`s first call on climate change impacts on cultural heritage
2006 Stern Review on the Economics of Climate Change
2015 Paris Climate Agreement signed by 197 countries
2018 Greta Thunberg and Fridays for Future
2021 EU OMC Group 'Strengthening Cultural Heritage Resilience for Climate Change'

On presenting the EU OMC Group's work to date, four meetings had been held in 2021. Delegates attended from 28 participating European countries with a Mandate to:

- Examine the current and emerging threats and impacts of climate change on cultural heritage
- Identify and exchange good practices and innovative measures for protection of cultural heritage (including both tangible & intangible)
- Examine contribution cultural heritage can make to mitigating & combatting climate change in line with Green Deal's goals
- Awareness-raising, capacity-building and produce recommendations to contribute to discussions and planning of climate change measures at European and national level

Work in progress involved the preparation of a questionnaire seeking information on the state of play in Member States; the identification of direct and indirect threats from climate change; the risk potential by type of heritage, and the collection of good practice examples – with 60 adaptation and mitigation case studies having been received by November 2021.

Reflecting upon previous research projects and their publications, the following were noted:

- The Atlas of Climate Change Impact on European Cultural Heritage Scientific Analysis and Management Strategies
- Global Climate Change Impact on Built Heritage and Cultural Landscapes: Noah's Ark 6th Framework Programme
- Climate for Culture

Emphasis was put on the need to:

- Focus on future indoor climate – because much of our cultural heritage is displayed and stored inside buildings and people too spend more time inside buildings
- Indoor climate is important for preservation of cultural heritage and for wellbeing of people
- Indoor climate control is very costly and requires a large amount of energy
- Buildings are responsible for one quarter of total energy consumption and greenhouse gas emissions, according to Eurostat.

As a result, a variety of consequences were needing to be considered, including an increasing danger and problems created by mould growth and insects.

Summary

In offering a preliminary overview from the EU OMC Expert Group activities, it was noted that:

- Extreme climate events and gradual climate change are affecting all kinds of cultural heritage (tangible and intangible) all over the world
- There are still many gaps in understanding and knowledge about climate change impacts
- Relevant and reliable data are missing – difficulty to collect the information
- Lack of awareness about urgency to adapt exists on all levels
- Create a forum for mutual exchange – need for common entry point or observatory
- Invest into skills and training opportunities
- Intensify cooperation/exchange between heritage experts, climate services, decision makers
- Important mainstream policies on EU and Member State level – cultural heritage not integrated
- Example: many national adaptation plans do not consider cultural heritage
- Start planning now and develop adaptation/mitigation and resilience plans for climate change

The Group's task is to identify and exchange good practices, raise awareness, capacity building and presenting recommendations. The various threats to cultural heritage were introduced, some obvious but some new issues identified. Some examples of adaptation and mitigation were shown and discussed, once again highlighting the need to refurbish rather than rebuild. Training the younger generation was also flagged up as a requirement.

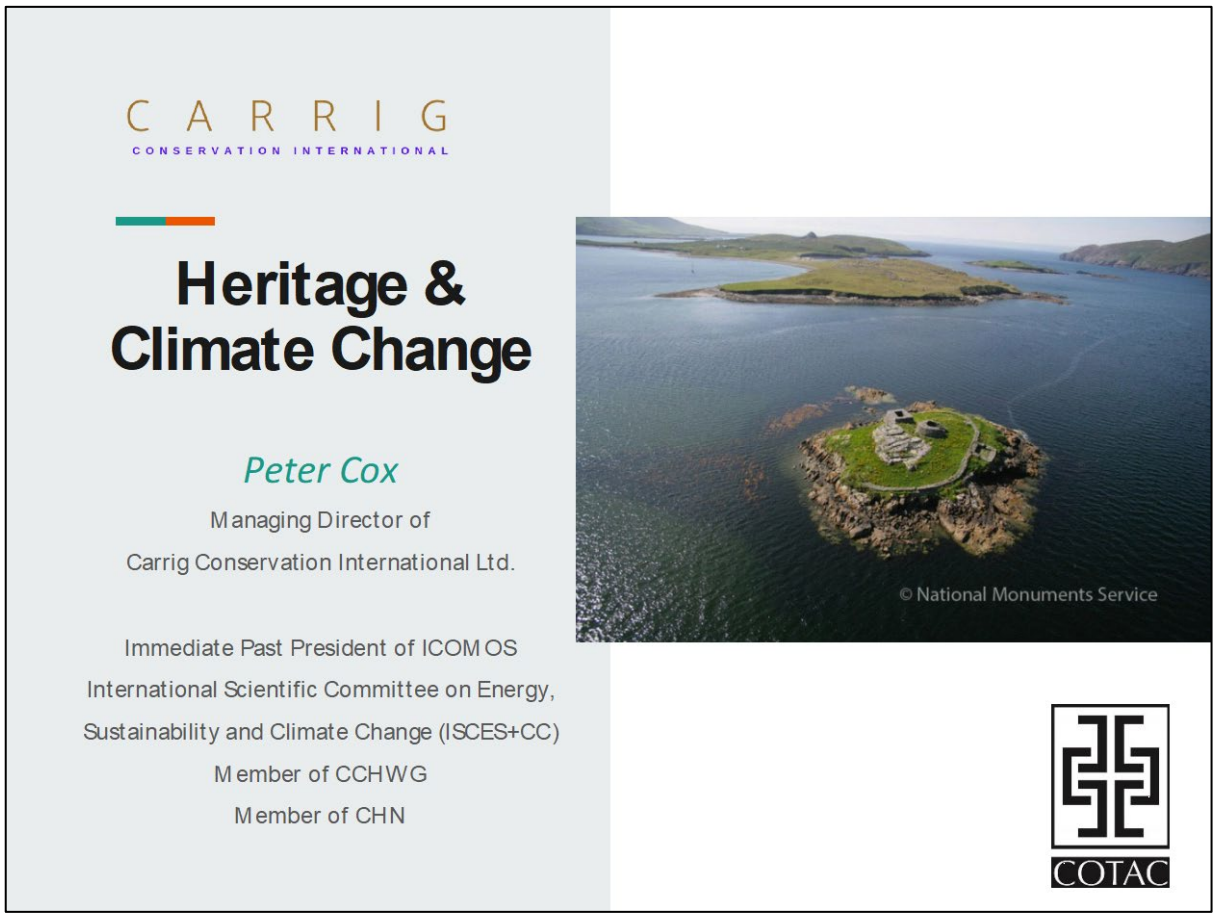
Research projects into the threats have begun, based on whole building simulations. There are still shortages in our knowledge and understanding about the impact of climate change on heritage buildings, especially regarding embedded and embodied carbon. The key messages are that we need to intensify co-operation, invest in skills and training, and start planning now to develop adaptation and mitigation schemes to protect our world and our heritage.

Heritage and Climate Change

Peter Cox
Managing Director of Carrig Conservation International Ltd

Abstract
The presentation covered Carrig Conservation's pioneering work on analysing embodied energy and carbon in the historic environment, including the carbon comparison of potential intervention scenarios, ranging from demo and rebuild, deep retrofit, and a 'do nothing' approach. It also reported on experiences at COP26 and the potential implications for the heritage and heritage practitioners, in addition to referencing several relevant publications

Report on the Presentation



The presentation opened by discussing climate change impacts on heritage and Carrig's pioneering work on carbon emissions from buildings. It reflected upon some of the published IPCC special reports and offered some examples where recent catastrophic events have had a toll on the historic environment. It outlined the roles of the various ICOMOS/UNESCO Working Groups and their reports, together with issued future adaption plans by the Government of Ireland.

In developing the introduction, a 2017 IUCN World Heritage Outlook 2 quotation was offered to note that: *"Climate change has been the fastest moving current threat [to natural World*

Heritage] increasing dramatically since 2014 – by 77% (62 sites in 2017 where it was assessed as a high or very high current threat, compared to 35 in 2014)"; together with part of the 2017 ICOMOS 19th General Assembly Resolution "…*climate change has become one of the most significant and fastest growing threats to people and their heritage worldwide…"*

In addition, ICOMOS involvement was noted as being exercised through the:

- International Scientific Committee on Energy & Sustainability
    - Energy Efficiency in Traditional and Heritage Buildings
    - Climate Change and Heritage
- Climate Change & Heritage Work Group
    - UNESCO needed to update their 2007 Climate Change Policy document it was agreed that ICOMOS would set up a Work Group of 4 Divisions: High Ambition; Adaptation; Mitigation and Energy Efficiency; Loss and Damage
    - A 3-year Work Plan including "Future of our Pasts"
- Sustainable Development Goals (SDGs) Work Group
    - A 7-point work plan

The referenced and quoted reports included:

Climate Change 2021 The Physical Science Basis. Working Group 1 contribution to the Sixth Assessment Report of the WHO and UNEP Intergovernmental Panel (ipcc) on Climate Change

Future of Our Pasts: Engaging Cultural Heritage in Climate Action 2019:
Prepared by the ICOMOS Climate Change and Heritage Working Group it highlights several ways in which the core considerations of cultural heritage intersect with the objectives of the Paris Agreement, whilst providing a framework for cataloguing the impacts of climate change drivers on 6 main categories of cultural heritage.

Climate Change and its Effect on Heritage 2009: ICOMOS Ireland's Study for Irish Government concluded climate change will affect the conservation of Bru na Boinne and Clonmacnoise in the future. With monitoring at the sites providing much needed quantifiable data on climate change impacts, extending the monitoring scheme to include other geographical, climatic, and typological sites was desirable.

Climate Change Sectorial Adaptation Plan Built and Archaeological Heritage: Government of Ireland

National Adaptation Framework Planning for a Climate Resilient Ireland: Department of Culture, Heritage and the Gaeltacht

Deep Energy Renovation of Traditional Buildings Addressing Knowledge Gaps and Skills. Training in Ireland 2018 by Caroline Engel Purcell

A Guide to Climate Change Impacts on Scotland's Historic Environment Our Place in Time 2019: Published by Historic Environment Scotland, it identifies many risks and hazards presented by climate change and presents potential adaptation solutions for seven historic environment elements, being:

- Roofed Buildings and Infrastructure
- Gardens and Designed Landscapes
- Marine
- Coastal
- Surface Remains
- Buried remains
- Collections and Internal Fabric

Amongst the observed and projected Climate Change Impacts for Ireland, it was reported:

- Increased annual averaged temperatures and less frost days (up by 0.8°C now and up to 1.6°C by 2060)
- Increased growing season (by 1 week so far and up to 40 days by 2060)
- Increase in intense rainfall events (up by 30% in winter by 2060)
- Increased likelihood of dry periods without rain (up by 40% in summer by 2060)
- Continued Sea Level Rise (currently rising at a rate of 2-3 mm/year, leading to a total rise of up to 800mm by 2100)
- Increased frequency and intensity of storms
- Increased relative humidity in winter months

On considering relevant Mitigation there was a need to:

- Understand the building and its actual energy performance
- Know the best practice for a sensible energy upgrade
- Do an accurate Life Cycle Analysis (LCA) for the project
- Be ready to Monitor all interventions – there is a need hard evidence
- Fully understand Carbon Mitigation
- Consider renewable Energy and whole building approach
- Consider maintenance

The adaptation plans focused on the projected impacts that climate change will have on the built and architectural heritage of Ireland, and the goals that need to be aimed for protecting our world and our heritage. In a case study of a recent restoration project different materials were used as render in order the understand the building and its energy performance to produce an accurate Life Cycle Analysis (LCA). In turn, by having a better understanding of carbon in the built environment, such a process will hopefully avoid 'maladaptation'.

Research by the *European Committee for Standardization (CEN) Technical Committee 346* which wrote *EN 1683: 2107 Guidelines to Energy Efficiency in Traditional & Heritage Buildings* also identified 66 million dwellings in the 28 European countries all dated pre-1945. With only 8% having statutory protection, this leaves 92% that can be Maladapted! Consequently, maladaptation emerges as being the greatest challenge to be faced, and there was a need to acknowledge the consequences of:

- Not understanding the building
- Employing the wrong products and/or systems
- There being no quick fix solutions
- Lack of control over what is done

Several conclusions were offered, including:

- The type and quantity of materials used in energy efficiency refurbishments and new construction are a deciding factor in the overall environmental impact of projects
- By sourcing local materials, life cycle emissions can be reduced
- Data on materials used in refurbishment of historic buildings should be strengthened
- City planning authorities should be educated in life cycle approaches
- Occupier behaviour has an important role in energy savings of historic buildings
- 'Reuse matters'
- Improve life cycle inventory data
- A better understanding of material impacts
- Quantity and type of materials used matter
- Balance between carbon and other indicators is required
- Deep energy efficient refurbishment of historic buildings is necessary if they are required to achieve performances like new buildings
- The quantity and type of materials matter
- A simple to use LCA tool which is designed for the concept design stage is required
- EPDs should become mandatory for all building materials
- More data on refurbishments should be made available

Summary

More care is required in choosing the type and quantities of materials used in refurbishments, including sourcing materials locally, and guiding occupier behaviour if we are to make the necessary savings in energy use and carbon emissions. It also appears that the policy makers need to start looking at a combination of indicators, not just temperature or just carbon emissions, but also human health, ecosystem quality and resource depletion.

Bearing in mind many of the recent new builds are only given a 50-year design life, a recent investigation looked at carbon emissions in relation to new build, verses refurbishment. This suggested that it would take a new build 63 years to become more environmentally friendly (due to energy savings in the new materials) than a refurbishment,

LCAs are common for new builds but not for renovations, with an emphasis on the difference between embodied and operational carbon. All this requires policy changes such as making EPDs (Environmental Product Declarations) mandatory, a carbon fine for demolition or a credit for working on buildings from pre-1945 and, mainly, the change of exempting VAT from heritage work and placing it on new builds, whilst all in the construction industry need to be appropriately educated and upskilled.

Climate Change Risk Assessments and Sustainable development goals need to be set and adhered to. That way, sensible energy retrofits in heritage buildings can be achieved, thereby helping with their future protection.

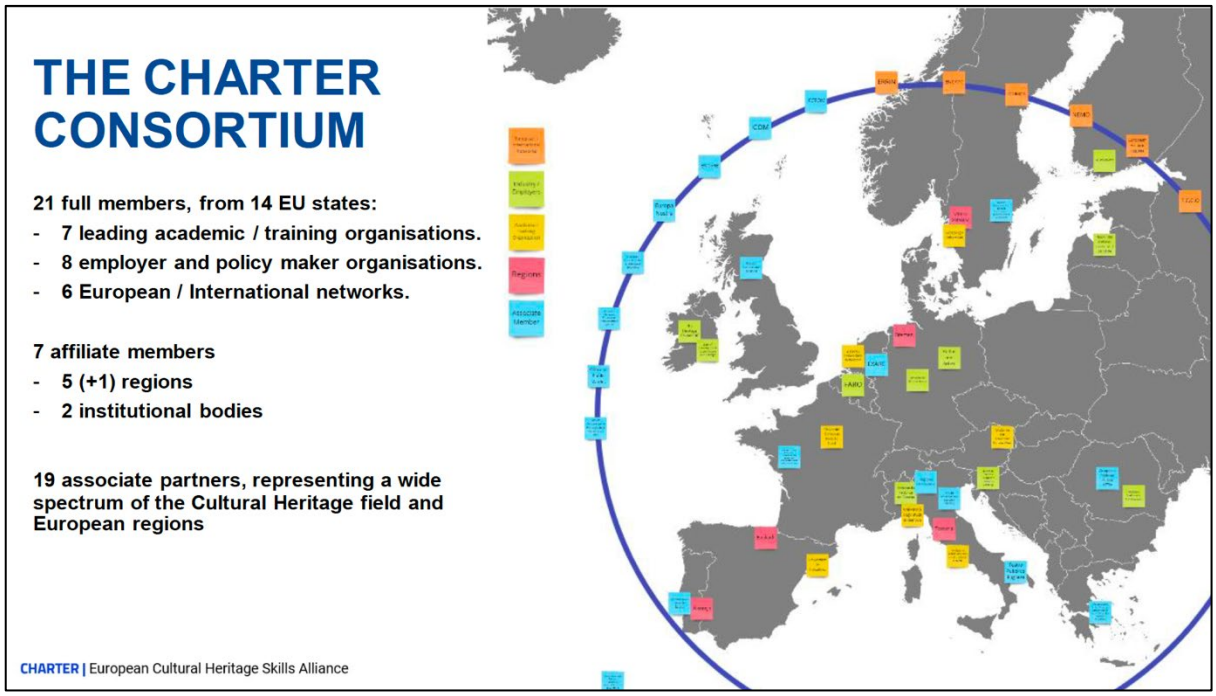
Cultural Heritage Actions to Refine Training Education and Roles: Project Overview

Nessa Roche Department of Housing, Local Government and Heritage, Ireland

Abstract

The presentation outlined the CHARTER Programme. The European Cultural Heritage Skills Alliance brings together and represents the whole range of the cultural heritage sector in Europe. The project strives towards making apparent the value of cultural heritage in regulatory frameworks and creating a lasting, comprehensive strategy to provide the necessary cultural heritage skills to support sustainable societies and economies. The project will map current needs and forecast future needs of the sector to bridge the gap of skills shortages and mismatches between the educational and occupational fields.

Report on the Presentation



The CHARTER project is an EU initiative to "sustainably protect, promote and enhance European tangible and intangible cultural heritage". Its Mission is to sustainably protect, promote and enhance European tangible and intangible cultural heritage by creating a lasting and comprehensive sectoral skills strategy, bridging the gaps between educational and occupational systems and employer needs and proposing training and curricula for the development of new skills for cultural heritage professionals.

Background

The Blueprint for Sectoral Cooperation on Skills (2017) was a European Commission initiative to select sectors for funding (€4m for 4-year projects) which demonstrate readiness to correct identified skills gaps and mismatches between education and training and industry needs.

Cultural heritage was submitted by the Commission in 2019 as part of a competitive process to select sectors (the fourth 'wave') with 6 sectors selected per wave. The Construction Blueprint project is also underway looking at green/retrofit skills. (www.constructionblueprint.eu)

Cultural heritage succeeded in being selected and the CHARTER consortium won the competitive application. Existing evidence was used to demonstrate the readiness of cultural heritage, including the Open Method of Coordination report of member states' experts, *Skills, training, and knowledge transfer in cultural heritage professions, 2019*.

What is defined as Cultural Heritage?
FARO Convention Council of Europe 2005 (Framework Convention) notes that "Cultural heritage is a group of resources inherited from the past, which people identify, independently of ownership, as a reflection and expression of their constantly evolving values, beliefs, knowledge and traditions". Cultural heritage includes all aspects of the environment resulting from the interaction between people and places through time. This includes the built environment: structures, landscapes, objects, and the associations they hold and the skills that created them and sustain them - a critical element of the intangible cultural heritage

Who Are the Cultural Heritage Professionals?
Cultural heritage professionals work with the resources that we value as a source for common well-being and quality of life, which as a collective we regard as a common good.

Built environment occupations work with buildings and places of cultural heritage character and significance:

- Architects, technologists, engineers, and surveyors
- Tradespeople stone, brick, wet trades, carpentry/joinery, roofing, painting decorating etc.
- Craftspeople/specialists - many external and internal materials, fixtures, and features such as thatch, glass, marble, iron, ceramic, etc,

What types of functions do these roles have in relation to cultural heritage?

- Governance; management; R&D; recognition; conservation-restoration; education
- Design, alteration, repurposing/refitting
- Not creation/production/disposal/replacement as usual in construction occupations

Each role has a different skills mix and level

Project Stakeholders
To achieve a durable sectoral skills alliance, the project will involve and analyse the needs and expectations of the following main stakeholders:

- The education and training providers that seek to improve clarity on curricula provision, types, levels, and delivery routes to promote quality in learning outcomes, equivalence, and mobility.

- The industry and employers that wish to be certain of the availability of high-quality expertise, distributed regionally to facilitate the sustainable repair, access, use and promotion of cultural heritage
- Public bodies and agencies that need to articulate policies that safeguard, sustain and promote cultural heritage for the common good by resourcing the transmission of skills
- Cultural Heritage professionals who seek recognition for their roles and mission as these relate to experience, expertise, and professional qualification.

PROJECT MAIN GOALS

- To create a lasting, comprehensive sectoral skills strategy to ensure Europe has the necessary cultural heritage to support sustainable societies and economies.
- To bridge the gaps between educational and occupational systems and employer needs
- To reduce skills shortages, gaps and mismatches, and overcome the paucity of cultural heritage statistical data
- To achieve a people-centered, integrated and sustainable approach towards cultural heritage and its dynamics in future scenarios.
- To sustainably protect, promote and enhance European tangible and intangible cultural heritage
- To build a durable cultural heritage skills alliance in Europe

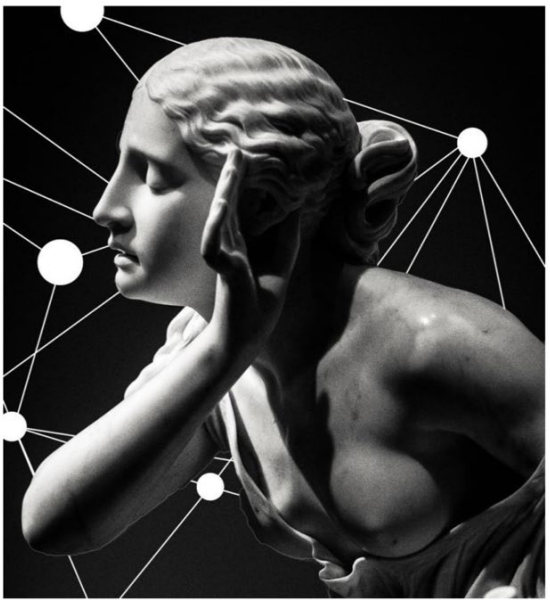
What kind of results would demonstrate the success of the CHARTER project?

A strong and durable **cultural heritage skills Alliance** that will work well across the EU by:

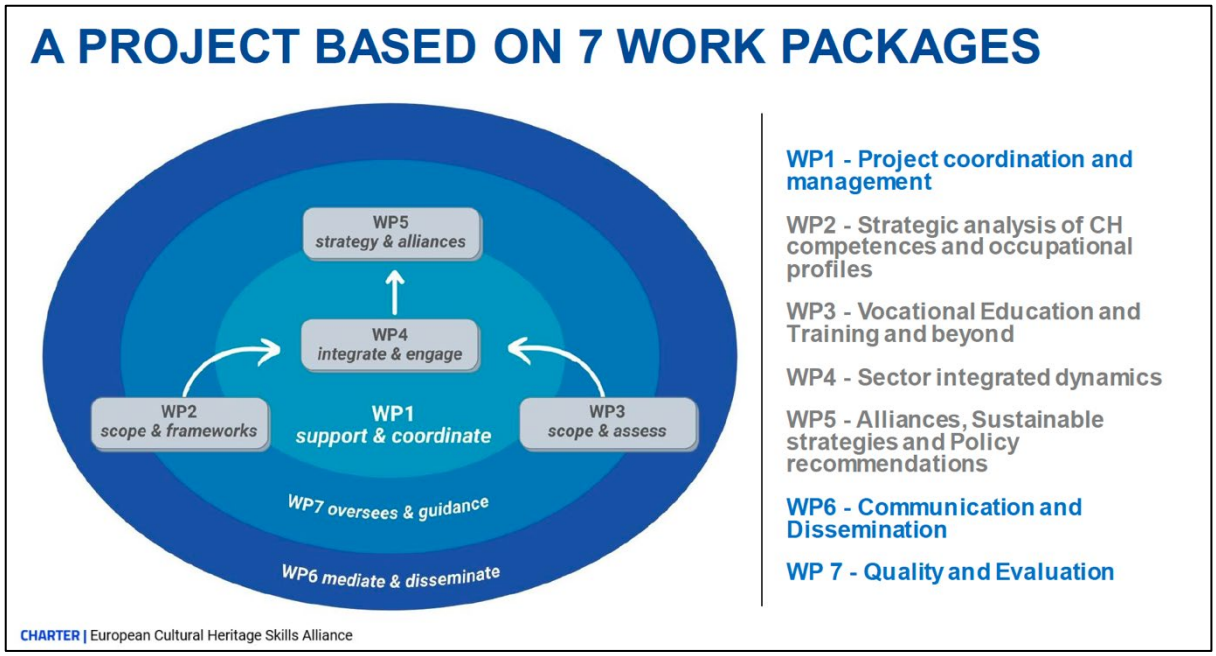
- Making visible **Roles and Occupations**, **existing and emerging**
- Ensuring **Learning outcomes** describe necessary **core and transversal skills needs** (cognitive, affective and psychomotor)
- Translating Learning Outcomes into **Education and training qualifications** so that education providers operate a mutually beneficial network
- Enabling Informal **on-the-job learning** to be translated into **credits**

This means that:

- **Competences** can be recognised by employers, clients and procuring organisations, so that:
  - **Cultural heritage work** is valued and paid accordingly
  - **Europass** uses qualifications to bring personal **mobility**
  - **Personal development** plans are used by all
  - **Upskilling** in **core and transversal skills** is easy



CHARTER | European Cultural Heritage Skills Alliance



First task: Mapping a new landscape for heritage professionals

The WP2 preliminary report is based on six months of research and testing, including examining cultural policy, existing economic models, educational, occupational, and economic frameworks and statistical indicators. https://charter-alliance.eu/charter-alliance-heritage-professions/ The proposed model is the conceptual foundation for the whole CHARTER project:

- It identifies the core tasks and processes found across cultural heritage occupations. These are the key activities that support the functions of a cultural heritage occupation –they characterize and distinguish it from other occupations
- The key activities must correspond to the required learning outcomes of education and training, with a qualification accorded a level on the national and European qualifications frameworks
- Learning achieved in these activities, personal attitude (ethics) and practice generate competences that enable a person to perform an existing occupation or an emerging one
- Circular feedback contributes to the creation / refinement of education and training programmes which will match the current and forecast needs of the workforce: a main goal of CHARTER

Summary

The project goals include the creation of a skills strategy, to bridge the gaps between educational and occupational systems and employer needs, thus reducing the skill shortages. It aims to achieve a people-centred integrated and sustainable approach towards cultural heritage, through a 'durable cultural heritage skills alliance in Europe" with its 21 full members from 14 EU states, 7 affiliate members and 19 associate partners. The seven work packages will look at different but interrelated aspects, such as competencies required by the workforce, education and training, alliances, sustainable strategies, and policy recommendations.

The Development of Standards for Cultural Heritage

Tim Yates: Building Research Establishment
Chair of British Standards Committee B/560

Abstract
'Setting Standards – European and wider initiatives' Climate change and its impact has no respect for national boundaries! To help address the challenges it's important that we share ideas and best practice. The work of European Standards Technical Committee 346 '*Conservation of Cultural Heritage'* provides a forum for experts to develop standards using a common terminology to support heritage organisations and heritage practitioners across Europe and beyond. The presentation will provide a brief overview of the work to date and intended future plans.

Report on the Presentation

The original purpose of standards was to ensure that fixtures and fittings were of a consistent size and quality. Over the past 100 years the purpose of Standards has shifted towards providing a minimum quality and making sure that methods and materials reflect good practice. Standards and codes of practice allow specifications to be written concisely and can also be used to support accreditation schemes for conservators and building conservation craftsmen.

Conservation, like many other activities and businesses, has become increasingly global and, as a result, there was considered a need for the creation of a common set of conservation principles.

These reflect upon the Venice Charter (1966) (*which stresses the importance of setting, respect for original fabric, precise documentation of any intervention, the significance of contributions from all periods to the building's character, and the maintenance of historic*

buildings for a socially useful purpose) and the UNESCO Recommendation for the Protection of Moveable Cultural Property (1978) (*which defines the broad range of items that make up moveable cultural property and identifies measures to safeguard property and to indemnify in case of damage, alteration or loss of the property resulting from transport and exhibition, environmental conditions, handling, faulty packaging, and other unfavourable conditions*).

Based on the earlier work undertaken by UNESCO, the approach to developing European Standards - 'Standardisation in the field of conservation of Cultural Heritage' started in 2002 requiring the need to agree:

- Terminology relevant to movable and immovable artefacts, and to the conservation of the artefacts and the material constituting the artefacts
- Guidelines for a methodological approach to the knowledge of the artefacts and of the materials constituting the artefacts, of the deterioration processes, and of preservation/ conservation work
- Test and analysis methods for the diagnosis and for the characterisation of the artefacts
- Tests and analysis methods for the evaluation of the performance of conservation products
- Test and analysis methods for the evaluation of indoor conservation conditions – particularly transport, packaging, and exhibition environments

The work of European Standards CEN/TC 346 Cultural Heritage can be outlined as follows:

Working Group Number	Working Group Title
CEN/TC 346/WG 1	General methodologies and terminology
CEN/TC 346/WG 2	Characterisation and analysis of porous inorganic materials constituting cultural heritage
CEN/TC 346/WG 3	Evaluation of methods and products for conservation works on porous inorganic materials constituting cultural heritage
CEN/TC 346/WG 4	Protection of collections
CEN/TC 346/WG 5	Packing and transport
CEN/TC 346/WG 6	Exhibition lighting of cultural heritage - Joint Working Group CEN/TC 346 and CEN/TC 169
CEN/TC 346/WG 7	Specifying and measuring Indoor/outdoor climate
CEN/TC 346/WG 8	Energy efficiency of historic buildings
CEN/TC 346/WG 9	Waterlogged wood
CEN/TC 346/WG 10	Historic timber structures
CEN/TC 346/WG 11	Conservation process
CEN/TC 346/WG 12	Show cases
CEN/TC 346/WG 13	Investigation of architectural finishes – Procedure, methodology and documentation of results
CEN/TC 346/WG 14	Monitoring of cultural deposits
CEN/TC 346/WG 15	Exhibition lighting of cultural heritage
CEN/TC 346/WG 16	Specification for the management of moveable cultural heritage

Representatives of the various European national standards bodies make up the CEN membership. Countries involved are:
Austria, Belgium, Bulgaria, Croatia, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Republic of North Macedonia, Romania, Serbia, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey, and the United Kingdom.

The intention is not to provide rigid and prescriptive solutions but to provide common questions, and common ways to describe and evaluate cultural heritage. The national standards can take this further and focus on local needs within the same common framework.

Relevant to the UK, emanating from British Standards Committee B/560 *Conservation of Tangible Cultural Heritage* are:

- BS 7913 Guide to the principles of the conservation of historic buildings (2013).
- BS 8221 Part 1 Code of practice for the cleaning of natural stones, brick, terracotta and concrete (2012)
- BS 8221 Part 2 Code of practice for the surface repair of natural stones, brick and terracotta (2000/2012)
- BS 6270 Part 3 Code of practice for cleaning and surface repair of buildings - Metals (cleaning only) (1991/2013)
- BS 5454 / PD 5454 Guide for the storage and exhibition of archival materials (2000/2012)

Summary

The presentation offered, a brief retrospective history of standards in building and the way they have changed from ensuring fixtures and fittings were of a consistent size and quality, to more of a code of practice providing minimum quality of methods and materials so they reflect good practice. Since 2002, European standards have been developed to provide a common language, framework, terminology, and methodological approach to testing and analysis. Embedded in both British (BS) and European standards (EN) there is emphasis on describing sampling, characterisation, conserving and, recently, climate change.

Lessons From the Past for the Future

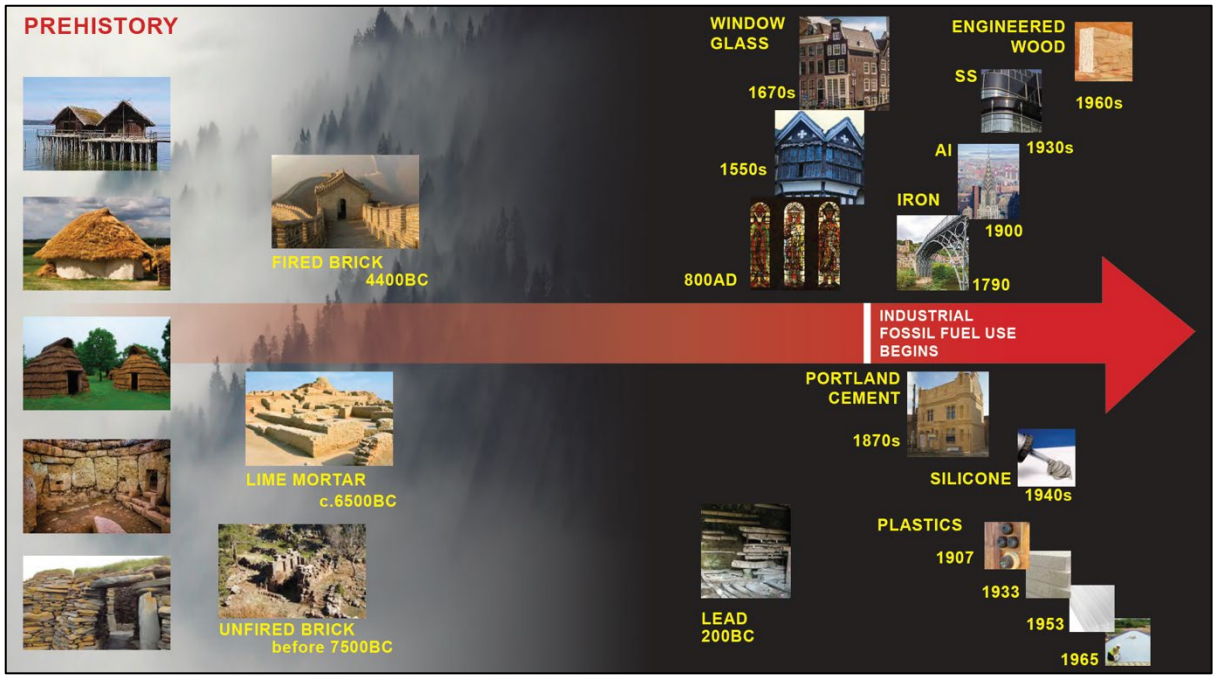
Dr. Robyn Pender
Building Conservation and Climate Change Adaptation Team, Historic England

Abstract
The historic built environment has an important but, arguably, overlooked role to play in efforts to mitigate and adapt to climate change. In our search for ways to create a low-energy low-carbon built environment, it is often forgotten that all the buildings constructed prior to the Industrial Revolution and well beyond - especially vernacular structures - were of necessity built using low-energy materials and designed to operate passively (and certainly without the input of fossil-fuel energy).

Report on the Presentation

The presentation offered numerous informative examples of how much of our built heritage incorporated relevant features to cope with the elements, cut down on internal drafts and keep heat in. When glass was introduced to windows, adaptation to the building was required to consider water run-off, such as awnings, windowsills, and sash windows to control over-heating.

In industrialised countries as the use of fossil fuel and the resulting centralisation markets in design and materials took hold, we completely forgot why certain features evolved, and why they were critical to keeping buildings in good condition, and their occupants operational. Vital elements of 'fixed furniture' such as wall cloths, lime renders and awnings were removed, which necessitated energy-expensive space heating and cooling had to be brought in to overcome resulting discomforts.



With an increasing transition away from inherent indigenous constructional techniques to industrialised building design and fabrication adopting a broad range of manufactured, and factory produced modern building materials, several fundamental questions can be posed:

- What lost lessons should we be relearning from the past?
- How can modern interventions and traditional approaches be integrated to make a truly sustainable built environment, that works effectively for its occupants?
- What can we learn from the old ways of acquiring building knowledge (by action and observation)?
- How can we use what we learn now from experience to underpin improvements in practice that will be as fast and effective as they will need to be?

From the 19th century, the increasing adoption of ill-considered minimalist styles and a plethora of factory produced constructional details, traditional features and indigenous materials have been discarded and removed from the builder's portfolio with an equally increasing consequential set of performance problems and longevity in use emerging. Damp penetration issues have becoming progressively more apparent, especially at building element junctions where the application of gun-applied sealants is virtually considered a near-standard solution.

The change from solid wall construction, which was effective at keeping water penetration at bay, to cavity wall build and other less well-devised forms of construction, and with an increasing use of factory produced timber sheet particle board has increasingly led to complex internal damp and mould problems emerging in many properties. Another major factor that has had an increasing impact on the way we currently build is the near universal use of computers in the design process. Effectively eroding the traditional skills and knowledge base of the current labour force, there needs to move away from the rigidity of the electronic spreadsheet to a more common-sense pragmatic approach.

Summary

There is a powerful message to be learnt from history. Structures were built using locally sourced building materials, constructed in a vernacular manner eminently suitable for climate and inhabitants. Builders were local and, fully understanding of their trade and materials used, quickly attending to and remedy any faults occurring through use or imposed by the elements. New build has emerged just the opposite, incorporating many new synthetic materials, not only imported internationally (with the related carbon costs) they are not so long lasting. For ease of rapid and mass building, an international style has emerged as the norm that requires additional energy to control heating, ventilating, and air conditioning, adding to the climate challenge.

Comments and Questions from Day 1 Forum

How do we incorporate cultural heritage into policy making?

Although the impact of climate change on heritage was discussed continually during COP26, there was no mention of it in the closing statement. Politicians are never around long enough to make a difference. Politicians are only looking at carbon, not energy issues as a whole. Sweden, for example, still only looks at reducing temperatures.

There are worries about computers deskilling the people and the effect it has on the economy*.*

Promoting awareness of the Skills shortage is the lever for politicians

Why are we still just talking to the converted?

It is too easy to do this so there is a critical need to widen the audience
There is a need to get children involved at primary level when they are curious and need exposure to practical skills from an early age.

Is a Life Cycle Analysis tool required for existing buildings (LCA)?

We have carbon calculators and simulations for new build but not existing, so there is no hard data to give to politicians.

Why do heritage buildings seem have 'no value' after 60 years?

Land is worth more than the building.

Does Global South have solutions to the problems caused by Global North?

Can UK join EU projects?

UK needs to plug the gap of research funding lost to Brexit.

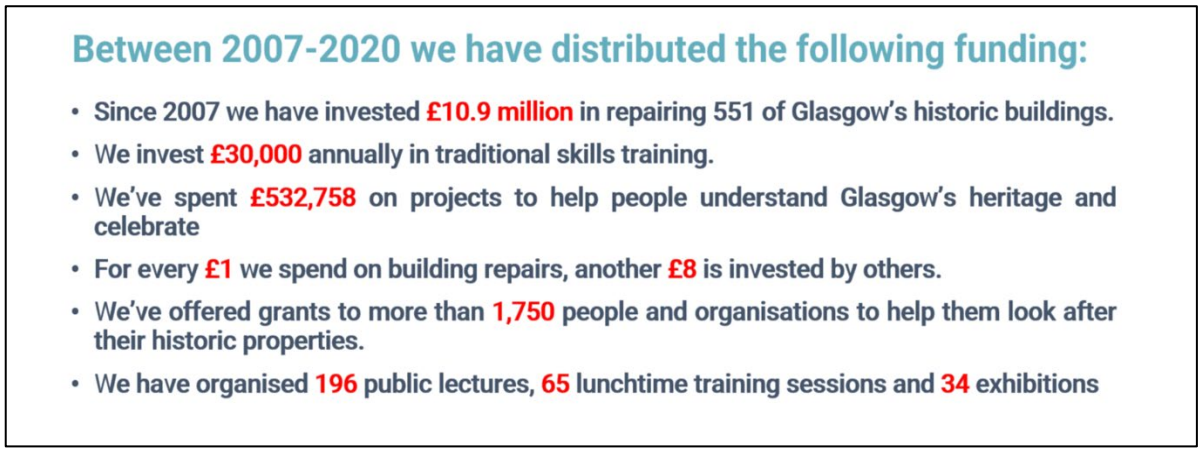
Day 2 - Protecting our built heritage: Training, skills, and expertise

COP26 From a Heritage Perspective

Niall Murphy
Deputy Director of Glasgow City Heritage Trust

Abstract:
The presentation will reflect on COP26, as Glasgow City Heritage Trust (GCHT) was involved in several events which COTAC conference delegates might be interested in.

Report on the Presentation



On initially offering background information to the GCBT and having been involved with COP26 during the first half of November 2021, the presentation then explored the diary of cultural heritage COP events that involved the Trust.

A significant interest was the Trust's involvement in the *Sustainable Glasgow Storymap* in conjunction with Glasgow City Council. This initiative viewed building projects across the city in a walking trail starting at the City Chambers in George Square.

In addition, the Trust's work with Historic Environment Scotland under the banner *Foundations for Our Future* resulted a jointly produced short video travelling around the city discussing with participants how historic buildings such as The Briggait, Glasgow Central Station, Bell Street Stables and Govanhill Baths can provide sustainable solutions that could help Glasgow mitigate climate change consequences.

Amongst others, Trust attended initiatives included:

- University of Glasgow Built Heritage and Net Zero Conference
- Girls@COP26 – The Solutions are Feminist Event with S3 Secondary Pupils

At the Scottish Minister for Culture's COP26 Event in Glasgow City Chambers several key statements were offered, including:

- Is culture the secret weapon for climate policymakers?

- Our message to the world's climate people and culture people:
    - Climate action needs culture to inspire, to inform, to engage
    - Let's work together now

English Parish Churches and Sustainability

Dr Nigel Walter
Church of England Church Buildings Council: Working Group Chair
Ecclesiastical Architects and Surveyors Association: Member

Abstract
The presentation explored the output of a joint Working Group between the Church of England's Church Buildings Council and EASA set up to develop best practice guidance for church architects and surveyors on sustainability in historic church buildings. Because of their existing relationship with church communities, church architects and surveyors are ideally placed to advise churches on appropriate sustainability measures.

The Sustainable Guidance takes the form of two Best Practice Notes, one on Quinquennial Inspections, the other on Project Works, both being designed to be of use across the sector, not just for Church of England buildings. A third document, the Practical Path to Net Zero Carbon, was also developed by others to provide a framework for improving the sustainability of historic buildings. Aimed at churches it is also very useful for professionals.

Report on the Presentation

Offering context to the initiative the presentation noted that there were some half a million listed buildings in England where, of all those Grade 1 listed, 45% were Churches. In numerical terms, the Church of England have c 16,000 church buildings: 4,300 (27%) each at Grade 1 and Grade 2*; 3,700 Grade 2 (24%), and 3,400 unlisted (22%) and is currently taking a

significant initiative on sustainability. But the question emerges as to the practicalities of making a venerable structure energy efficient - Is the church building an object of art or a living animation, owned by local communities?

In responding to the Climate Crisis, in February 2020, the Church of England General Synod adopted an ambitious net zero carbon target by 2030. The approach being to represent sustainability as something heritage professionals should be considering as a normal part of their work, not as a specialist add-on.

Nevertheless, the continued health of a building depends upon an effective relationship developing between the professionals and non-professionals who 'own' it and are responsible for its daily care. Consequently, in preparing the Best Practice Notes the Working Group were aware that, once published, their impact would be also embraced by non-professionals who would use them. This, in recognition that local churches often have their own sustainability agenda, and professionals needed to work with that or risk becoming side-lined.

A significant underlying issue is whether the church can survive as a living community if it cannot adapt its structure to suit present day pressures?

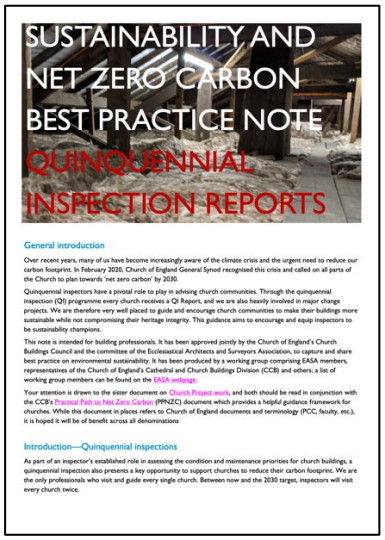
The set of emerging documents that aim to address the issues are:

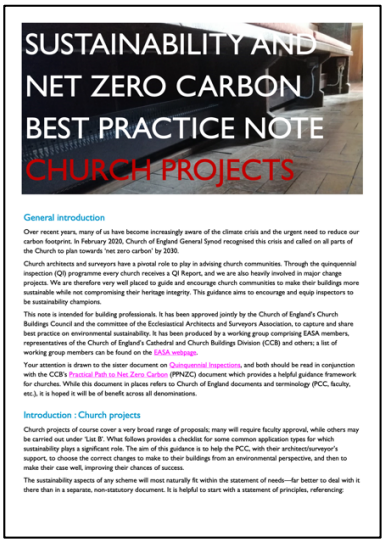
1. *Sustainability and Net Zero Carbon Best Practice Note Quinquennial Inspection Reports* (3 pages) covers:
    General introduction
    Introduction – Quinquennial inspections
    Preparation for the quinquennial inspection
    The inspection itself
    Report format
    Other resources

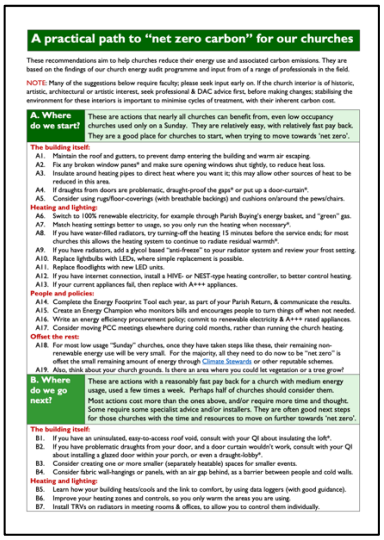
2. *Sustainability and Net Zero Carbon Best Practice Note Church Projects* (6 pages) covers:
    General introduction
    Introduction: Church projects
    Principles that apply to any project
    Principles that apply to specific types of project
    Other matters: monitoring and data gathering
    A sample of useful links and resources

Both the above should be read in conjunction with:

3. *The Practical Path to Net Zero Carbon* (2 pages) addresses:
    Where do we Start?
    Where do we go next?
    Getting to zero
    Only if…
    By exception







Summary

The documents outline practical steps on how net zero carbon can be achieved within the wider church communities, and beyond. The documents are accessible at: https://www.churchofengland.org/resources/churchcare/net-zero-carbon-church/practical-path-net-zero-carbon-churches

https://easa.org.uk/index.php/resources/sustainability-net-zero-carbon

The Church of England has also produced other resources to help church communities that typically become a reference point for professionals, non-professionals, and decision makers, such as:

https://www.churchofengland.org/resources/churchcare/advice-and-guidance-church-buildings/heating,

https://www.churchofengland.org/about/policy-and-thinking/our-views/environment-and-climate-change/how-you-can-act/sustainable-2

Energy Efficiency of Traditional Buildings – knowledge, skills, and competencies

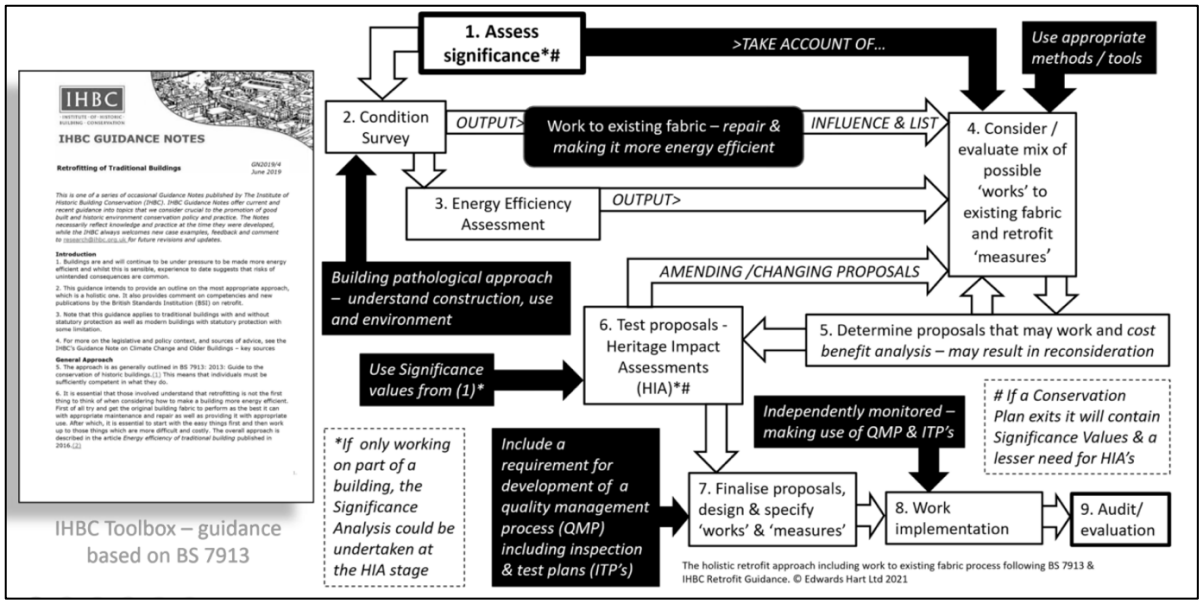
Prof. John Edwards
Director Edwards Hart Consultants

Abstract
Buildings will only benefit from retrofit if it's done properly. This comes down to the competence of all involved including the retrofit assessor, designer, and installer. The current mainstream approach is inadequate, and the presentation will explore why and will look at what needs to be done for effective and sustainable energy efficiency improvements that goes beyond just retrofit. It will also focus on what we must all do to improve competencies for ourselves and others.

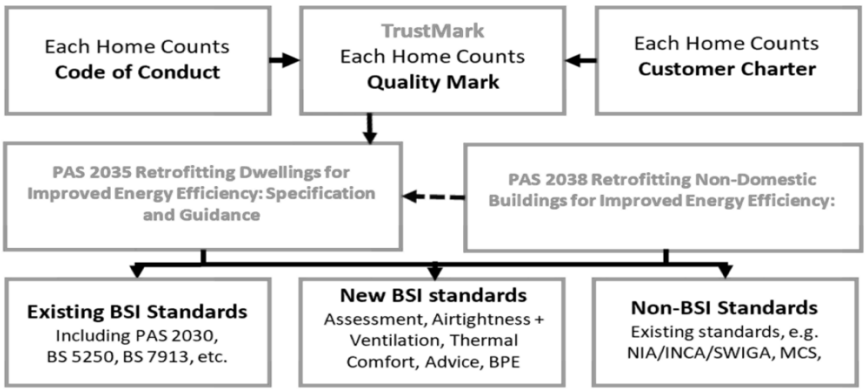
Report on the Presentation

Supporting the main theme of the second day to look at skill shortages and their impact on making traditional buildings sustainable, it was argued that without the necessary knowledge, skills, and competencies, we cannot achieve their required energy efficiency to reduce carbon emissions and energy use. One reason being that 'retrofit' is too specific in its application rather than being 'holistic' in approach when it comes to considering energy.

In *BS7913: 2013 Guide to the conservation of historic buildings* (Section 5.3.1) it is stated that '*the most effective way of ensuring energy efficiency and sustainability is to keep… buildings in good repair'*. The IHBC have developed their Toolbox Guidance in accordance with this intention. As such, 'condition surveys' should be carried out by 'professionally qualified / accredited / certified' practitioners, but when it comes to 'energy assessments' and creating an Energy Performance Certificate, training is minimal, and it does not consider how traditional buildings were constructed or perform.



Building upon BS7913 and the IHBC Toolbox guidance, a holistic approach for retrofit work to traditional buildings, in flow chart format and sequence, devised by Edwards Hart Ltd was presented. The result of consulting experts, it was noted that two related Publicly Available Specification (PAS) standardisation documents have been issued by British Standards (PAS 2030 and PAS 2035) for retrofitting energy efficiency into dwellings. But they are not holistic in approach, concentrating solely on retrofitting, introducing the 'new' roles of a *Retrofit Coordinator, Retrofit Assessor, Retrofit Advisor and Retrofit Evaluator*; roles that do not require excessive training and omits any mention of older buildings. This omission is partly rectified in *PAS 2038 Retrofitting Non-Domestic buildings*, where qualified professionals are suggested to be required in the retrofit team.



Summary

Despite the intentions of emerging guidance on undertaking effective retrofitting work on traditional and existing older buildings within the developing and complex mainstream framework and approach, without adequate historic/heritage building knowledge, skills, and competencies, there is a real risk of not achieving the net zero carbon target for this important sector.

University of L'Aquila (Italy) ERASMUS + Programme Current Projects

In addition to exploring the Sustainability for Architectural Heritage (SAH), ERASMUS + Programme two University of L'Aquila developments are presented that provided expertise and know-how during the implementation of the SAH project

Preserving architectural heritage: the compulsory interdisciplinary skills

Prof. Anna Tozzi,
University of L'Aquila (Italy)
Coordinator of Sustainability for Architectural Heritage (SAH), ERASMUS + Programme

Abstract:
The Sustainability for Architectural Heritage is a curriculum development project focused on the preparation of a new Architect/Engineer profile capable of restoring buildings belonging to the cultural heritage of participating countries with support of Higher Educational Institutes from Italy, Germany, and Greece. Though focused on supporting Institutions from third countries, the problems are international. Threats undermining the preservation of cultural and natural heritage are not only the result of carelessness and lack of finance, but also new agents of degradation connected to climate change. Support for the restoration of monuments after the 2009 earthquake involved several competences, confirming and explaining the need to adopt a multidisciplinary approach.

Report on the Presentation

Chosen as prime locations for noteworthy architectural heritage, the international SAH Project Partner Institutes and Countries are:

- Universita degli Studi dell'Aquila (Italy)
- Rheinisch-Westfaelische Technische Hochschule Aachen (Germany)
- National Technical University of Athens (Greece)
- Federal State Institution of Higher Education Moscow State University (Russia)
- Kazan State University of Architecture and Engineering (Russia)
- Northern (Arctic) Federal University (Russia)
- Samara State Technical University (Russia)
- National University of Architecture and Construction (Armenia)
- Goris State University (Armenia)
- Chamber of Architects of the Republic of Armenia
- University of Tehran (Iran)
- Islamic Art University of Tabriz (Iran)

Specific Aims and Objectives will involve the development of new interdisciplinary training models for practical-orientated Bachelor and Master's Degree curricula in Architectural Heritage in accordance with best EU practises to increase awareness and responsiveness to environmental and economic changes. This will involve the establishment of an interactive platform for education, science, practitioners, and authorities to create specialists with modern professional competences in architectural heritage that can respond to the needs of a sustainable society. In terms of activities the main result will be the identification of core knowledge leading to the formation of architect-restorers with interdisciplinary competences at graduate and postgraduate level, able to provide innovative solutions for the preservation of heritage structures. To assess the issues comprehensively, teachers, researchers, restoration companies, employees and representatives of architectural heritage associations will be directly involved in participating countries. All course module material in the programme will be devised in accordance with the 1993 ICOMOS Guidelines for Education and Training.

Summary
The aim of the project is to advance the training of professionals involved in architectural preservation work, where wider objective is to update the quality of the curricula involving Historic BIM and Urban Historic Landscapes in Russia, Armenia, and Iran. The approach aims to create architect-restorers, with a good scientific understanding, who can adapt technological evolutions to create innovative solutions. This will be achieved through the creation of new degree programmes, the establishment of an interactive platform for those involved, and a network of multi-disciplinary centres at partner universities.

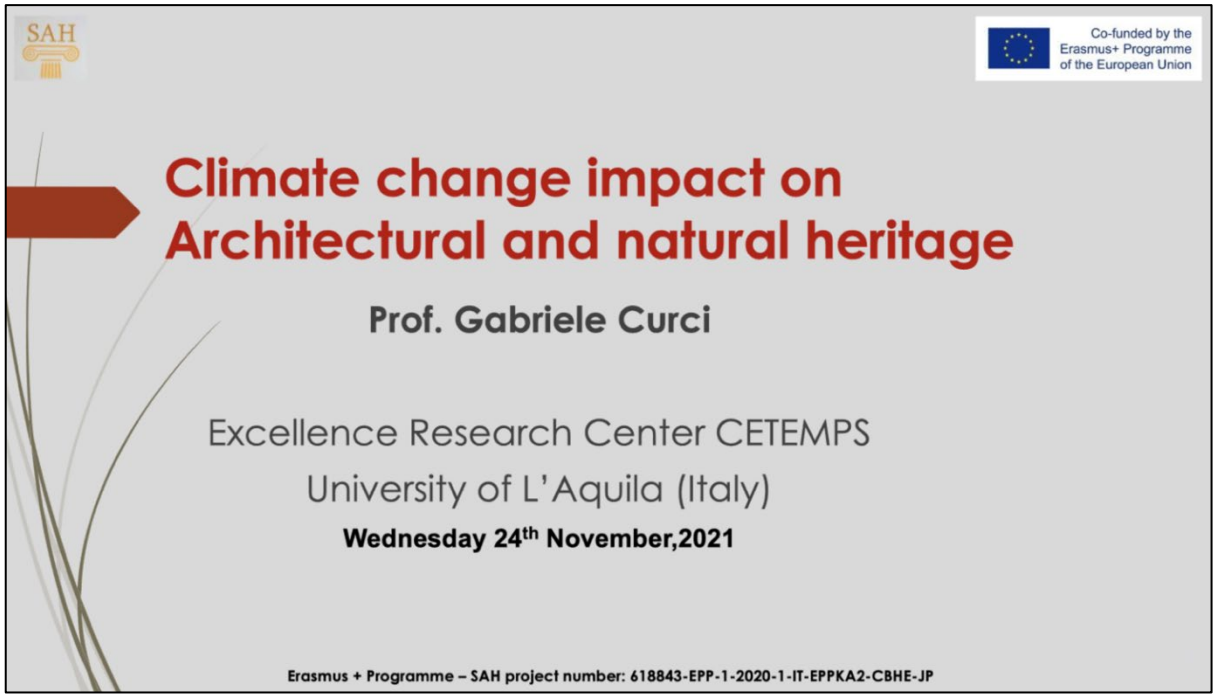
Climate change impact on Architectural and natural heritage

Prof. Gabriele Curci
Excellence Research Center CETEMPS, University of L'Aquila (Italy)

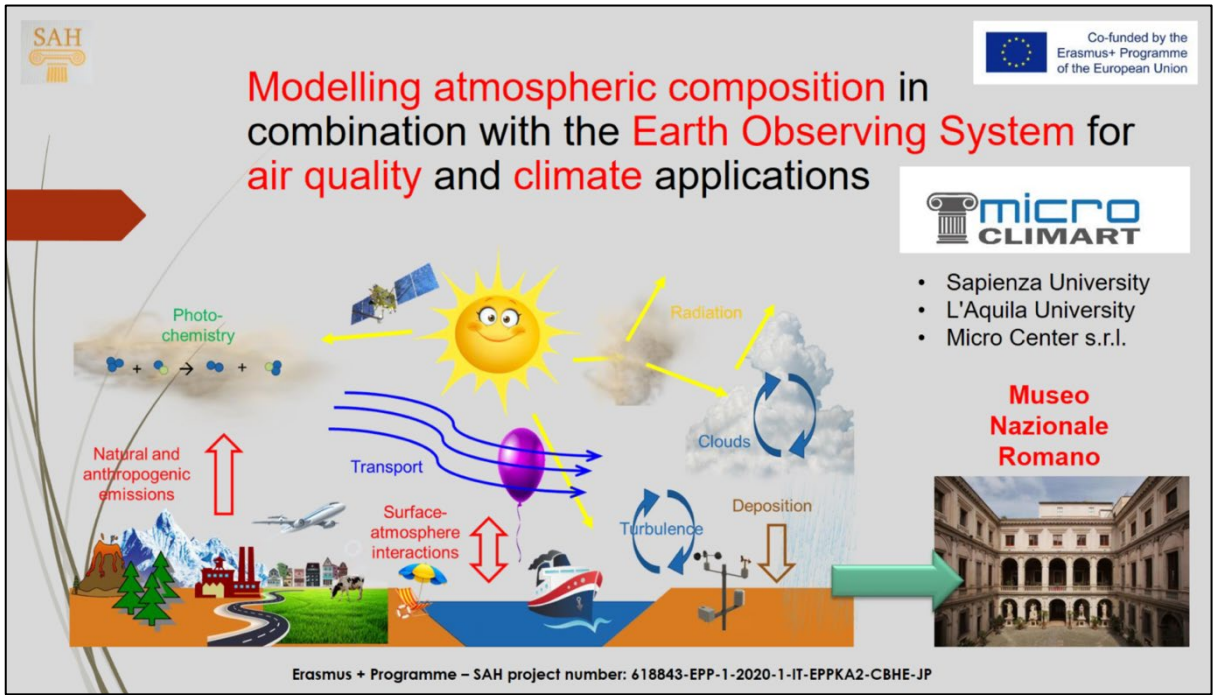
Abstract
A recently concluded project on the development of a modelling system useful for the short-term prediction of degradation on metals and stone materials that can be estimated from

constantly evolving atmospheric agents. These results will be extended to climatic scales to assess the impact of climate change on the potential degradation of outdoor cultural heritage.

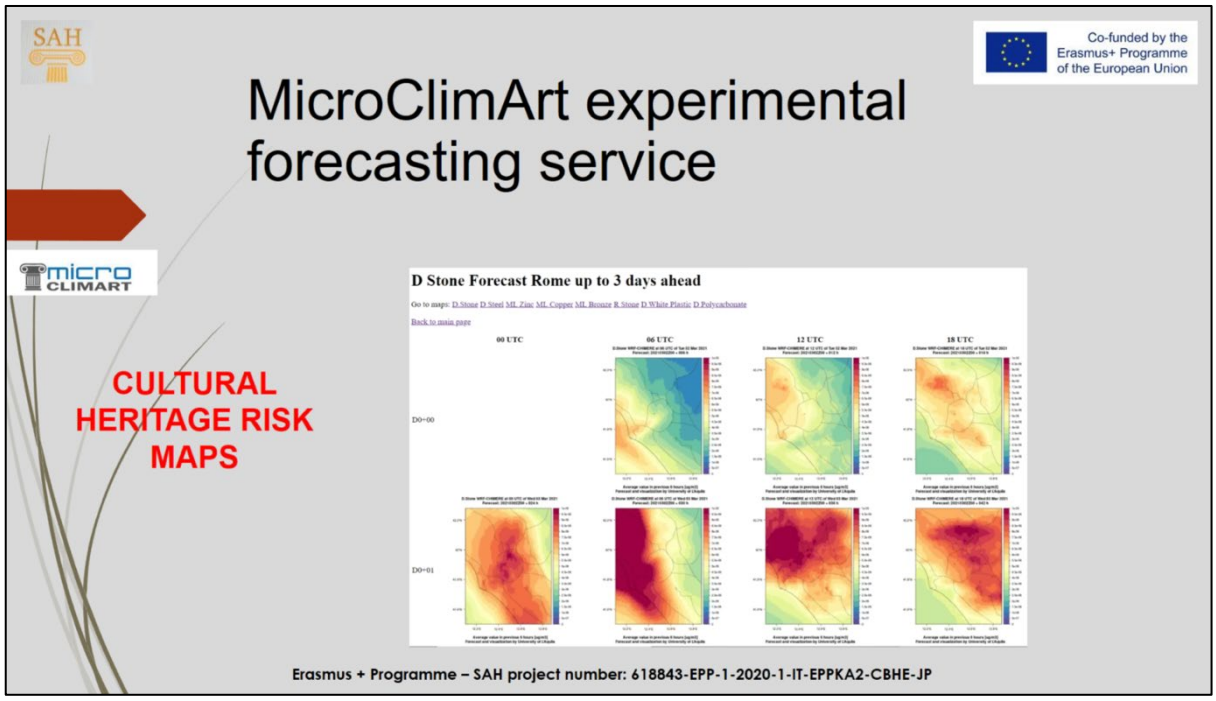
Report on the Presentation



The research project explored the results of developing a modelling system to predict the degradation of metals and stone that can be estimated from constantly evolving atmospheric agents.



The system will be further developed to assess the impact of atmospheric variables in climate change on the potential degradation of cultural heritage in the external environment,



Producing Cultural Heritage Risk Maps involving MicroClimArt experimental forecasting build upon mathematically defining 'dose-response functions' for the assessment of risks from atmospheric pollution to further define risk thresholds in real-time.

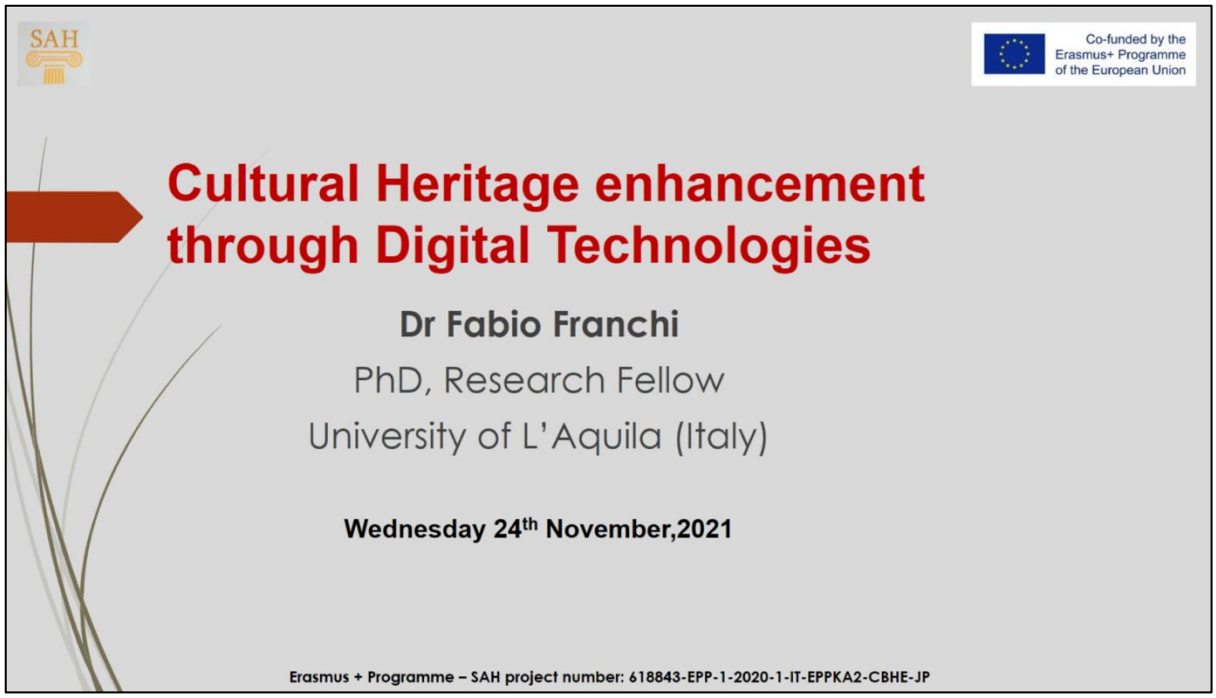
Cultural Heritage enhancements through Digital Technologies

Dr. Fabio Franchi
PhD Research Fellow, University of L'Aquila (Italy)

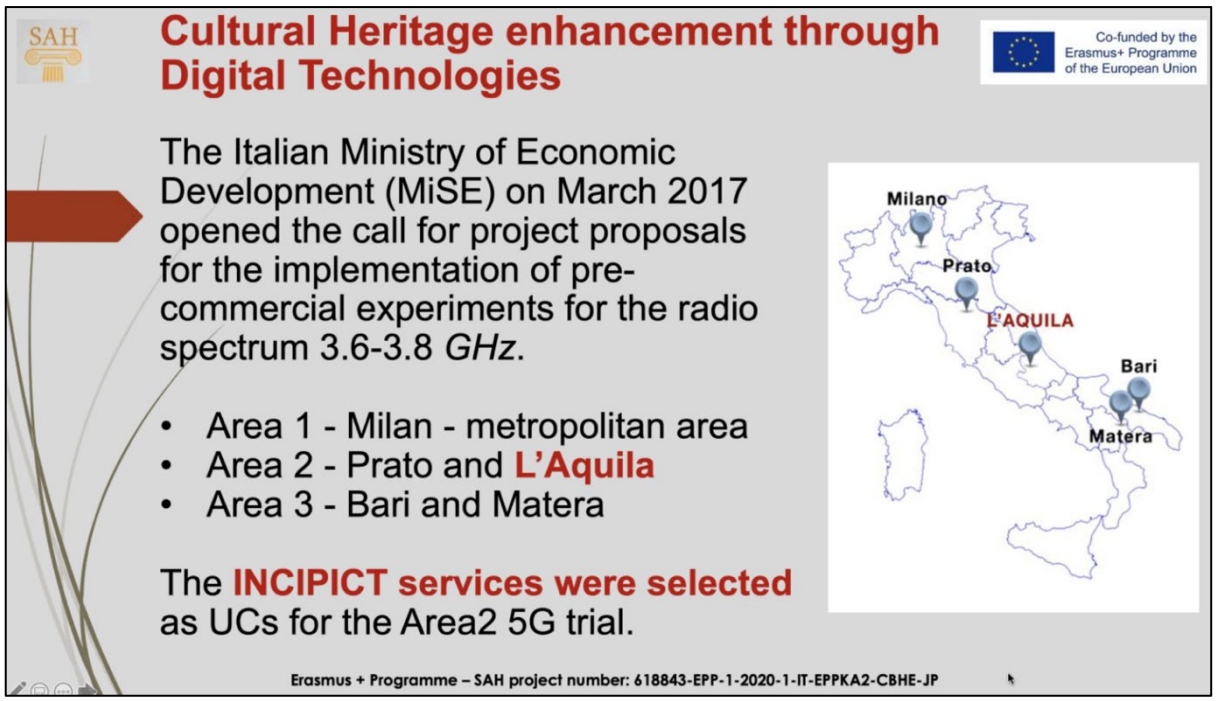
Abstract
The project looks at cultural heritage enhancement through digital technologies. This involves methodologies and devices for the development of an ecosystem to be used with the future 5G network. The current research focus is on concepts, methods, and tools in virtual/augmented reality, in addition to building information modelling, to investigating the possibilities of integrating new technologies into the preservation and valorisation of cultural heritage, with L'Aquila hosting the first Italian 5G Trial in July 2021.

Report on the Presentation

The University of L'Aquila is driving an ambitious project named *Innovating City Planning through Information and Communications Technologies* (INCIPICT) through collaboration with industry partners, universities, and research centres. The main objectives are in trialling, developing, and validating new applications and innovative technologies in the IoT and Smart City areas.



Triggered by a National initiative, this involves creating experimental optical networking for the L'Aquila city areas, and the construction of an innovative communication approach where information can be easily and efficiently accessed.



By combining laser scanning with building information modelling, created from libraries of parametric objects based on historic architectural rules a new concept is being proposed for the modelling of historic structures. this is expressed as Historic Building Information Modelling (HBIM) and differs from other approaches as the product is the creation of full 3D models, including details behind the object's surface regarding method of construction and underlying material.

Next Steps for COTAC and How You Can Help

Ingval Maxwell
Chair of COTAC

Abstract
For over six decades COTAC has been alive to and addressed ever-changing circumstances that have affected the future physical well-being of the built heritage, no less of which are the current concerns and impact of climate change. With a remit to help promote relevant standards in addition to producing and publishing education and training materials for conservation education and training, COTAC does so in conjunction with many others.

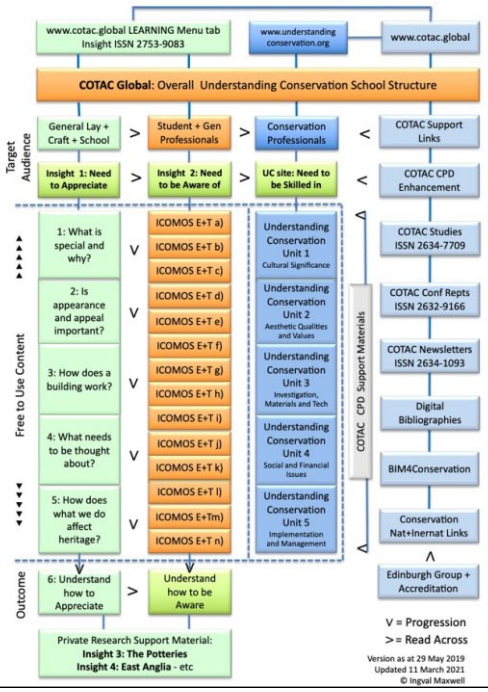
Report on the Presentation

At the heart of COTAC's activities, the Charity has fully adopted the ICOMOS Education and Training Guidelines and the intentions of BS 7913: 2013. Traditionally constructed and 20th C historic buildings derive value from their period, context, method of construction and fabric. Any changes to these factors can significantly negate this worth. Fundament in approach, COTAC believes in the need to broaden the conservation education and training base in the appreciation, awareness, and importance of the built heritage.

To that end COTAC has created freely downloadable self-learning materials within an integrated Understanding Conservation School Structure. This is accessible at www.cotac.global where, on opening introductory volumes for the three learning strands, a broad range of on-line users are guided through a developmental process, supported by

associated CPD materials for professionals. The presentation explored what COTAC materials are offered and concluded with some issues that warranted further consideration.

COTAC: Understanding Conservation School + Matrix



	a	b	c	d	e	f	g	h	i	j	k	l	m	n	score
Administrator or Owner			x	x				x	x	x		x	x	x	8
Archaeologist	x	x	x	x				x	x	x	x	x	x		10
Architect	x	x	x	x	x	x	x	x	x	x	x	x	x	x	14
Art/architectural Historian		x	x	x	x	x	x	x	x			x	x		10
Builder or Contractor		x			x	x	x	x	x		x	x		x	9
Conservation or Historic Buildings Officer	x	x	x	x	x	x	x	x	x	x	x	x	x	x	14
Conservator	x	x	x	x	x	x	x	x	x	x	x	x	x	x	14
Engineer (Civil or Structural)		x		x	x	x	x		x			x	x		8
Environmental Engineers			x	x	x	x	x	x	x		x	x	x		10
Landscape Architect or Historic Gardens Conservators	x	x	x	x	x	x	x	x	x	x	x	x	x	x	14
Master Craftworker		x				x	x	x	x		x	x	x		8
Materials Scientist		x		x	x	x	x	x	x		x	x	x		10
Building Economist (Quantity surveyor)				x			x	x	x	x	x	x	x	x	9
Surveyors	x	x	x	x	x	x	x	x	x	x	x	x	x	x	14
Town Planner			x	x			x	x	x		x	x	x	x	9
Curator	x	x	x	x	x	x	x	x	x	x	x	x	x	x	14

COTAC Continuing Steps: Relearning Awareness

On considering what the Next Steps might be it was suggested there was a need to:

- Consider how much new-build orientated Education and Training dominates the established learning institutes and professional bodies, and the imbalance this creates in the workforce when conservation, repair and maintenance work occasions some 40% of all construction industry activities

- Consider if the COTAC UC School Structure Matrix and learning materials have value in dealing with the existing building stock and how this can support Student developments, the Education and Training institutes, and various professional body Conservation Accreditation Schemes

- Consider the philosophical and ethical conservation language and terminology in the recognised Conservation Charters and Conventions, the practical relevance of *BS7913: 2013 Guide to the conservation of historic buildings* and associated researched information

- Consider the embodied energy, sustainability, significance and value of the existing built heritage stock, and the regional details and variations that exist in the diverse use of materials, previously exercised by traditional craft skills in their working methods.

- Consider and how these integrated aspects will continue to perform under increasing pressure and a growing apprehension created by continued exposure to, and threats from, the elements

Summary

Changes will be required to rebalance education away from new build to equally start considering the needs of existing structures to reflect the type of work currently being undertaken. With an emphasis that the refurbishment approach is much more carbon friendly than new build, such a message has become clear from the presentations offered during the Conference. This needs to be listened to and acted upon.

Comments and Questions from Day 2 Forum

Several lessons emerging from Day 1 of COTAC's 2021 Conference

This included expressed regret that, due to Brexit, the UK is denied continuing collaborative EU research working. With additional pressures emerging from climate change concerns, the is a need to:

- *Continue to target Politicians to become more aware of built heritage values*
- *Understand and fully appreciate the existing building stock and its details*
- *Map out and develop greater cooperation across the education and training worlds*
- *Create and promote career paths with explicit progression routes for students*
- *Communicate through lay, school, vocational, professional and client exchanges*
- *Disseminate relevant knowledge within a recognised multi-disciplinary matrix of need*
- *Recognise where gaps exist, and map these against current progress/pressures*
- *Uphold and promote recognisable terminology and accepted standards*
- *Look to the Past to learn Lessons for the Future*

How all this retrofitting and sustainable adaptations will be paid for?

In an answer it was pointed out that the current policy on VAT on refurbishment projects takes away money from those who will need it to make these changes happen. The current situation where new build is exempt from VAT actively discourages any attempt at reducing carbon emissions from buildings, so tends to contradict any Government policy on achieving a reduction in carbon.

How can the number of dwindling church goers afford to pay for the upkeep and retrofit of the churches?

Some communities are beginning to see cultural heritage as relevant to 'mission and ministry' and are using the churches for 'other' community activities (in rural areas where no alternative is available or unsuitable). Some grant funding is available, but significantly short of the amount required to make the buildings sustainable and energy efficient as required.

Culture is made up of many parts, peoples' roots being one of the fixed points.

Heritage and buildings in general, are not sustainable if they are not connected to the local culture, community and have a local identity. Governments need culture for people to identify with, for stability. There is concern that children will not have this link to the local community thanks to global communication taking over through their constant use of technology.

Training issues: We have a 10-year window to 'get it right'.

We are currently putting right the errors of the 1960s and 1970s (a third of Glasgow was rebuilt and the social fabric displaced). We are at the risk of suddenly having purpose and money but no strategy, so the money will be spent quickly, creating more mistakes. We need to be ready.

We need to concentrate on informing the un-converted, so we need a more attractive way of encouraging them to join in with the challenges

The overly complicated documents, especially the detrimental cost of buying BS/PAS publications, put people off using them

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2021 Conference Flyer

COTAC Conference 2021

'Protecting our world, protecting our heritage'

Developing skills, training, and expertise for the challenges ahead

When: Tuesday 23rd November 2021 09.45 – 13.00 and
Wednesday 24th November 2021 09.45 – 13.00

Where: The conference is to be held online hosted by IHBC

Who: Architects, Surveyors, Planners, Engineers, Conservators, Conservation officers, Contractors, Craftspeople, other heritage professionals, Educationalists running conservation courses, students in secondary and tertiary education, and those seeking training for accreditation and CPD.

What:

Tuesday 23rd November: Protecting our world: Climate change and the built heritage

- Key-note speaker
- Presentations on the expected impact of climate change on the built heritage, and the potential impact of climate change mitigation on the built heritage
- Round table Q&A discussion

Wednesday 24th November: Protecting our built heritage: Training, skills, and expertise

- Key-note speaker
- Presentations on ways to support the development of the training, skills, and expertise needed to protect the built heritage and reduce emission of greenhouse gases
- The benefits of online training – post Covid-19
- Round table Q&A discussion
- Next steps for COTAC and how you can help

COTAC – the Council on Training in Architectural Conservation - was formed in 1959, the Council's objectives are to advance the education and training of all those involved in the protection and preservation of the historic environment that is of cultural, architectural or historical value, and to provide knowledge in support of training and education in the arts and skills required to protect and preserve it.