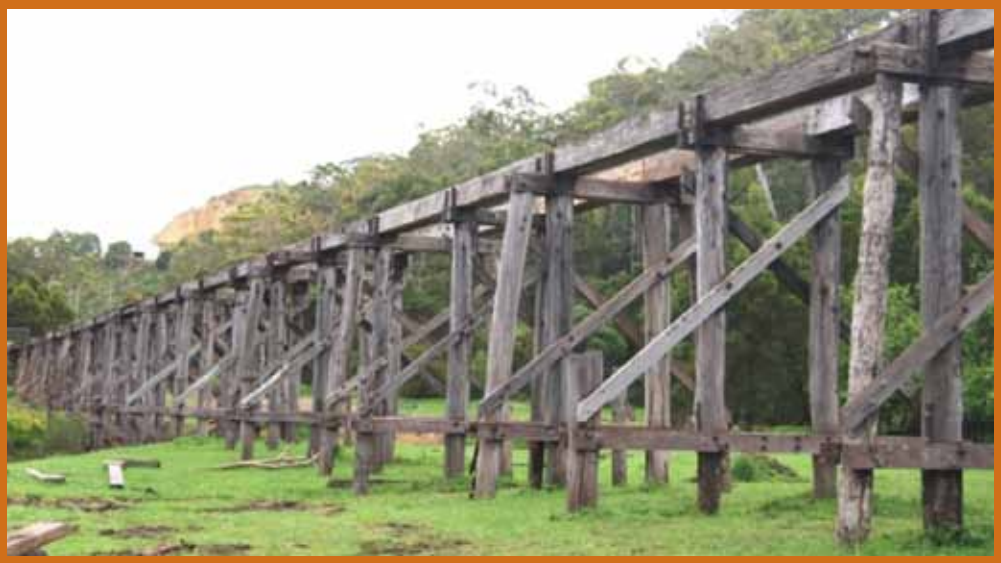
International Specialised Skills Institute

Preservation and Restoration of Timber Heritage Structures



Amy Chan

The Pratt Foundation/ISS Institute Overseas Fellowship

Fellowship supported by The Pratt Foundation

PRATT FOUNDATION

ISS Institute Inc
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Executive Summary

Heritage conservation in Australia has traditionally focused on monumental masonry structures and public buildings. Timber heritage conservation has attracted comparatively less attention within the heritage profession. There is a renewed interest in conserving industrial heritage, which features many Australian native timbers and unique construction methods.

Scarcity of quality timber and lack of tradesmen with traditional carpentry skills pose unique challenges to timber heritage conservation activities. Historic timber structures were often constructed of old growth native timbers that are becoming very scarce. The conservation of existing timber structures is, therefore, critical to ensure that such irreplaceable heritage fabric and the associated skills are not lost.

This report details the learnings gained by Amy Chan—The Pratt Foundation/ISS Institute Overseas Fellow—at the 14th International Course on Wood Conservation Technology (ICWCT) from 24 May to 2 July 2010. The ICWCT has been conducted in Norway biannually since 1984. Directed towards professionals who have been working for some years within the field of wood conservation, the course covers both theoretical and practical aspects of wood conservation from an interdisciplinary and global perspective. It provided a unique opportunity to share knowledge and experience with international colleagues including architects, conservators and engineers.

Through field work and lectures, the Fellow gained a deeper understanding of the properties of wood, factors affecting the decay of wood; principles of conservation at a global level; preventive conservation; conservation of objects and painted surfaces, including archaeological wood and furniture; conservation of wooden buildings and structures, including wood working tools and machinery.

Through meeting international colleagues, course participants discovered common aims and challenges in their work. Heritage conservation is a complex process of managing change as conflicting values often emerge. Various charters are available to guide the decision making, but actions must also be taken after ensuring an understanding of heritage significance and critical analysis.

In learning about conservation techniques and ongoing research into improving conservation practices, it is highlighted that conservation is not a static approach. Practitioners need to be creative and adaptable to make good use of technology in improving our work.

While modern technology can present opportunities, there is an urgent need to prevent the loss of traditional skills. We need to ensure that traditional craftsmanship is transferred between generations to preserve the intangible human quality and value of cultural heritage.

Table of Contents

Abbreviations/Acronyms

c.	circa
ICCROM	International Centre for Study of the Preservation and Restoration of Cultural Property
ICOMOS	International Council on Monuments and Sites
ICWCT	International Course on Wood Conservation Technology
ISS Institute	International Specialised Skills Institute
mm	millimetre
NIKU	Norwegian Institute for Cultural Heritage Research
NTNU	Norwegian University of Science and Technology
SPAB	Society for the Protection of Ancient Buildings
UNESCO	United Nations Educational Scientific and Cultural Organisation
UV	ultraviolet
vs	versus

Definitions

Design

Design is problem setting and problem solving. Design is a fundamental economic and business tool. It is embedded in every aspect of commerce and industry and adds high value to any service or product—in business, government, education and training, and the community in general.[1]

Innovation

Creating and meeting new needs with new technical and design styles. (New realities of lifestyle).[2]

Skill deficiency

A skill deficiency is where a demand for labour has not been recognised and training is unavailable in Australian education institutions. This arises where skills are acquired on-the-job, gleaned from published material or from working and/or studying overseas.[3]

There may be individuals or individual firms that have these capabilities. However, individuals in the main do not share their capabilities, but rather keep the intellectual property to themselves. Over time these individuals retire and pass away. Firms likewise come and go.

Sustainability

The ISS Institute follows the United Nations for Non-Governmental Organisations' definition on sustainability: *"Sustainable Development is development that meets the needs of the present without compromising the ability of future generations to meet their own needs".*[4]

The following definitions of heritage terms are extracted from The Burra Charter 1999, Australia ICOMOS[5]:

Adaptation

Modifying a place to suit the existing use or a proposed use.

Anisotropic

Material that does not behave the same way in all directions (e.g. wood). Wood is very strong along the grain, but against the grain, it will easily break.

The opposite of an anisotropic material is an isotropic material. Most metals (steel, aluminim) are isotropic materials. They respond the same way in all directions.

Conservation

The processes of looking after a place so as to retain its cultural significance.

Cultural significance

The aesthetic, historic, scientific, social or spiritual value for past, present or future generations. Cultural significance is embodied in the place itself, its fabric, setting, use, associations, meanings, records, related places and related objects.

Hewn Timber

Hewing is the process of shaping timber in to a square or rectangular beam using hand tools such as axes.

Interpretation

The ways of presenting the cultural significance of a place.

Definitions

Maintenance

The continuous protective care of the fabric and setting of a place, and is to be distinguished from repair. Repair involves restoration or reconstruction.

Preservation

Maintaining the fabric of a heritage site in its existing state and retarding deterioration.

Reconstruction

Returning a heritage site to a known earlier state and is distinguished from restoration by the introduction of new material into the fabric.

Restoration

Returning the existing fabric of a heritage site to a known earlier state by removing accretions or by reassembling existing components without the introduction of new material.

Acknowledgements

Amy Chan would like to thank the following individuals and organisations who gave generously of their time and their expertise to assist, advise and guide her throughout the Fellowship program.

Awarding Body – International Specialised Skills Institute (ISS Institute)

The International Specialised Skills Institute Inc is an independent, national organisation that for over two decades has worked with Australian governments, industry and education institutions to enable individuals to gain enhanced skills and experience in traditional trades, professions and leading-edge technologies.

At the heart of the ISS Institute are our Fellows. Under the **Overseas Applied Research Fellowship Program** the Fellows travel overseas. Upon their return, they are required to pass on what they have learnt by:

1. Preparing a detailed report for distribution to government departments, industry and educational institutions.
2. Recommending improvements to accredited educational courses.
3. Delivering training activities including workshops, conferences and forums.

Over 200 Australians have received Fellowships, across many industry sectors. In addition, recognised experts from overseas conduct training activities and events. To date, 22 leaders in their field have shared their expertise in Australia.

According to Skills Australia's 'Australian Workforce Futures: A National Workforce Development Strategy 2010':

> Australia requires a highly skilled population to maintain and improve our economic position in the face of increasing global competition, and to have the skills to adapt to the introduction of new technology and rapid change.
>
> International and Australian research indicates we need a deeper level of skills than currently exists in the Australian labour market to lift productivity. We need a workforce in which more people have skills, but also multiple and higher level skills and qualifications. Deepening skills across all occupations is crucial to achieving long-term productivity growth. It also reflects the recent trend for jobs to become more complex and the consequent increased demand for higher level skills. This trend is projected to continue regardless of whether we experience strong or weak economic growth in the future. Future environmental challenges will also create demand for more sustainability related skills across a range of industries and occupations.[6]

In this context, the ISS Institute works with Fellows, industry and government to identify specific skills in Australia that require enhancing, where accredited courses are not available through Australian higher education institutions or other Registered Training Organisations. The Fellows' overseas experience sees them broadening and deepening their own professional practice, which they then share with their peers, industry and government upon their return. This is the focus of the ISS Institute's work.

For further information on our Fellows and our work see http://www.issinstitute.org.au.

Acknowledgements

Fellowship Supporter

The Pratt Foundation was established in 1978 by Richard and Jeanne Pratt with the shared vision of supporting charitable enterprises and adding value to philanthropy. The Foundation is now one of the largest private sources of philanthropy in Australia. In the words of its mission statement, it aims *"to enrich the lives of our community"* and, in the words of Jeremiah, it works to fulfil this aim in a spirit of *"kindness, justice and equity"*. Amy Chan would like to thank them for providing funding support for this Fellowship.

Supporters

Course Organisers

- International Centre for Study of the Preservation and Restoration of Cultural Property (ICCROM)
- Norwegian University of Science and Technology (NTNU)
- Norwegian Institute for Cultural Heritage Research (NIKU)
- Riksantikvaren – The Directorate for Cultural Heritage, Norway
- United Nations Educational Scientific and Cultural Organisation (UNESCO)

Mentors

- Dr Liam Connell, University of Melbourne (Report Writing Mentor)
- Megan McDougall, Manager Assistance Programmes, Heritage Victoria (Professional mentor)
- John Shaw, Manager External Projects, Puffing Billy Railway (Industry Mentor)

Other Supporters

- Australia ICOMOS
- Ken Greenhill, General Manager, ISS Institute
- Paul Roser, Conservation Manager, National Trust of Australia (Victoria)
- Paul Sumner, former Fellowship Coordinator, ISS Institute
- David Young, ISS Institute Fellow and Heritage Conservation Consultant

Organisations Impacted by the Fellowship

Government

- Heritage Victoria, Department of Planning and Community Development
- Public Land Division, Department of Sustainability and Environment

Industry

- National Trust of Australia

Education and Training

- Cultural Heritage Centre for Asia and the Pacific, Deakin University

About the Fellow

Name: Amy Chan

Employment

- Project Manager, Woods Bagot Pty Ltd

Amy Chan was employed by Heritage Victoria at the time of the Fellowship and they supported her before and during her Fellowship. She is now employed at Woods Bagot Pty Ltd in the position of project manager where she manages a broad range of construction projects and provides specialist heritage input during the project inception and design phases.

The Fellow has worked as a conservation architect at Heritage Victoria, and was a member of the Heritage Council Technical Advisory Committee, which monitors the standards of technical advice provided by Heritage Victoria and the Heritage Council. She provided input into reviews of technical conservation issues, publications and training activities.

The Fellow is currently serving on the executive committee of the International Council on Monuments and Sites (ICOMOS), Australia.

Memberships

- Architects Registration Board of Victoria, (Registered Architect)
- Australia ICOMOS, Executive Committee member

Brief Biography

The Fellow has practiced as an architect in heritage conservation for over eight years. Currently based in Melbourne, she has spent extended periods in China and Japan undertaking heritage-related studies and work. She studied traditional Chinese architecture at Tsinghua University in Beijing in 1999, and was a consultant to the Asia Pacific Cultural Centre for UNESCO in Nara in 2003.

The Fellow is particularly interested in the technical aspects of built heritage conservation, including the properties and uses of traditional materials, building techniques and craftsmanship. She wishes to promote the awareness and protection of traditional craft skills as intangible heritage. This interest was initially inspired from experiences in Japan, where the management and protection of intangible cultural heritage is highly developed and intrinsically incorporated into the conservation of places.

The Fellow became an Associate Member of the ICOMOS International Committee on Intangible Cultural Heritage in 2010. She is committed to promoting a broad, international and progressive approach to cultural heritage conservation practices.

Aims of the Fellowship Program

The aims of the Fellowship program were as follows:

- To improve environmental sustainability in the practise of timber heritage conservation practice, by learning about appropriate ways to conserve existing timber structures that minimises environmental impact.
- To obtain a global perspective on timber conservation methods, by analysing the application of internationally recognised conservation charters in projects with consideration of specific cultural and socio-economic contexts.
- To evaluate timber conservation techniques and their applications, and learn traditional carpentry techniques no longer widely practised in Australia.
- To analyse timber properties and identify decay mechanisms by site inspections, learn to accurately diagnose problems with historic timber structures, and specify appropriate conservation procedures.

The Australian Context

Australia has a well-established heritage conservation industry, and through the development of internationally recognised guidelines such as the Burra Charter as early as 1979, Australia is considered a leader for heritage conservation in the Asia Pacific region.

Due to rapid global changes in technology and shifting priorities, the philosophy and practice of heritage conservation needs to be regularly reviewed within an international context. Only then can Australia uphold its reputation and leadership role in the region.

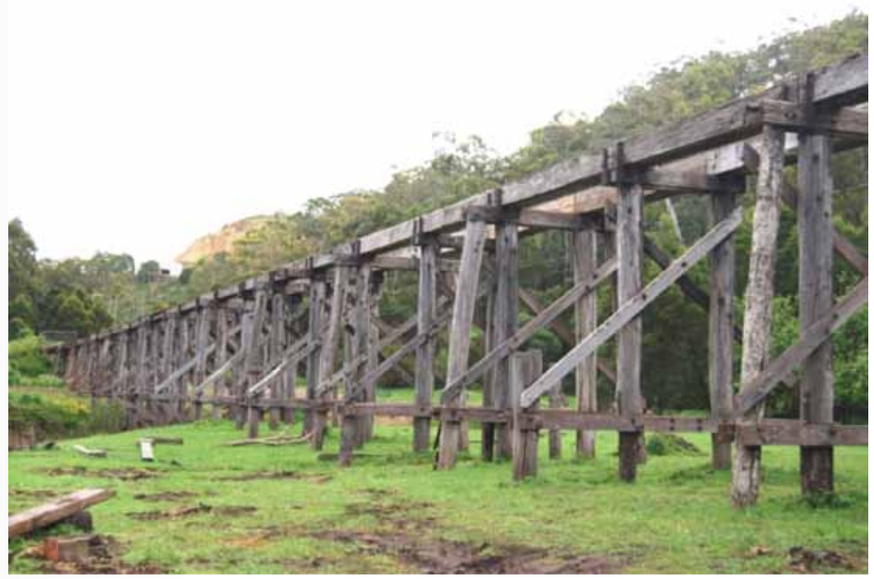
Heritage conservation in Australia has traditionally focused on monumental masonry structures and public buildings. Timber heritage conservation has attracted comparatively less attention within the profession. There is a renewed interest in conserving industrial heritage, many of which feature Australian native timbers and unique construction methods.

Australia's industrial heritage is represented by timber trestle bridges, wharves, and rural structures, as well as storage and manufacturing facilities. Many of these structures are in a state of poor repair and neglect. There is an urgent need to develop expertise in timber conservation, and establish guidelines within the heritage profession to ensure the preservation of Australia's unique timber heritage.

The following are selected examples of timber heritage conservation projects that the Fellow has managed during her work at Heritage Victoria. These projects were funded by the State Government of Victoria, under the 'Strengthening our Community' program. They provide an overview of some of Victoria's unique timber-built heritage, and highlight the various challenges associated with the conservation of timber heritage in Australia.

Curdies River Bridge, Timboon, Victoria

Repair and upgrade of the former timber rail bridge for pedestrian access as part of a recreational 'rail trail'. Due to the difficulty in sourcing high quality matching replacement wood (Australian red gum), recycled wood was used for the repairs to the structure.

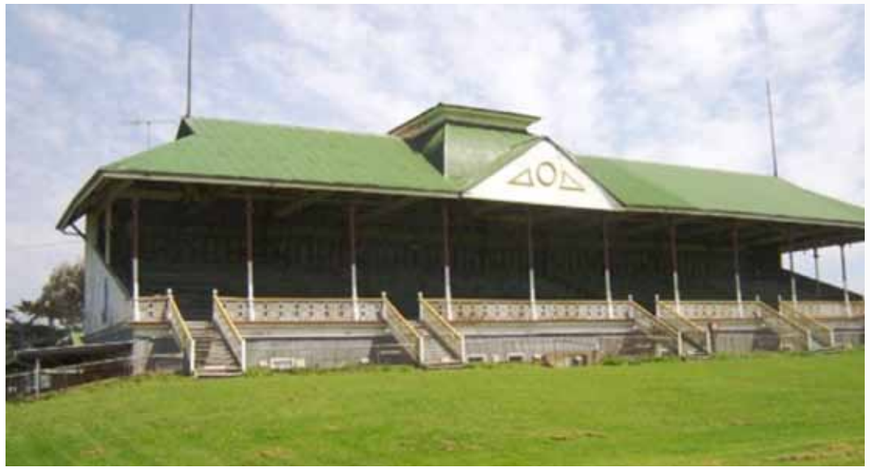


Curdies River Bridge, Timboon, Victoria

Grandstand, Camperdown, Victoria

Replacement of termite infested timber columns and stairs. Wood matching the size and properties of the original timber columns is no longer available.

Innovative engineering enabled the use of smaller sections of wood. Although using steel was a cheaper option, the use of wood preserved the integrity of the original design intent.



Grandstand, Camperdown, Victoria

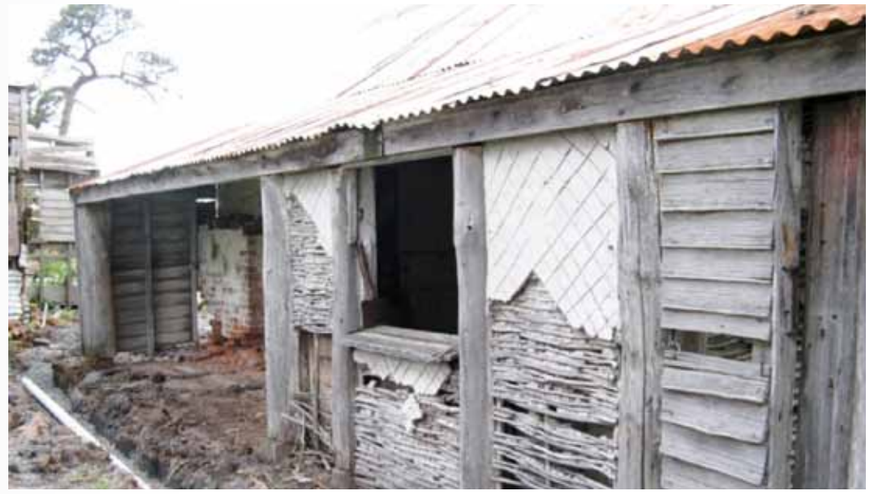
Gulf Station, Yarra Glen, Victoria

Conservation and repair of various farm buildings of 19th century vernacular timber construction. Many of the buildings feature timber posts set into the ground as a main component of the framing. The base of most timber posts was rotted and repair involved splicing in new sections using traditional carpentry techniques.

Gulf Station, Yarra Glen, Victoria

Hawthorn Bank, Yarram, Victoria

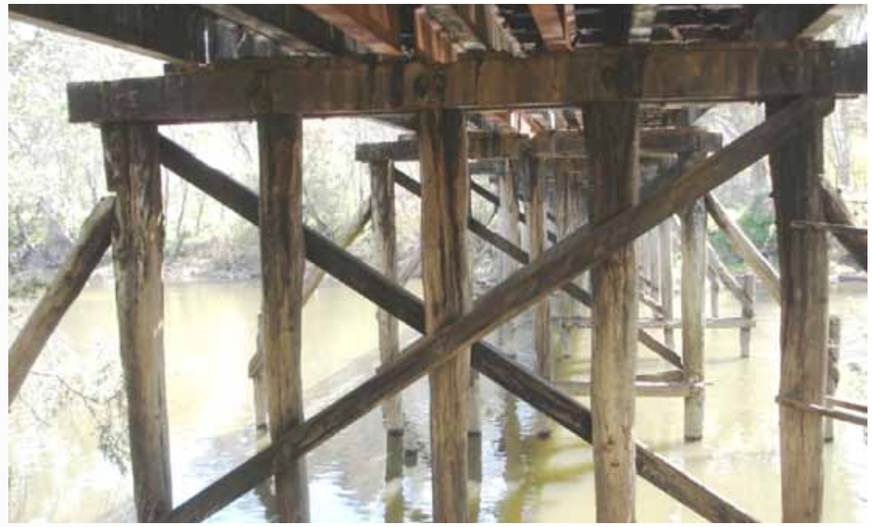
Stabilisation works to the 1840s farm cottage, which was in an advanced state of deterioration. Works include the preservation of wattle and daub walls that have had inappropriate cement repairs, and improving drainage around the building.



An 1840s farm cottage in an advanced state of deterioration

Old Goulburn River Bridge, Seymour, Victoria

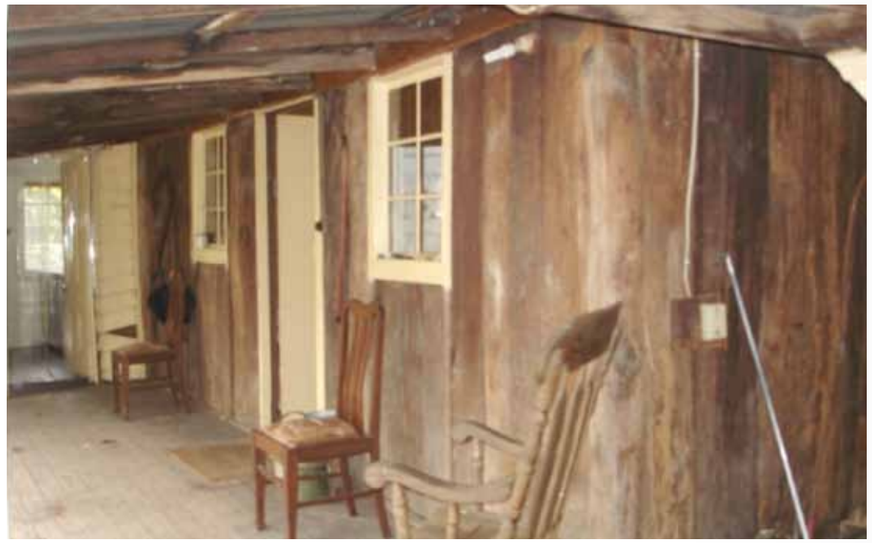
Repair and upgrade of the timber road bridge for pedestrian access as part of a recreational trail. Challenges included difficulties in accessing the sub-structure from the river during the repair works, and selecting a contractor with appropriate skills and experience.



Old Goulburn River Bridge, Seymour, Victoria

Sages Cottage, Baxter, Victoria

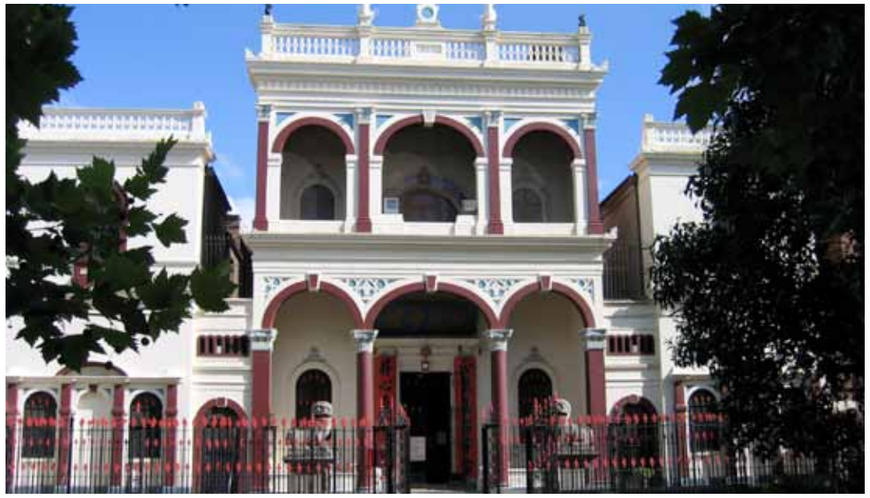
Repair of the 1870s main homestead, which features vertical timber slab construction—a bush carpentry technique consisting of split timber slabs set into grooved top and bottom plates.



Caption: Sages Cottage, Baxter, Victoria

See Yup Temple, South Melbourne, Victoria

Cleaning and recording of over 13,000 wooden ancestral tablets, these tablets are objects of worship and record the names and birthplaces of deceased members of the Melbourne Chinese community from the See Yup district (southern China) since the 1860s.



See Yup Temple, South Melbourne, Victoria

Timber Bridge, Crossover, Victoria

Engineering assessment of the timber road bridge and installation of interpretation signage. The engineering report will establish the scope of works and costs to enable further development of the project. Subject to funding availability, the bridge will be repaired and re-opened to the public as part of a cross-regional walking trail.

Timber Bridge, Crossover, Victoria

SWOT Analysis

Strengths

- Australia has a well-established heritage conservation industry.
- Australia is considered a leader for heritage conservation in the Asia–Pacific region.

Weaknesses

- Heritage conservation in Australia has traditionally focused on monumental masonry structures and public buildings. Timber heritage conservation has attracted comparatively less attention within the heritage conservation profession.
- Redundant historic structures are costly to maintain and repair.
- There is a lack of skilled traditional carpenters able to undertake sympathetic repair to historic timber structures.

The Australian Context

Opportunities

- There is a renewed interest in conserving industrial heritage.
- Promote adaptive reuse of historic structures.
- Promote awareness of timber heritage.
- Promote training opportunities.

Threats

- Many timber heritage structures are in a state of poor repair and neglect, and are at risk of loss if conservation treatment is not applied in the near future.
- Lack of funding for conservation projects.
- Depleting natural resources: old growth timber.

Identifying the Skills Deficiencies

1. Improve environmental sustainability in timber heritage conservation.

Historic timber structures were often constructed of old growth native timbers that are becoming very scarce. The conservation of existing timber structures is, therefore, critical to ensure that such irreplaceable heritage fabric and the associated skills are not lost. However, facing a shortage of matching timber for repairs, the conservation of historic timber structure poses conflicting challenges: while it is desirable to conserve such structures, the sourcing of matching timber for repairs is problematic and needs to be minimised to conserve our natural resources.

Learning about alternative techniques for repairing timber structures will lead to more innovative conservation solutions. Understanding about timber properties and behaviour will inform decisions on appropriate substitute timber species to specify in repairs, in order to reduce the demand for old-growth native timbers.

In a global context of depleting natural resources, built heritage conservation will play an increasing role in environmental sustainability by ensuring the survival and reuse of existing structures.

This understanding will lead to a reduction in waste and the need for new material resources that are scarce or high in embodied energy. Built heritage conservation is essentially large-scale recycling; learning about more efficient conservation practices, therefore, provides significant environmental benefits in the long term.

2. Review heritage conservation principles in Australia in the global context.

Various conservation charters have been developed around the world, reflecting local contexts and requirements. The co-existence of various internationally recognised heritage conservation charters suggests that conservation philosophies need to reflect specific cultural circumstances. The practical implications of this will be investigated by analysing the practices and techniques adopted for the conservation of historic timber structures in various countries

This will lead to a synthesis of the principles and best practices worldwide, enabling a critical review of our application of the Burra Charter in timber conservation practices in Australia.

3. Traditional carpentry techniques for application in timber heritage conservation.

Australia's, and specifically Victoria's, early settlement and pastoral history have produced a legacy of unique timber structures, ranging from modest slab huts to spectacular timber trestle bridges. These structures reflect our pioneers' resourcefulness in fashioning bush tools and building with available local resources. While some historic timber structures have survived, the practice of traditional carpentry and bush carpentry is disappearing, and our native timber resources are depleting.

Learning about traditional carpentry is important in ensuring sympathetic repairs to historic timber structures, and in the process, preserve the associated intangible cultural heritage (i.e. traditional skills).

As traditional carpentry is not commonly practised or consistently taught in Australia, this knowledge can only be gained by visiting workshops and sites overseas where traditional carpentry techniques are still widely used.

4. Conserve historic timber structures by accurate diagnosis and applying appropriate conservation solutions.

Correct diagnosis of issues causing defects is vital in the conservation of historic structures, as the causes must be treated before the cure. Observing the behaviour of timber structures in various contexts and sites through case studies overseas will complement the Fellow's theoretical knowledge of timber properties and decay mechanisms.

Timber decay is usually caused by a common set of conditions (e.g. moisture, insects, ultraviolet [UV]), but decay manifests itself in different ways due to variable factors such as timber species and site conditions. The diagnosis of the causes of decay is, therefore, not always straightforward and must be informed by experience.

Being exposed to more examples of timber decay on old structures occurring under different conditions has improved the Fellow's ability to accurately analyse problems and advise on appropriate conservation procedures. Having an opportunity to learn from experts in countries with an abundance of timber heritage structures has enabled the Fellow to acquire and bring back specialist knowledge that is currently lacking in Australia.

The International Experience

The ICWCT, UNESCO, Norway

The Fellow attended the 14th International Course on Wood Conservation Technology (ICWCT) from 24 May to 2 July 2010. The ICWCT has been conducted in Norway biannually since 1984. Directed towards professionals who have been working for some years within the field of wood conservation, the course covers both theoretical and practical aspects of wood conservation from an interdisciplinary and global perspective.

The six-week program consisted of lectures, laboratory exercises, conservation workshop exercises, field studies, museum visits and excursions. Topics covered include the properties of wood; factors affecting the decay of wood; principles of conservation at a global level; preventive conservation; conservation of objects and painted surfaces including archaeological wood and furniture; conservation of wooden buildings and structures, including wood working tools and machinery.

The ICWCT is organised under the auspices of UNESCO by:

- ICCROM
- Riksantikvaren – The Directorate for Cultural Heritage, Norway
- NTNU
- NIKU

Further information about the ICWCT can be obtained from their website: http://www.iccrom.org/eng/01train_en/announce_en/2010_05woodNor_en.shtml

Objectives and Outcomes

This section details the training activities the Fellow undertook during the ICWCT and highlights the key learnings. The content is structured around the topics covered in the course over five distinct units.

Unit 1: Wood Properties

Locations:

- Oslo University laboratory
- Vikingskipshuset

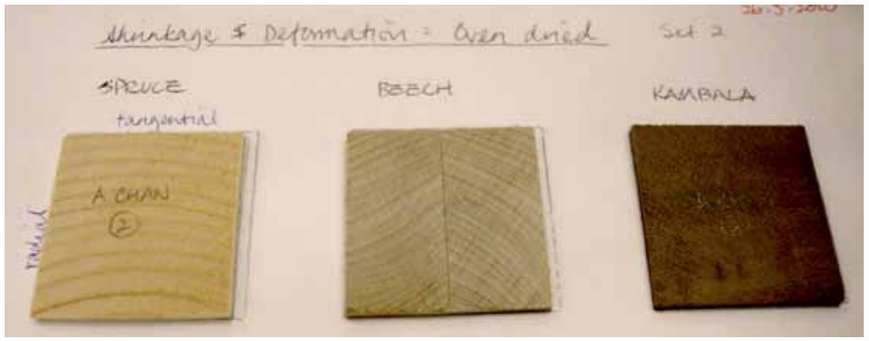
The objective of this unit was to achieve an understanding of the properties of wood and its behaviour as a material. The microscopic anatomy of wood was examined, which highlighted the factors that affect the strength, durability and processes of wood deterioration. Past and current techniques in the conservation of archaeological wood were reviewed. The technologies being developed in commercial timber seasoning (drying) processes and current wood modification research to enhance the durability of the material were also discussed.

A series of laboratory experiments were undertaken at Oslo University. The anatomic structures of hardwoods and softwoods were examined under a microscope, and the behaviour of various species of timber in wetting (swelling) and drying (shrinkage) was compared and analysed.

The key learning from this unit was that the properties and behaviour of wood not only vary greatly between different species but also within the same species. This is due to the anisotropic nature of the material, that is, the transverse, radial and tangential directions of wood exhibit different properties. No two pieces of wood are the same, and it is due to this unique quality that makes timber such a versatile and aesthetically interesting material.

Factors that influence the properties and longevity of timber include the growing condition of the tree, the way the wood is cut, the seasoning method, its use and surface finishes (e.g. axed vs sawn surface, the application of protective coatings).

While modern chemical wood modification processes that enhance the durability of timber are available, these artificial treatments are not reversible and often compromise other desirable properties of timber. Correctly selecting and handling wood, applying common sense in design and diligence in routine maintenance are more reliable methods to ensure the longevity of timber. These are also more economical and environmentally friendly approaches.



Different species of timber exhibit different shrinkage (top) and swelling (bottom) behaviour. The samples tested were spruce, beech and kambala.

Unit 2: Environment & Decay

Location: Riksantikvaren conference centre, Oslo

This unit examined the causes of wood deterioration, including biodeterioration caused by fungi and insects, and the effects of inappropriate environmental conditions such as exposure to UV, humidity and water, temperature, location and weathering.

Other risks such as natural disasters, fire, vandalism and theft were also considered. The control of such risks in both the building/structural and museum contexts was discussed.

Most factors that cause wood to deteriorate can be effectively controlled or eliminated. The fundamental principle is to minimise contact with water, as this would eliminate fungal attack and significantly minimise opportunities for insect infestation. This is commonly achieved by applying surface treatment such as paint, oil and tar, which is traditionally used in Norway. However, good design and appropriate detailing are often overlooked. Incorporating eaves and drip lines in buildings to protect vertical timber surfaces, keeping timber components off the ground, applying appropriate surface treatments, ensuring good site drainage and ventilation are some of the key considerations in building with timber.

Good design can nevertheless be compromised by inappropriate repair or later modifications. Building extensions or modifications that block off ventilation are one of the most common problems that the Fellow has observed as an architect. This could result in the rapid deterioration of original building fabric. Applying careful analysis and a logical approach before implementing change is critical to the long-term conservation of structures and objects.

An important lesson is that to treat a problem is often more costly than investing in appropriate preventative measures in the first place. In addition to financial loss, the negative environmental and health consequences of applying remedial treatments need to be considered. For example, highly toxic chemicals are used in fumigation processes—some of these chemicals are now banned in many countries. Museums are also favouring natural or passive environmental control over air-conditioning due to an increasing awareness of environmental responsibility.

Unit 3: Conservation Theory & Principles

Locations:

- Stave church, Uvdal, Bryggen World Heritage Site, Bergen
- Historic Cluster farm, Otternes
- Stave church, Borgund
- Stave church, Urnes
- Stave church, Lom
- Garmo farms
- Søre Harildstad farm, Heidal
- Sveinhaug farm, Heidal
- Cathedral, Domkirkeodden, Hamar
- Sælid farm, Ridabu
- Horne farm, Ilseng

In this unit, conservation approaches were reviewed from a historical perspective, and the application of conservation theories was explored. Challenges faced by managers of historical places were discussed at various sites. Issues such as changes in use, redundancy of buildings due to socio-economic developments, the use of substitute modern materials in repairs and appropriate interpretation/ reconstruction approaches were discussed.

The discussions highlighted that cultural heritage conservation is fundamentally a process of managing change. Change is inevitable, but it can be managed to preserve a sense of cultural continuity and identity that underpins human civilisation. The development of conservation theories and principles addresses the need to guide the decision making process involved in managing change.

Significant development in conservation theories occurred in the 19th century in Europe, within a context of rising nationalistic and nostalgic sentiments combined with an interest in science and historical knowledge.

The conservation movement led by William Morris in England resulted in the establishment of the Society for the Protection of Ancient Buildings (SPAB) in 1877. This was one of the first institutions dedicated to the conservation of historical structures.

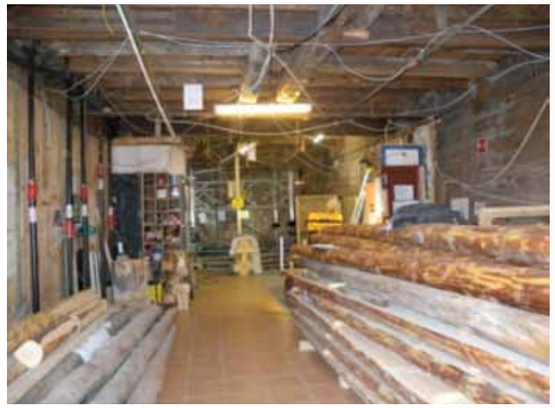
Throughout the 20th century, international guidelines for cultural heritage conservation were manifested in various charters adopted by UNESCO, including the more recent Burra Charter (Australia, 1999), The Nara Document on Authenticity (Japan, 1994), and the China Principles (China, 2002). These charters reflected the evolving perceptions of cultural heritage values, which are contextual and not absolute. There is also a need to review conservation approaches within different cultural contexts to reflect unique practices and traditions that are also intrinsic to cultural heritage.

Cultural heritage conservation in Australia is premised on the principles set out in the Burra Charter. Fundamentally it describes a conservation process based on identifying the significance of a heritage object or place, and making decisions that minimises negative impact on or loss of heritage values.

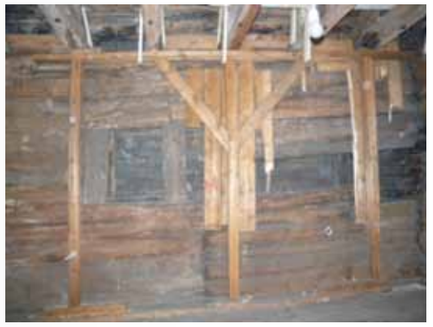
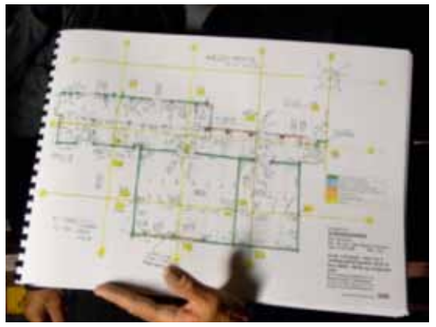
The pitfall is that guiding principles can be misused when applied as prescribed methods either through complacency or by using 'rules-of-thumb' without understanding the ethos of the principle. This could lead to the perception of heritage conservation as irrelevant, impracticable and regressive in the public realm. It is important to remember that heritage conservation is a process of managing change. A progressive and adaptable approach informed by critical analysis should be the basis of sustainable and valid conservation practices.

Conservation & Technology


Left and right: An old warehouse by the wharf undergoing restoration, Bryggen World Heritage Site, Bergen

Left and right: An old warehouse by the wharf undergoing restoration, Bryggen World Heritage Site, Bergen

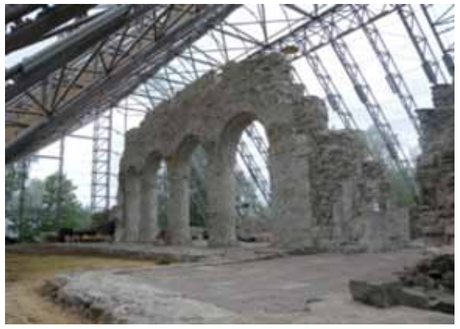



Left and right: An old warehouse by the wharf undergoing restoration, Bryggen World Heritage Site, Bergen

Bryggen World Heritage Site, Bergen: This settlement in Bergen was established 1017. The World Heritage listed timber structures present major technical challenges in their conservation. Built on a timber raft footing system, substantial settlement has occurred, causing deformation of the building structure. While concrete had been used in previous repairs as a means of improving structural stability, it is no longer considered acceptable as it compromises the authenticity of the structure.

Recent research provided an insight into the remarkable durability of the foundation timber: the high salt content was found to prevent fungal and insect attack. Restoration work focuses on conserving original fabric and using traditional techniques and matching materials. Laser technology is used in site surveys to overcome the difficulty of measuring these deformed and haphazard structures.

Protection vs Authenticity & Interpretation

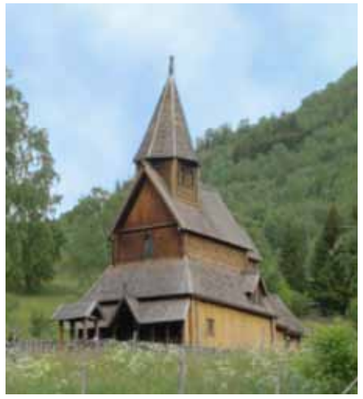



The glazed steel superstructure built over the ruins of the cathedral, Domkirkeodden, Hamar, to enable climate control

The cathedral ruins inside the glazed steel superstructure

Cathedral, Domkirkeodden, Hamar: The Romanesque cathedral in Hamar was destroyed by fire during the Swedish-Norwegian War. The ruins have been preserved since the 1870s. In the 1980s, frost-cracking was causing the rapid deterioration of the stones.

Following an architectural competition, a glazed steel superstructure was built over the ruins to enable climate control. The space is constantly heated to prevent frost. While this provided a technical solution to the frost problem, the enclosure altered the presentation of the ruins in its landscape. This was a contentious project at the time. The glazed superstructure has since been embraced as a new icon for the town.



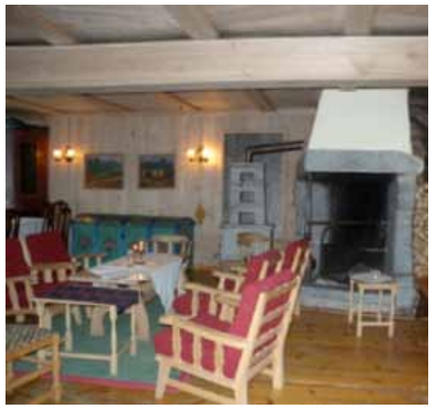
Stave Church, Urnes

This church exhibits rare and superb examples of medieval Scandinavian carved panels

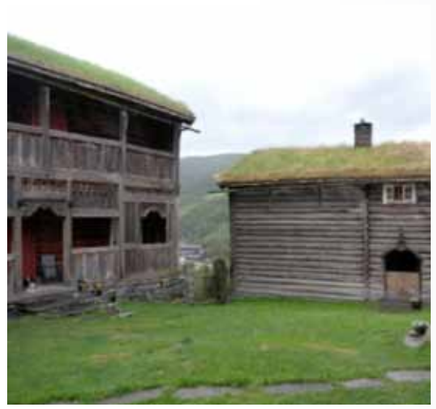
Stave Church, Unes: This is the oldest surviving stave church in Norway, with materials dated from c. 900s. The church exhibits rare and superb examples of medieval Scandinavian carved panels.

The option of removing the carved panels and relocating them to a museum for better preservation was considered; however, retaining the panels in situ as part of the church was determined to be more important. As a means of protecting the gable panels, which are in the most exposed location, a cover panel was fitted in 1902. This cover is only opened on special occasions for public viewing of the carvings.

Redundancy & Adaptive Reuse



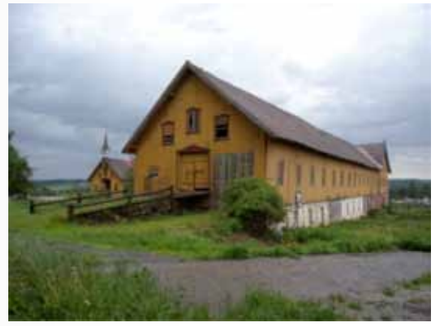
Søre Harildstad farm, Heidal



Søre Harildstad farm, Heidal

Søre Harildstad farm, Heidal: Constructed in c. 1899, eight generations of the same family have resided on this farm. Restoration work commenced in the early 1900s during a surge of interest in vernacular architecture following the independence of Norwary in 1905.

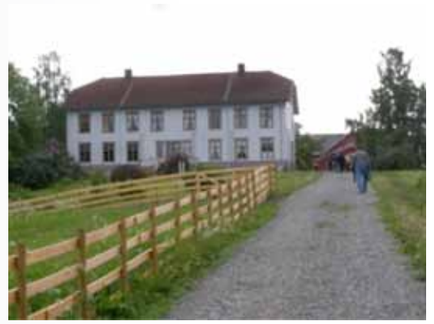
The current owner offers accommodation in the farmhouse as a means of generating income for the ongoing maintenance of the property.



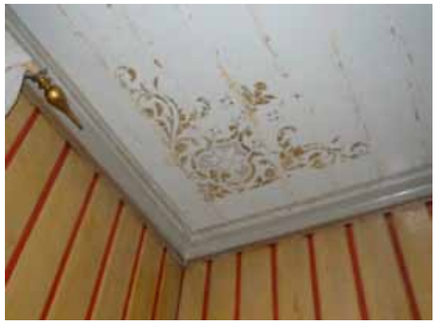
Horne Farm, Ilseng

Horne Farm, Ilseng

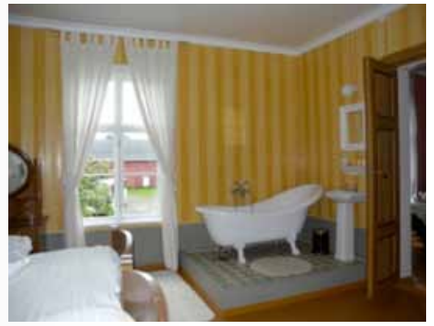
Horne Farm, Ilseng: Constructed in the early 1900s, this huge barn reflects the significant changes in farming practices in the past century. Once labour intensive, farming had become mechanised after World War 2 due to increased labour costs. The owner recalled that at its height, the farm once employed over 30 workers, and this shed (see above) was full of animals and produce. With changes in farming methods, the shed has become redundant and its future is uncertain given the high cost of maintenance. Opportunities of adaptive reuse need to be explored for this significant structure to have a viable future.



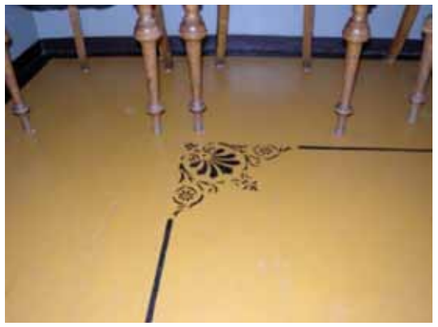
Sveinhaug Farm is a classical European-villa-style house and is of log construction and clad in timber



Conservators from the local museum were consulted to assist in recovering the original stencilling



The restored internal decorative scheme



Another example of the recovered original stencilling

Sveinhaug Farm: Constructed in c. 1850 is a late classical European villa style house. It is of log construction and clad in timber. The current owner restored the internal decorative scheme. Conservators from the local museum were consulted to assist in recovering the original stencilling. The interior was painted according to the original colour scheme. This property is now operating as a guesthouse.

Unit 4: Conservation of Objects & Surfaces

Locations:

- Museum of Cultural History
- University of Oslo Conservation Laboratory

This unit examined the various techniques conservators apply when restoring timber objects, including antique furniture, ethnographic materials and medieval polychrome sculptures. A critical consideration in material conservation is to preserve historical evidence.

Historical evidence may not be obvious and can include original brush and tool marks that provide insights into traditional techniques and date of production, dirt and impurities on surfaces that could reveal the origin and uses of the object, and fragile surface finishes that are intrinsic to the aesthetic intent of the creator.

The guiding principle is to *"do as much as necessary but as little as possible"*.[7] Non-invasive, reversible techniques are now favoured by conservators.

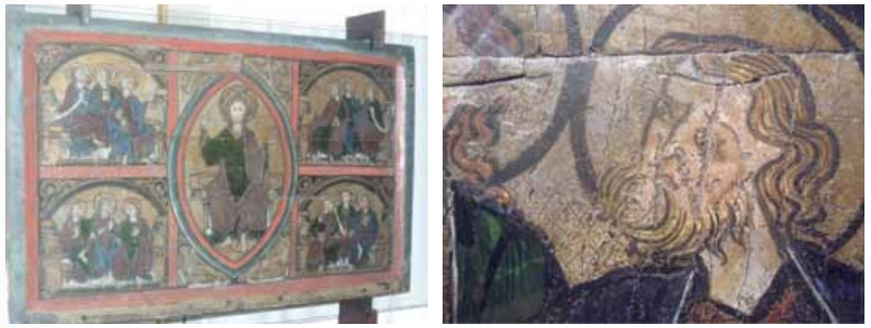
While preservation primarily prevents further deterioration and retains an object in its found condition, restoration aims to reinstate a significant aspect of an object, which may be desirable to enhance an understanding or appreciation of an object.

Restoration poses a range of challenges, as it raises questions such as to what period/state do we restore? How can the restoration be distinguished from the original fabric? How would the restoration alter the presentation and understanding of the object? What is the significance of the object – will this be enhanced or diminished by the proposed intervention? All of these issues need to be considered when determining an appropriate course of action.

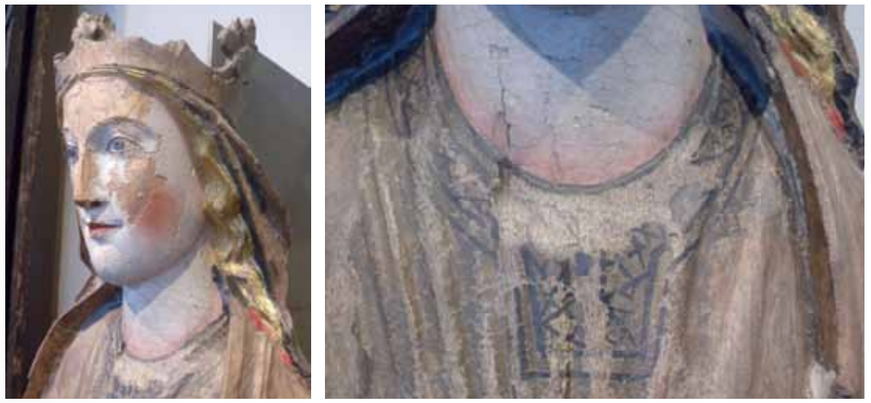
The approach adopted in the restoration of medieval polychrome artwork illustrates these considerations. Polychromatic surface treatment was a popular decorative technique that involved the application of pigments over layers of ground, which consisted of various materials. Polychromatic decorations are intrinsic to the original artistic intent, and the layers of materials reveal historical information such as traditional techniques and tools, as well as trade routes.

Conservator Kaja Kollandsrud, from the Museum of Cultural History, explained that the principle in restoring medieval polychrome artworks is to maintain their value as historical documents while balancing the need to preserve and present their aesthetic intent. Careful judgment is required to avoid excessive intervention, which would compromise the authentic presentation of the piece. Focus is, therefore, on retouching to achieve a unified picture.

The photos illustrate the subtle touching up of damaged areas by applying a neutral tone to, and in, the damage, rather than attempting to reinstate the original finish. This assists the viewer to complete the picture without drawing attention to the damaged areas, while preserving and presenting the historical authenticity of the piece.



Left: Altar front panel, c. 1250, Heddal Church, Notodden, Telemark. Right: Close-up view of the altar front panel. Damages such as cracks and missing patches can be observed on close examination. Restoration focused on blending the damage in to enable the viewer to read the piece.



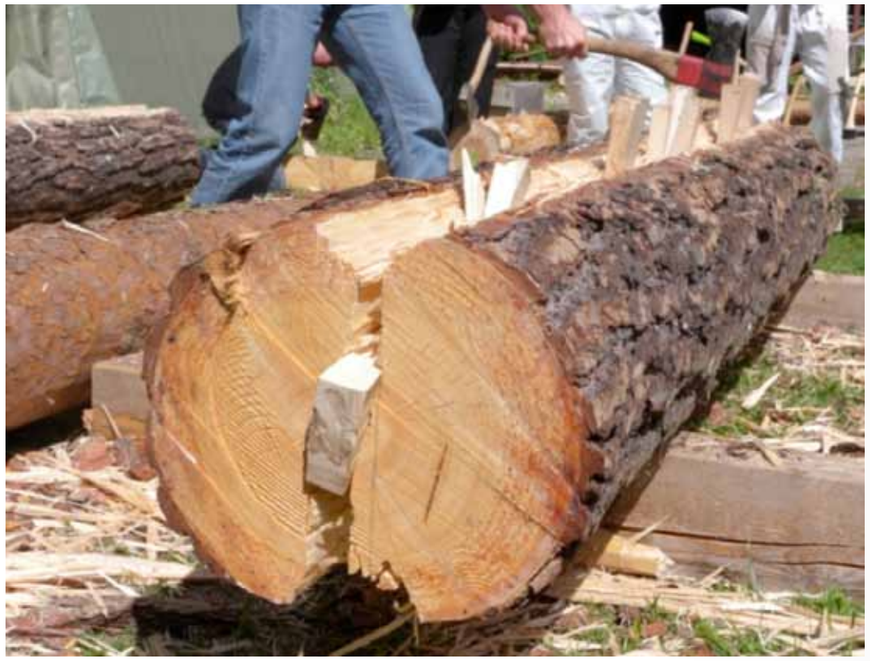
Left: Virgin with child, c. 1250–1260, Hillestad Church, Botne, Vestfold. Right: Close-up view of the Virgin with child restoration touch up. Missing details are not reinstated to avoid conjecture and preserve authenticity. There is sufficient information for the eyes to interpret the artistic intent.

Unit 5: Conservation of Built Structures

Location: Norsk Folkemuseum

A series of practical workshops in traditional building techniques were held at the Norsk Folkemuseum. The museum was established in 1894 during a period of Swedish rule in response to a desire to reinforce a sense of Norwegian national identity. The museum showcases Norwegian culture through its extensive collection of folk art, costumes, furniture and tools, church art and other objects from all socio-economic groups in Norway. It also includes an open air museum consisting of vernacular buildings relocated from all over the country. A majority of these are timber structures, including a stave church and various rural dwellings.

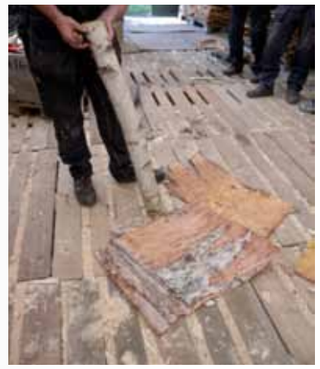
The museum's in-house team of carpenters apply traditional techniques in the maintenance and restoration of the museum's buildings. Logs are split, cut and hewn with axes; birch bark roofing methods are applied; traditional finishes are used. This ensures that authentic details are replicated, preserving the aesthetic and historical values of the structures. Of equal importance is that in the process of practising traditional skills and craftsmanship, such intangible heritage is also preserved.



Splitting a low, using an axe and wooden wedges

Left: Hand-sawing planks from a log. This did not become popular until the 19th century, when steel saw blades were produced. Prior to that, only forged iron saws were available – they were easily blunted and not easy to sharpen. Right: The saw cuts on the downward pull; the person above guides the saw along.

Left: Hewing wood using an axe was the method of creating a smooth surface finish before hand planes were invented in the 12th century. This process is labour intensive, but produces a durable finish as the split face retains closed cells on the surface. Right: The axes used in the workshop demonstration were modelled on traditional axes. Blades of different shapes and weights were made for different purposes.

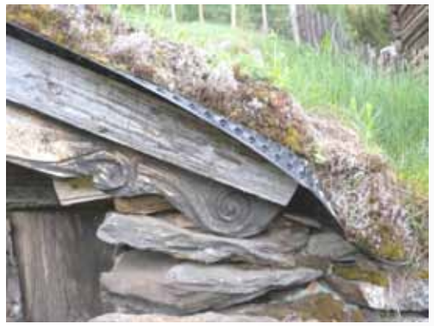


Left: Birch bark is harvested in summer in 15-year cycles. Right: Birch bark has high acidity and can be up to 3–4 mm thick. It is an insect-resistant and waterproof material.

Laying a birch bark roof over a planked roof

Laying a birch bark roof over a planked roof

A traditional birch bark roof, consisting of layers of over-lapping birch bark as waterproofing, with soil above for insulation



Synthetic material is often used as a cheaper alternative to birch bark

Unfortunately, the reality is that outside the museum context, it is usually not possible to undertake conservation work in such a faithful manner due to economic constraints. Mass-produced synthetic materials present cheaper substitutes for traditional materials, and modern mechanical processes yield faster and less labour intensive results. The challenge for heritage professionals is to manage such changes. Most historic structures that the profession deals with are not museum pieces – they must remain functional and viable. There needs to be a balance between progress and preservation; conservation practitioners need to engage with modern technology as a potential solution to sometimes conflicting values.

An area of increasing concern is the loss of traditional trade skills—an intangible but equally significant aspect of cultural heritage. While modern techniques and materials may sometimes present a viable conservation option, the loss of traditional skills is an emerging issue. In our mechanised, high technology society, the need to preserve rare traditional skills is more pronounced. Skills must be transferred across generations. Unless conscious efforts are made to promote and teach traditional skills, such intangible heritage can be lost within a generation.

Concluding Remarks

The learnings gained through the ICWCT enabled the Fellow to appreciate that the ethos underlying heritage conservation activities and many of the challenges conservation practitioners face around the world are common. Those involved all work to preserve intrinsic cultural heritage values by managing change. This is a complex process as conflicting values often emerge. Various charters are available to guide the decision making, but actions must also be informed by an understanding of heritage significance and critical analysis.

In learning about conservation techniques and ongoing research into improving conservation practices, it is highlighted that conservation is not a static approach. Practitioners need to be creative and adaptable to make good use of technology in improving our work.

While modern technology can present opportunities, there is an urgent need to prevent the loss of traditional skills. We need to ensure that traditional craftsmanship is transferred between generations to preserve the intangible human quality and value of cultural heritage.

Knowledge Transfer: Applying the Outcomes

How to Share the Knowledge?

As a member of the Australia ICOMOS Executive Committee, the Fellow is well placed to bring the need to address skill deficiencies in traditional trades to the attention of her professional colleagues. Being the peak international organisation for heritage conservation, ICOMOS regularly liaises with its membership and government bodies to address emerging issues and promote best practice in heritage conservation. As a member of the Australia ICOMOS Executive Committee, the Fellow can provide direct input into the ongoing discourse on heritage conservation practices in Australia.

The Fellow can also share the experience and knowledge she has gained overseas through ICOMOS events and presentations, which target heritage professionals as well as the general public. As an associate member of the ICOMOS International Committee on Intangible Cultural Heritage, the Fellow wishes to encourage further recognition and protection of traditional trade practices as intangible cultural heritage.

Recommendations

Government

- Partner with educational institutions in promoting specialist traditional trades courses.
- Provide subsidy/scholarship programs to encourage and attract young apprentices.
- Provide competitive job opportunities to qualified graduates e.g. Reinforce the demand for specialist heritage tradesmen by introducing standards that prescribe the quality of work on conservation projects, and regulations that require the engagement of specialist tradesmen on conservation projects.
- Promote community awareness and appreciation of the skills of heritage tradesmen through public events such as workshop demonstrations, open days at conservation project sites.

Industry

- Increase dialogue with trade associations to communicate the need for specialist tradesmen qualified to undertake heritage conservation work.
- Host seminars and events such as site tours of conservation projects that are in progress to foster mutual understanding and cooperation.

Professional Associations

- Encourage and promote membership of traditional tradesmen to increase participation and input into the ongoing discourse on heritage conservation practices.
- Engage with industry bodies and host joint events to increase networking between professionals and tradesmen within the heritage industry. Foster exchange of knowledge and cooperation.

Education and Training

- Introduce specialist heritage trade programs to address skill deficiencies and industry needs. Programs should target young trainees to promote a career in heritage conservation.
- Introduce shorter programs aimed at experienced tradesmen who wish to pursue work in heritage conservation.
- Work with government to ensure an appropriate industry accreditation system is established to recognise the skills of heritage tradesmen.

Community

- The community represents consumers that ultimately drive the demand for skilled tradesmen. Government, industry and educational organisations, therefore, need to invest in promoting the value of specialist input on conservation projects to the public.

ISS Institute

- Establish an online directory of overseas Fellows and their specialisation to facilitate industry/public access to resources.
- Host events targeting particular industries to facilitate networking between Fellows and industry groups (e.g. education sector, environmental sector, trade associations).
- Promote the value of ISS Institute's activities and Fellowships through appropriate marketing to government and peak industry organisations.

References

Endnotes

[1] *Sustainable Policies for a Dynamic Future*, Carolynne Bourne AM, ISS Institute 2007.

[2] Ibid.

[3] *Directory of Opportunities. Specialised Courses with Italy. Part 1: Veneto Region*, ISS Institute, 1991.

[4] World Commission On Environment and Development 1987, *Our Common Future*, Oxford University Press, Oxford, United Kingdom.

[5] *The Burra Charter: The Australia ICOMOS Charter for Places of Cultural Significance*, Australia ICOMOS, 1999.

[6] Skills Australia's *Australian Workforce Futures: A National Workforce Development Strategy 2010*, pp. 1-2. http://www.skillsaustralia.gov.au/PDFs_RTFs/WWF_strategy.pdf

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