



Traditional Wooden Boatbuilding and Restoration in the New Millennium



Terence Lean

'06 National Overseas Fellowship

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Executive Summary

The purpose of the Fellowship was to undertake an overseas study program in New Zealand and Norway, to gain a comprehensive understanding of the traditional wooden boat building techniques used in these countries and how they are integrating using modern products and techniques into their work. The fellow also wanted to learn how they are teaching tradesmen to preserve and restore historically important boats and what training programs are available on the use of traditional wooden boatbuilding and how these programs are delivered.

In the last two centuries Australia has been a maritime nation with a legacy of various types of wooden boats, many of which are still in existence and date back to the 1880's. If the historical and cultural significance of these boats is not recognised they may be lost forever as a timber boat has a limited lifespan. In many ways these vessels are living history. By studying their construction we can learn much about what materials and methods were used at specific periods in time. So while the preservation of maritime culture and heritage is in the hands of a few individual devotees we will continue to lose not only these boats but also the history and culture that created them in the first place. In Australia there is not enough done to promote our maritime cultural heritage to the broad base community. In Australia today, boat restoration/preservation projects are largely carried out by individual boat owners employing individual tradesmen or boat sheds, with no outside funding or assistance.

This history, and the current context of boat building in Australia, identifies the need to retain traditional wooden boatbuilding skills and promote the importance of these skills so underpinning skills so important to the preservation and building of wooden boats is not lost. It must be acknowledged that skills and knowledge and the ability to problem solve can be transferred to more contemporary boatbuilding. As economic pressure mounts to purchase product offshore, the direct result is a shrinking demand for skilled tradespeople. Traditional wooden boatbuilding is highly labour intensive and requires tradespeople with specialised skills. This means we have to design the very best training packages available for our boat builders and restorers.

This fellowship program has realised the opportunity to study the design and delivery of traditional wooden boatbuilding and restoration training and to judge if it meets industry needs, to study boatbuilding/restoration methods and make observations against Australian practice and to ascertain whether New Zealand and Norway are recognising and meeting local skills shortages. The knowledge gained will allow the fellow to address skills shortages in Australia through recommendations made at the conclusion of this report. Opportunities for transferring the knowledge gained through this fellowship can be created through ISS Institute, organised presentations, publishing and generally liaising with the industry. It is apparent that we may lose the skills identified if we do not develop a greater awareness of our culture, heritage and the specialised skills needed to build, restore and present traditional wooden boats. We are in danger of losing skills developed over hundreds if not thousands of years and whilst skills and the training of them must evolve, if we lose traditional skills in any trade we are losing not only history and culture but valuable transferable skills and therefore the ability to preserve our history.

It is well documented that Norway has been building wooden boats for practical and recreational use for at least 1000 years. In Australia our boatbuilding, as in New Zealand only dates back 200 years. In Norway and New Zealand the traditional wooden boat community promotes itself as being historically and culturally important. In both countries the boating public and the boat building industry are very aware and appreciative of function, beauty and cultural importance of their traditional wooden boats. Within the Australian context, it is apparent that education is vital to establish wider community awareness of local maritime culture and the importance of the role wooden boats have played through our short history. By studying maritime culture in New Zealand and Norway knowledge, insights and ideas will be explored, which will provide opportunities to

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promote, advise and improve understanding and acceptance of traditional wooden boat culture in Australia.

There are a number of stakeholders who will benefit from addressing skills gaps that can be addressed through site visits in New Zealand and Norway.

Specific skills and knowledge gaps to be addressed include:

- Construction methods used in traditional New Zealand and Norwegian boat building.
- Application of current technology in the restoration of traditional wooden boats.
- Application of current technology in the building of traditional wooden boats.
- The relationship of modern technologies and traditional methods, including product knowledge.
- Sustainability of supply of traditional wooden boats for restoration.
- Strategies for promoting traditional wooden boatbuilding/repair methods to tradesmen.

In order to effectively address the skill gaps identified throughout the application process, the following activities were undertaken during the course of the Fellowship:

- Visits to traditional wooden boat restorers in both New Zealand and Norway to obtain information on how they implement their methods and technology to suit different vessel types and constructions.
- Investigation of boatbuilding training packages and their delivery in New Zealand.
- Discussion with New Zealand and Norwegian boat builders regarding the sourcing and use of indigenous timbers (the availability of these timbers are an integral part of the restoration and building process).
- Visits to museums and cultural centres in New Zealand, England and Norway to gain an appreciation of the background and history of the boats and boatbuilding of those countries.
- Investigation of the balance of contemporary composite to pure traditional method in the restoration/repair of traditional wooden boats and how the philosophy may vary from country to country.
- Investigation of the relationship between traditional wooden boat owning community and boatbuilding industry by meeting with individuals, associations and industry representatives.

These objectives were achieved by:

- Undertaking a study program on the North Island of New Zealand and particularly in the greater Auckland area to gain a comprehensive understanding of the method, materials sustainability and training delivery.
- Visiting museums in Norway to understand how they present the importance of coastal culture and maritime history.
- Undertaking a study program of marine preservation and training centres in Norway to identify how they combine their boatbuilding training packages and boatbuilding method while providing interpretation and museum opportunities to the public.

Following an overview of the fellowship experience, a series of recommendations are made to government, industry, and the business sector, professional associations, education and training providers, our community and the ISS Institute.

Abbreviations and Acronyms

ISS Institute	International Specialised Skills Institute
TAFE	Technical and Further Education
MAST	Marine and Safety Tasmania
BIA	Boating Industry Association of NSW
SBA	Shipwrights and Boatbuilders Association of NSW
GRP	Glass reinforced plastic – fibreglass
BITO	Boating Industry Training Organization
DPIWE	Department Primary Industries and Water and Environment
RTO	Registered Training Organisations
CAD	Computer aided design

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Acknowledgements

1.1 General acknowledgement statement

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

1.2 Specific acknowledgements

1.2.1 International Specialised Skills (ISS) Institute Inc

Over twenty years ago Carolynne Bourne AM recognised the need to work holistically across occupations and industry sectors and build bridges along the way - filling skill deficiencies and skill shortages; valuing the trades as equal, but different to professional disciplines; using 'design' (problem solving) as a critical factor in all aspects of work; working in collaboration and enhancing communication (trades and professional); learning from the past and other contemporary cultures, then transposing those skills, knowledge and insights, where appropriate, into today's businesses.

In 1990 she met Sir James Gobbo AC, CVO who was seeking to address a critical need in Australia, namely the retention and enhancement of skills and knowledge of artisans and tradesmen and joined Sir James as the founding CEO of International Specialised Skills Institute (ISS Institute).

ISS Institute has successfully functioned as an independent, national organisation, committed to identifying skill deficiencies through market research and meeting associated need through its 'Overseas Skill Acquisition Plan (Fellowship Program)', education and training activities and consultancy services.

Based on experience and acute insights gained over nearly two decades, ISS Institute has developed extensive expertise in the development of the knowledge economy encompassing high level skills and knowledge underpinned by design and innovation across industries and their related occupations.

ISS Institute has an extensive record in assisting Government and non-Government organisations, firms, industry bodies, professional associations and education and training institutions to identify skills deficiencies and deliver practical solutions.

ISS Institute has been integral to the success of organisations and individuals seeking solutions with regard to optimising and enhancing existing abilities and establishing new directions and strategies for workplace practices.

A key initiative of ISS Institute is the 'Overseas Skills Acquisition Plan (Fellowship Program)'. The ISS Institute Fellowships are an exciting and unique opportunity for Australians to enhance their capabilities.

The Fellowship Program is the means by which skill and knowledge gaps are identified and verified, and then matched to overseas organisations where the skills can be acquired. Australians are presented with an opportunity to travel overseas, or for experts to travel to Australia. Importantly, Fellows must pass on what they have learnt through their Report and participate in a range of education and training activities and events such as workshops, lectures, seminars, forums, exhibitions and conferences.

The activities place these capabilities, plus insights (attitudinal change), into the minds and hands of those that use them - trades and professional people alike - the multiplier effect. Individuals gain; industry and businesses gain; the Australian community gains economically.

For further information contact Ms Carolynne Bourne AM, CEO

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Acknowledgements

1.2.2 Fellowship sponsor

I would like to express my sincere gratitude to Carolynne Bourne AM and Jeanette McWhinney at the ISS Institute for all their support and guidance during the planning of my study trip. Without their assistance I would probably still be in the planning stage. DEST provides national leadership and works in collaboration with the States and Territories, industry, other agencies and the community in support of the Government's objectives. They develop and implement policies to ensure the continuing relevance of education, science and training to contemporary needs and the growing requirement for lifelong learning. They also ensure high quality and value for money in delivering Government funded programmes. I would like to thank them for providing funding support for this Fellowship.

1.2.3 Fellowship supporters

In Australia

- Master Shipwright - Bernie Skinner
- 2005 ISS TAFE Fellow - Rick Mitchell

In New Zealand

- Salthouse Boatbuilders Ltd - John and Judy Salthouse, Directors and staff
- New Zealand Maritime Restoration School Trust - Jay Lawry, CEO
- Colin Brown Shipwright Ltd - Colin Brown, Director
- New Zealand Boating Industry Training Organisation - Robert Brooke
- Classic Yacht Association of New Zealand - Tony Blake, chairman and the executives
- Royal New Zealand Yacht Squadron - Members and staff
- New Zealand Ferry Restoration Trust - Peter McCerdy

In Norway

- Naval Architect - Barry Spradbrow
- Hardanger Faroyvernserter - Geir Madsen and staff
- Master, Colin Archer, Rescue Ship - Knut Von Trepken
- Solander School - Neils-Peter Rasmussen, Director
- Earling, bosun, Anna Christina

1.2.4 Individuals/organisations/companies involved in the development of the overseas program

Two key individuals contributed to the development of the overseas program:

- Carolynne Bourne AM from ISS Institute was integral to the process and suggested Norway as a possible destination.
- Bernie Skinner – (Master Shipwright originally from New Zealand), provided an introduction to John and Judy Salthouse of Salthouse Builders – one of the last family owned and operated waterfront based boatbuilding and repair sheds in Auckland.

1.2.5 Australian Organisations Impacted by the Building & Construction Industry

Marine and Safety Tasmania (MAST)

Marine and Safety Tasmania is a statutory authority that was established on 30 July 1997 to manage all the functions relating to the safe operation of all recreational boats and commercial vessels up to 500 tonnes, or 35 metres in length, in Tasmania. For the first time in the State, there is one organisation that is responsible for the management of all

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Acknowledgements

vessels, licensing of operators and the oversight of a wide range of marine facilities. Two of the primary roles of the Authority are to ensure the safe operation of vessels in all Tasmanian waters and to manage its marine facilities. MAST has taken over the regulatory and safety functions performed by the former Marine Boards including the registration of vessels, licensing of speedboat operators and the management of moorings. The third role which is to manage environmental issues relating to the operation of vessels only relates to the specific issues relating to ensuring commercial vessels comply with the Pollution of Waters by Noxious Substances Act.

The general management of environmental issues is governed by the Environmental Management and Pollution Control Act 1994 which is managed by the Department of Primary Industries Water and Environment (DPIWE). MAST has no control over planning matters. This is governed by the Land Use Planning Approvals Act 1994 managed by local government and DPIWE. A large number of marine facilities have been transferred to MAST including jetties, boat ramps and navigation aids previously owned by the Department of Transport and the Marine Boards. The Marine Boards have divested themselves of all boat ramps and jetties and all the navigation aids that are outside their immediate port areas or are not part of their core commercial activities. MAST is managed by a board appointed by the Minister for Infrastructure, Energy and Resources, which represent the various sectors of the boating community and at the same time is drawn from all parts of the State.

Forestry Tasmania

Forestry Tasmania is a Government Business Enterprise with a board of Directors. The company manages 1.5million hectares of State forest, employs 586 personnel, with total assets of A\$842 million. Forestry Tasmania also has a partnership to manage softwood plantation jointed ventures with American companies. Forestry Tasmania produces about 3 million tonnes of wood per year, consisting of sliced veneer logs, peeled veneer logs, sawlogs, pulp logs, woodchips, fuel wood and other forest products. Forestry Tasmania produces both hardwood and softwood logs.

Technical and Further Education (TAFE)

The following TAFE organisations are involved in the delivery of training packages for boat builders in Australia. This overseas fellowship program has provided an opportunity to study and analyse the structure and delivery of overseas training and draw comparisons and make relevant recommendations.

TAFE NSW
TAFE Victoria
TAFE South Australia
TAFE Queensland

Wooden Boat Centre Tasmania

The old traditional skills of wooden boatbuilding are taught here to a new generation of craftspeople from all over the world. The Wooden Boat School provides the only course where students create a full-sized, carvel planked, sea-going cruising vessel "from lofting to launch" as part of their program. For the past 12 years they have concentrated on a Diploma course - an intensive, full time, 18 month course. Many of its graduates have gone on to build careers in boatbuilding, all over Australia and internationally. From 2006 they will be offering instead a new 12 month course, the Certificate in Traditional Wooden Boatbuilding, as well as a range of short courses in a variety of different aspects of wooden boat building.

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It should be noted that the Wooden Boat Centre Tasmania focuses on building new boats to traditional methods and offers no training in repair/restoration. Nor does it research, document or archive records.

Australian Wooden Boat Festival

Held on Hobart's historic waterfront every two years during February, the Australian Wooden Boat Festival celebrates maritime craft, art and heritage. From the inaugural event in 1994, when 180 wooden boats graced Hobart's docks, The Australian Wooden Boat Festival has grown to become one of the nation's most exciting and spectacular celebrations. In 2005, more than 40,000 visitors admired 450 superb wooden craft of all shapes and sizes, including international exhibits like the two replica Viking boats from Denmark. The presence of remarkable wooden boats like this has made the festival the biggest event of its kind in Australia and given it international recognition as a maritime festival of the highest quality. The Australian Wooden Boat Festival is an iconic event on Tasmania's biennial calendar. It is strongly supported by the Government of Tasmania, Hobart City Council, Hobart Ports Corporation and a range of business and community groups. New to the festival in 2007 is the Shipwrights Village where crafts and skills of wooden boat building will be on display.

Shipwrights and Boatbuilders Association of NSW

The SBA is primarily a division devoted to Boat Building and Repairer Services. They are unique in NSW, encompassing company membership, individual tradesman, apprentices and sub-contractors, and also providing a forum to address issues relevant to the industry and trade needs.

The SBA's main objectives include:

- Creating a forum through which members can obtain continuing education and upgrading of skills and knowledge through accreditation, trade nights, seminars, demonstrations and product promotions.
- Developing and recognising a code of work practice.
- Fostering consumer and government recognition through association self-regulation.
- Providing a recognised identity for association members.

SBA Services include:

- Boat Building to your plans and specifications - Timber - Fibreglass - Steel - Aluminium
- Custom design and refitting.
- Maintenance and repairs on all vessel types.
- Anti-fouling.
- Safety Checks.
- Spray-painting.
- Sign-writing and Decals.

Australasian Institute of Marine Surveyors

The Australasian Institute of Marine Surveyors was formed in 1985 and was formally incorporated in 1986. Most full members have qualifications at least as Master Mariner, Chief Engineer or equivalent in other acceptable disciplines and have at least five years full-time experience in survey work. Many have over twenty five years experience. Continuing professional development is actively encouraged and an educational programme

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Acknowledgements

for new entrants is under active development. Members of AIMS have different fields of expertise. Some are qualified in commercial hull and cargo matters, while others specialise in the fields of engineering, marine insurance claims or oils and chemicals.

Wooden Boat Association of NSW Inc

The Wooden Boat Association of New South Wales is part of the national Australian community of wooden boat enthusiasts. Their purpose is to enjoy, share and promote an appreciation of wooden boats of all shapes and sizes, old or new. The current membership of the association stands at around 250, which increases monthly.

Wooden Boat Guild of Tasmania

Given that Tasmania is home to one of the world's finest boat building timbers, Huon Pine, it's not surprising that it is also home to some of Australia's finest wooden boats. As well as being the destination for one of the world's premier off-shore yacht races, Hobart is also host to Australia's premier wooden boat show. The keepers of wooden boat heritage and craft in Tasmania are the Wooden Boat Guild of Tasmania who see their role as being one of nurturing and educating in the art of wooden boat building and restoration.

Classic Yacht Association of Australia

Values and activities of the Association include:

- History and aesthetics of fine sailing yachts.
- Encouragement of the sailing of classic yachts.
- Organisation of races and other events.
- Bringing classic yachts and their crews together.
- Encouragement of the restoration and maintenance of classic yachts.
- Nurturing of the preservation of Australian yachting history.
- They have a focus that is primarily enjoyable and secondarily competitive.

A classic yacht is difficult to precisely define. It is probably more than thirty years old since its launching and it is probably of a traditional timber construction, although these are not necessarily true. The design, rigging and nature of construction will probably be traditional. The history and achievements of the yacht may also be of significance. The CYAA currently has around 350 members and about 200 yachts on the register. There are two categories of annual membership in the CYAA, Boat owner and Crew member.

Chapter 2

About the Fellow

Name: TERENCE JOHN LEAN

Contact Details

Lean Marine Survey Pty Ltd
 374 Saddle Road
 Kettering Tasmania 7155 AUSTRALIA
 Phone/Fax 61 3 6267 4314
 Email lean_marine@internode.on.net

Qualifications

Fully Qualified Shipwright
 Certificate IV Assessment and Workplace Training
 Accredited Chainsaw Operator
 Licensed Radio Operator – VHF and HF
 AYF Inshore Certificate – endorsed as Instructor Inshore No 2261
 AYF Coastal Skipper Certificate No 0578
 Motor Boat Licence
 Marine Surveyor
 ISS 2006 Fellow

Memberships

Shipwright and Boat builders Association of NSW (Level 1 Member)
 Royal Yacht Club Tasmania
 Wooden Boat Guild, Tasmania
 Member of the Australian Wooden Boat Festival
 Australasian Association of Marine Surveyors

Fellow's Background

Boatbuilding runs in Terry Lean's blood. Lean's father Alf, served his apprenticeship at Morts Dock Shipyard. He then worked as a shipwright at the Royal Sydney Yacht Squadron. In 1960 he began working for Alan Payne as a design draftsman. It was here they designed Australia's first 12 metre yacht Gretel 1. Following this, he then moved on to Warwick Hood's design office. As a child Terry Lean watched his father produce 12 metre yacht models for the testing tank at the NSW University. Lean Snr. was always building dinghies at home and including Terry in the process. He built Terry his first boat at home, a Sabot class dinghy which he sailed for many years. Some of Terry's earliest memories are of touring boatbuilding yards and marinas with his father. Terry has many memories of visiting Warwick Hood's design office during the school holidays and still enjoys a close working relationship with his father; particularly in his role as a boat designer.

Lean's early years were spent sailing weekends on the family yacht or with his Uncle Tony on his yacht "Junebird" which was built in 1912. Lean got his first boat for his 9th birthday and went on to race the moth class in Adelaide. While living in Adelaide Lean raced a Cole 23 yacht out of Port Adelaide Yacht Club. His first ocean racing was in Adelaide on "Ruthean" a 57' Laurent Giles design. In addition, Lean did some overnight offshore races and also the Adelaide to Port Lincoln long distance offshore race on "Ruthean".

On returning to Sydney Lean bought his first keel boat a 23' sloop which he weekend cruised for a couple of years. In the 1980's he completed several Sydney to Gold Coast

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About the Fellow

offshore races and also have done many miles between Port Hacking, Sydney, Broken Bay and Lake Macquarie over the years.

In 1989 Lean inherited his Uncle Tony's Carmen class yacht "Carefree". In 1997 Lean brought her home to do a complete interior, deck, rig and motor rebuild. She was relaunched in June 1999. Since her launching, Lean has been coastal cruising, twilight racing and skippered her from Sydney to Hobart (cruising) in 2002. Lean also delivered a Farr 1020 class from Sydney to Hobart for a friend in 2003 in the role of sailing master/navigator. He has also completed an overnight race with the Royal Yacht Club of Tasmania from Hobart to Maria Island and back on "Mirrabooka".

Over a career of thirty years as a shipwright Lean has worked in most facets of the boatbuilding industry including the building of new vessels, repairs to aluminium, fibreglass and timber boats and full restorations on timber boats. An example is the Kathleen Gillette – Norway's bicentennial gift to Australia – on which he was the principal shipwright. For the last three years Lean has filled the role of principal tutor/boat builder at the Wooden Boat Centre - Tasmania's boat school. During each eighteen month long course the students and staff build a 30' yacht as the major project. The last boat launched was Lean's own design, "Cloudy Bay 30" and his involvement with the school will continue as another of his designs "Cloudy Bay 32" is the major project of the current course.

Since returning from his Fellowship trip, Lean has commenced a new career path as a Marine Surveyor. Even though he will be less involved in the building and repair side of boats his passion for traditional wooden boats will keep him in close contact with like-minded individuals and associations. When not 'playing around with boats', Lean enjoys playing golf and spending time with his family.

Chapter 3

Aims of Fellowship Program

The aim of this Fellowship is to ensure that the skills of traditional wooden boat builders are retained and then improved upon by studying first hand the initiatives and training undertaken by apprentices and master shipwrights in New Zealand and Norway.

Specific areas of study and development:

- Investigate construction methods used in traditional New Zealand boatbuilding.
- Investigate the application of current technology in the restoration of traditional wooden boats.
- Investigate the application of current technology in the building of traditional wooden boats.
- Explore the relationship of modern technologies and traditional methods, including product knowledge.
- Discover what drives the relationship between wooden boat owners/enthusiasts and wooden boat builders.
- Research the sustainability of supply of traditional wooden boats for restoration. Consider alternatives such as the building of replicas.
- Examine current training packages for traditional wooden boat builders.
- Identify new business development based on overseas principles.
- Identify key stakeholders.
- Develop ongoing training packages through TAFE, private training providers and the ISS Institute.
- Develop strategies to promote traditional wooden boatbuilding/repair methods to tradesmen.

Ongoing areas for development include

- Developing relationships between traditional wooden boat builders, TAFE and other training providers, wooden boat associations and clubs to provide exchange of information and ideas and to promote the importance of historically and culturally important traditional wooden boats to the community.
- Encouraging Government and philanthropists to invest in the preservation and restoration of historically and culturally important boats.
- Developing relationships between state training bodies to encourage exchange of knowledge and ideas.

The purpose of the Fellowship was to undertake an overseas study program in New Zealand and Norway, to gain a comprehensive understanding of the traditional wooden boatbuilding techniques used in these countries and how they are integrating using modern products and techniques into their work. The fellow also wanted to learn how they are teaching tradesmen to preserve and restore historically important boats and what training programs are available on the use of traditional wooden boatbuilding and how these programs are delivered.

Chapter 4

The Australian Context

4.1 A brief description of the industry

In the last two centuries Australia has been a maritime nation with a legacy of various types of wooden boats, many of which are still in existence and date back to the 1880's. If the historical and cultural significance of these boats is not recognised they may be lost forever as a timber boat has a limited lifespan. In many ways these vessels are living history. By studying their construction we can learn much about what materials and methods were used at specific periods in time. So while the preservation of maritime culture and heritage is in the hands of a few individual devotees we will continue to lose not only these boats but also the history and culture that created them in the first place. In Australia there is not enough done to promote our maritime cultural heritage to the broad base community. In Australia today, boat restoration/preservation projects are largely carried out by individual boat owners employing individual tradesmen or boatsheds, with no outside funding or assistance.

As Australia becomes a more affluent and cosmopolitan nation our mentality tends toward mass production and the throw away society and so ownership of wooden boats is left to a small sector of the boating community with the market driving the factory production of GRP (fibreglass) vessels. Because these boats are built on a production line, training (mostly provided by TAFE) evolves to reflect industry needs. During the colonial period all shipbuilding was located along the waterfront. This meant that these facilities had the dual purpose of building new vessels and also the repair and maintenance of existing vessels. This demanded that boat builders had a wide range of skills. All training up until the 1960's was carried out by the employer at the boatshed. This meant that qualified boat builders had a broad range of skills and the ability to solve problems. It must be acknowledged that not only did the boat builders carry out the woodworking tasks but also the engineering, spar work, rigging and painting etc. Boat builders would not only be competent in structural woodworking, keels and planking, (the robust woodwork) but also the finer woodwork of ships joinery used to finish and fit a boat out. In other words they were multi-skilled.

In the 1960's good timber boat yards came under pressure from the new GRP production vessels. These boats were most often built in shore-based factories located in industrial areas. As a consequence of this shift, not only did the construction techniques and material technologies change but also the waterfront culture was altering. Many boatsheds now cater to wealthy boat owners and provide marina facilities for them but no longer provide any training facilities. Here and there are tiny pockets of timber boatbuilding but it has been largely replaced by GRP. Much of GRP production has also gone offshore as a result of:

- Skills shortage
- Economic pressure
- Shrinking demand for skilled tradesmen

As boats continue to be constructed using more exotic and high tech materials, traditional boat building techniques have become marginalised.

This history, and the current context of boat building in Australia, identifies the need to retain traditional wooden boatbuilding skills and promote the importance of these skills so underpinning skills so important to the preservation and building of wooden boats is not lost. It must be acknowledged that skills and knowledge and the ability to problem solve can be transferred to more contemporary boatbuilding. As economic pressure mounts to purchase product offshore, the direct result is a shrinking demand for skilled tradespeople. Traditional wooden boatbuilding is highly labour intensive and requires tradespeople with specialised skills. This means we have to design the very best training packages available for our boat builders and restorers.

Chapter 4

The Australian Context

This fellowship program has realised the opportunity to study the design and delivery of traditional wooden boatbuilding and restoration training and to judge if it meets industry needs, to study boatbuilding/restoration methods and make observations against Australian practice and to ascertain whether New Zealand and Norway are recognising and meeting local skills shortages. The knowledge gained will allow the fellow to address skills shortages in Australia through recommendations made at the conclusion of this report. Opportunities for transferring the knowledge gained through this fellowship can be created through ISS Institute, organised presentations, publishing and generally liaising with the industry. It is apparent that we may lose the skills identified if we do not develop a greater awareness of our culture, heritage and the specialised skills needed to build, restore and present traditional wooden boats. We are in danger of losing skills developed over hundreds if not thousands of years and whilst skills and the training of them must evolve, if we lose traditional skills in any trade we are losing not only history and culture but valuable transferable skills and therefore the ability to preserve our history.

Chapter 5

Identifying the Skills Gap/s

5.1 Definition - Skill Deficiencies

Within the context of this Fellowship, skill deficiencies are defined as follows:

A skill deficiency occurs where a demand for labour has not been recognised and where accredited courses are not available through Australian higher education institutions.

This demand is met where skills and knowledge are acquired on-the job, gleaned from published material, or from working and/or study overseas.

5.2 Identifying and defining the gap/s

It is well documented that Norway has been building wooden boats for practical and recreational use for at least 1000 years. In Australia our boatbuilding, as in New Zealand only dates back 200 years. In Norway and New Zealand the traditional wooden boat community promotes itself as being historically and culturally important. In both countries the boating public and the boat building industry are very aware and appreciative of function, beauty and cultural importance of their traditional wooden boats. Within the Australian context it is apparent that education is vital to establish wider community awareness of local maritime culture and the importance of the role wooden boats have played through our short history. By studying maritime culture in New Zealand and Norway knowledge, insights and ideas will be explored, which will provide opportunities to promote, advise and improve understanding and acceptance of traditional wooden boat culture in Australia.

There are a number of stakeholders who will benefit from addressing skills gaps that can be addressed through site visits in New Zealand and Norway.

Specific skills and knowledge gaps to be addressed include:

- construction methods used in traditional New Zealand and Norwegian boatbuilding.
- application of current technology in the restoration of traditional wooden boats.
- application of current technology in the building of traditional wooden boats.
- the relationship of modern technologies and traditional methods, including product knowledge.
- sustainability of supply of traditional wooden boats for restoration.
- strategies for promoting traditional wooden boatbuilding/repair methods to tradesmen.

If these skills gaps are not addressed, Australia is losing an opportunity to preserve a significant part of our cultural history and importantly, at risk of losing valuable transferable skills.

The overseas program was purposefully designed to explore the identified skills and knowledge gaps and to obtain the information necessary to return to Australia equipped with the knowledge and ideas to enable me to advise, instruct, promote. To improve traditional wooden boatbuilding and the repair/restoration practices as well as gain a wider awareness of traditional wooden boatbuilding heritage.

Chapter 6

The International Context

6.1 The Destination and Objective

During the course of the Fellowship Program the visits encompassed many establishments and individuals involved in traditional wooden boatbuilding and the heritage movement.

In order to effectively address the skill gaps identified throughout the application process, the following activities were undertaken during the course of the Fellowship:

- Visits to traditional wooden boat restorers in both New Zealand and Norway to obtain information on how they implement their methods and technology to suit different vessel types and constructions.
- Investigation of boatbuilding training packages and their delivery in New Zealand.
- Discussion with New Zealand and Norwegian boat builders regarding the sourcing and use of indigenous timbers (the availability of these timbers are an integral part of the restoration and building process).
- Visits to museums and cultural centres in New Zealand, England and Norway to gain an appreciation of the background and history of the boats and boatbuilding of those countries.
- Investigation of the balance of contemporary composite to pure traditional method in the restoration/repair of traditional wooden boats and how the philosophy may vary from country to country.
- Investigation of the relationship between traditional wooden boat owning community and boatbuilding industry by meeting with individuals, associations and industry representatives.

These objectives were achieved by:

- Undertaking a study program on the North Island of New Zealand and particularly in the greater Auckland area to gain a comprehensive understanding of the method, materials sustainability and training delivery.
- Visiting museums in Norway to understand how they present the importance of coastal culture and maritime history.
- Undertaking a study program of marine preservation and training centres in Norway to identify how they combine their boatbuilding training packages and boatbuilding method while providing interpretation and museum opportunities to the public.

Fellowship activities were planned prior to departure, however, upon arrival in each of the countries visited, contacts and opportunities arose that led to other significant opportunities not known prior to planning the Fellowship overseas itinerary. However, the possibility of such events occurring was anticipated prior to departing on the study tour and sufficient time had been allowed in the program to include such impromptu visits.

The following table identifies the location, area of expertise and objective of visiting each site. These site visits proved to be the most significant in providing information and inspiration:

Destination	Business/site characteristics/expertise	Objectives to be explored
Salthouse Boatbuilders	Builders of high tech racing and cruising yachts, specialists in timber restoration and repair, GRP production boat builders, total repair/maintenance facility	Suitability of training packages that the apprentices undertake in their varied duties in the shed, ie composite boatbuilding, repair and restoration, GRP

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		boatbuilding etc., transferring of technology and skills from high tech boatbuilding to repair and restoration of wooden boats.
Colin Brown Shipwrights	Traditional Wooden Boat restoration	Training of traditional wooden boatbuilding skills, traditional wooden boat restoration methods
NZ Boating Industry Training Organisation	Training provider to all NZ boat builders	The design of training packages, their delivery, assessment and management
NZ Maritime Restoration School Trust	Private provider of training to traditional wooden boat builders and restorers	The re-sourcing of a small stand alone non-accredited training provider, lecture delivery method and traditional wooden boatbuilding methods.
Classic Yacht Association of NZ	Promoters of ownership and preservation and restoration of classic wooden yachts	Promotion of classic yachts and their historic and cultural value to the wider community
Barry Spradbrow	Naval Architect	Barry was a source of contacts in Norway.
Hardanger Fartoyvernssenter	Working Museum Centre of Excellence in traditional wooden boatbuilding and restoration. Training of disaffected youths	Wooden boatbuilding, restoration and preservation methods, training of traditional wooden boatbuilders. Preservation and promotion of local customs and traditions.
Sollerrudstranda Skole	School of wooden boatbuilding and restoration	Wooden boatbuilding, restoration and preservation methods, training of traditional wooden boat builders
The RS1 Colin Archer	Working museum piece	Upkeep and maintenance of a working traditional wooden boat. The importance to the community of using and maintaining a living piece of history

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Further background information regarding each of the sites visited:

Salthouse Boatbuilders Ltd, Greenhithe, New Zealand

John Salthouse, Director
 Jeremy Oust (Jo), Composite Project Manager
 Nick Peel, Boatbuilding Foreman

Salthouse Boatbuilders Ltd. was founded in 1956 by John F. Salthouse and the running of the yard is largely a family affair. Their yard is located on the upper Waitemata Harbour, a twenty minute drive from Auckland city. Their services include boatbuilding in epoxy composite for new builds along with refits and repairs in aluminium, timber and steel, electrical engineering, marine engineering, painting and joinery. Extensive facilities include three slipways. In addition to boatbuilding they offer a full range of maintenance, refitting and repair services. All their vessels are custom built to individual plans and specifications. Individual care and attention is employed in all stages of production. There have been changes over the years but Salthouse Boatbuilders are now firmly placed in the top echelon of custom boat builders in high-tech composite construction and finish.

Colin Brown Shipwrights Ltd, Kumeu, New Zealand

Colin Brown, Director and shipwright
 Colin Davidson, leading hand shipwright
 Josh Hawke, apprentice shipwright
 Dillon Brown, general hand

This is also a family run business. Colin has a large shed on his property at Kumeu. His company focuses on the restoration/rebuilding of timber heritage boats using more traditional methods and products.

New Zealand Boating Industry Training Organisation, Auckland, New Zealand

Robert Brooke, General Manager

Mission Statement:

“The Boating Industry Training Organisation is accountable to its stakeholders to ensure that there is an ongoing supply of appropriately skilled and qualified personnel for the New Zealand Marine Industry.”

BITO is New Zealand’s Boating Industry Training Organisation. BITO oversees and coordinates the training of personnel for the New Zealand marine industry. This includes being the Modern Apprenticeship Co-ordinator for the New Zealand marine industry; setting standards and qualifications on the National Qualifications Framework that meet the needs of the marine industry; and managing training arrangements that enable employees in the industry to achieve standards and qualifications.

New Zealand Maritime Restoration School Trust, Haruru Falls, New Zealand

Jay Lawry, CEO

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Mission Statement:

The New Zealand Maritime Restoration School is a shipwright training institute dedicated to restoring classic vessels while teaching a new generation of trades people the skills of traditional craftsmanship.

The aim of the trust is to:

- Teach the skills, history, science and art of restoring, maintaining and building classic vessels.
- Preserve the knowledge, heritage, craftsmanship and aesthetic genius, inherent in these yachts.
- Maintain a fleet of restored craft for the teaching of seamanship, navigation and maintenance skills.
- Show that honesty, integrity and mastery of a craft are life's greatest achievements.
- Develop an awareness in the community of the beauty and importance of maintaining the classic fleet in New Zealand and around the world.

The Classic Yacht Association of New Zealand, Auckland, New Zealand

Tony Blake, chairman and the executive committee

The Classic Yacht Association is an incorporated society formed in 1995 dedicated to:

- Promoting the ownership, preservation and restoration of Classic Yachts and Launches reflecting the significant role harbour and coastal sea craft have played in the development of New Zealand communities.
- Encouraging the fellowship that grows and exists between all men and women who delight in the pleasure of the sea and craft that sail those seas.

Barry Spradbrow, Naval Architect, Oslo, Norway

Barry is an Australian who has been living and working in Norway for the past 30 years.

Hardanger Faroyvernsester, Bergen, Norway

Geir Madson, director
 Kristoff Lange, apprentice shipwright
 Seppe L'chamre, blacksmith
 Bjorn Lingener, shipwright

Hardanger Ship Preservation Centre is one of the largest professional facilities for the restoration of seagoing vessels in Scandinavia. In the small boat workshop, in the boatyard, on the ropewalk and in the smithy the Centre works to preserve traditional handcrafts. The Centre has a youth program that includes follow-up in their work, schooling, living arrangements and spare time. The Hardanger jakt Mathilde sails with school classes, cultural events and vacation tours along the fjords and coast.

Sollerudstranda Skole, Oslo, Norway

Nils-Peter Rassmussen, director
 Earling, bosun, Anna Kristina

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The 'RS1 Colin Archer' Rescue Cutter

Knut Von Trepken, master

In 1891 'Norsk Selskab til Skibbrudnes Redning, NSSR ("The Norwegian Society for Sea Rescue") was founded. A year later Colin Archer built the first rescue cutter. The result was a double-ender with a continuous deck. The length was 13.95 metres, beam 4.65 metres and draught 2.25 metres. Mainsail, mizzen, staysail, jib and a topsail made a total of 110 sq.metres. This prototype cost NOK 10.900,43, including beer for the workers. At the launch in late July 1893 the ship was called after its designer, Colin Archer. 'RS1 Colin Archer' proved convincingly during her first season and became the prototype for every rescue cutter built in Norway over the next 30 years. After 40 years of loyal service, the prototype was sold. The ship had an impressive record: She had saved 67 ships, 236 people as well as assisting 1522 vessels carrying some 4500 crew.

In 1961 'RS1 Colin Archer' was found in America in a terrible condition after many years in private hands. She was brought back to Norway, and became a scout's boat for some years, but was finally acquired in 1972 by the Norwegian Maritime Museum. In 1973 the museum concluded a long-term agreement with the Seilskøyteklubben Colin Archer (SSCA). Knut and Gunn von Trepka took over the day-to-day responsibility, and have devoted very much time to operating her as a living museum. The hull of 'RS1 Colin Archer' was comprehensively overhauled in 1977 and the interior was refurbished and restored to its original colours in 1993 with financial support from the Norwegian off-shore company Kværner.

'RS1 Colin Archer' ended Winner over-all in the Cutty Sark Tall Ships' Race in 1983, leaving 74 ships behind. Also designed by Archer, the 'RS10 Christiania' ended second and the Stephansen-design 'RS5 Liv' came third. That this was no coincidence was proved in the next race in 1987, when the 'RS1 Colin Archer' again ended Winner over All and 'RS10 Christiania' was second best again. In 1993 'RS1 Colin Archer' ended Winner over All for the third time, and also took home the highest prize of the Cutty Sark Tall ships' Races, The Cutty Sark Trophy.

Keeping 'RS1 Colin Archer' in the water preserves for future generations not only the ship, but also the knowledge of how to sail her.

6.2 Outcomes

New Zealand

Salthouse Boatbuilders

The objective of visiting Salthouse Boat builders was to observe how their boatbuilding apprentices were being trained, traditional boatbuilding and restoration methods and the transference of technology from contemporary to traditional wooden boatbuilding. As established previously, Salthouse Boat builders are one of the last family owned and operated waterfront based boatbuilding and repair sheds in Auckland. This facility comprises 4 sheds and 3 slipways and provides a comprehensive service to their clients. Because of the variety of services provided their staff need to be skilled in many facets of the boatbuilding and repair industry. While some of the staff specialize in particular areas such as high tech composite boatbuilding it is company policy that apprentice boat builders train in all aspects of the business. During Lean's visit to Salthouse Boat builders, there was

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an “Elliot 50” grand prix race yacht under construction. She was being built with the latest technology and materials such as carbon fibre reinforcing matt laminated with epoxy post cure resin and vacuum bagged over “male” moulds.



Elliot 50 under construction



Finished boat sailing (predecessor sistership)

This is boatbuilding at the cutting edge of development. Building in this medium is standard for Salthouse Boat builders now, but it hasn't always been this way. When John Salthouse established the present yard in 1958 most new boats built were generally carvel planked or diagonally planked in New Zealand Kauri timber. Many boats were traditionally built over the years and a large number of these boats return to the yard for regular maintenance or repair.

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Trinidad on slipway for maintenance

Since 1958 Salhouse Boat builders has built boats in many mediums as the market and technology demanded. This means that today there is a wide range of skills and knowledge available to this business.



Interior joinery shop or cabinet work for "Windhaven"

This can be evidenced when one visits the large building shed in which the 70' Motorsailer "Windhaven" is at the time of writing undergoing an extensive refurbishment. This traditionally built motor-sailer is diagonally planked in New Zealand Kauri with copper fastenings. "Windhaven" is a good example of traditional boats being restored combining traditional method with modern materials and technology. Her entire hull is being sheathed in post-cure epoxy resin, reinforced with double bi-axial glass fibre cloth.

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Windhaven showing epoxy sheath



Close –up view Windhaven showing epoxy sheathing

There is and always will be argument around the use of non traditional methods to repair and restore traditional boats, and the argument is at times, heated. Needless to say, the Salthouse Boat builders need to be multi skilled. I found during my study program at Salthouse Boat builders that the tradesmen and trainee boat builders were working on a wide range of boats requiring them to be multi skilled.

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"Southstar 37" hull no. 2 under construction



The finished "Southstar 37" hull no. 1 underway

It was also evident that the range of industry related training packages offered by the Boating Industry Training Organisation (BITO) matches the needs of Salthouse Boat builders trainees. Since 1958 Salthouse Boat builders has retained the ability to repair/restore and build traditionally. This type of waterfront boatyard was typical of boatyards in Australia before the advent of mass production GRP boatbuilding in the 1960's. The training and providing of multi skilled tradespeople is now in the hands of just a few surviving waterfront boatyards in Australia. In Auckland there are commercial marine precincts, the Westhaven area for example. Also a new marine precinct at the old RNZAF base at Hobsonville is currently being developed with already a superyacht builder having relocated there. In 2007 the Auckland School of Wooden Boatbuilding is commencing operations there. Other facilities will include all related marine trades, slipway, boat storage and retail outlets.

A key observation:

This visit, more than any other, highlighted the need to design training packages for Australian apprentices based on the New Zealand model. This experience offered an opportunity to identify best practice with regard to how industry and training organisations can work together.

Boating Industry Training Organisation (BITO)

The aim of the visit to BITO was to study the design, construction and delivery of training packages. During the study program in New Zealand Lean had the opportunity to meet with the General Manager at BITO, Robert Brooke. BITO designs, constructs and manages curriculum and qualifications for the marine industries in New Zealand. These qualifications are endorsed by the New Zealand government through the New Zealand Qualifications

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Authority (NZQA). The qualification relevant to traditional wooden boatbuilding is the National Certificate in Boatbuilding, Wooden Boatbuilding Level 4. In this qualification, apprentices/trainees gain a comprehensive and detailed understanding of all aspects of wooden boat construction. This includes understanding boat drawings and learning to build boats of all sizes, learning lofting techniques (the full size drawing out of boats), pattern making and how to complete accurate calculations. Construction of the frames through to completion of the hull and superstructure are all covered in detail as are the fitting of interior and exterior components. Basic composite construction and the correct and safe use of all boatbuilding tools are also addressed. Lean also had the opportunity to take a day trip with Robert Brooke and a Field Officer to several boatyards around Auckland. It was evident that BITO have ongoing, hands on relationship with employers and trainees in the workplace.



Robert Brooke on left with Super Yacht builder on field trip

There are 3 full-time Field Officers based in Auckland and a part-time Field Officer based in Whangarei. They continue to visit each apprentice at least every 3 months, offering support and mentoring and build up a rapport with the apprentices and the on-job trainers. BITO maintain the following qualifications:

- Composite Boatbuilding
- Wooden Boatbuilding
- Alloy Boatbuilding
- Steel Boatbuilding
- Marine Cabinetmaking
- Marine Systems Engineering
- Sparmaking: Metal - Sparmaking: Composites
- Marine Rigging
- Marine Painting
- Marine Electrical & Electronic Installation (Level 3)
- Marine Retailing
- Boat Sales and Brokerage
- BITO National Certificate in First Line Management (Level 4)
- BITO National Diploma in Business (Level 5)

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Further qualifications under development:

- Marine Electrician (Level 4 & 5)
- Marine Electronic Technician (Level 4 & 5)

While there are no fixed lengths for these qualifications, it is anticipated that Level 2 qualifications will take 1 year to complete, Level 3 will take 18 months to 2 years, Level 4 between 3 and 5 years. On the 23rd November, 2005 BITO issued 162 National Certificates to 130 apprentice/ trainees. Of these 36 were for Wooden Boatbuilding. It is evident that the training in New Zealand is driven largely by industry and managed by a well funded BITO. Training of boat builders and accreditation of boat builders in New Zealand is managed from the central office in Auckland.

A key observation for Australia:

In Australia training packages are under a national framework but delivery of the courses is by registered training organisations, spread across the country with little or no collaboration between them. There is most probably even less cooperation between employers and the training providers. Lean believes that we would benefit from studying and following New Zealand's example and build up a closer working relationship between registered training organisations, employers and trainees.

Colin Brown Shipwrights Ltd

The key objective of the visit to Colin Brown Shipwrights Ltd was to observe a small business restoring and preserving traditional and historic wooden boats and the training of traditional wooden boat builders. Colin Brown conducts his business in Kumeu, north of Auckland. While his business is not located on the waterfront, this business practices many traditional crafts and skills. Colin Brown Shipwright is mainly concerned with the restoration and rebuilding of heritage wooden boats both power and sail. The emphasis is on traditional methods and materials. Brown and his boat builders are required to be multi skilled as they are involved in every aspect of traditional boat restoration from assessment, structural repairs, hull and deck framing, deck and cabin joinery, mechanical installations to the application of marine paints and finishes.



Applying topside paint finish with traditional method

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Of particular interest to the fellow was the durability of boats (power or sail) built to the construction method introduced to Auckland by Robert Logan most probably about 1880. At the time of the visit to Colin Brown's facility Lean had the opportunity to inspect "Jessie Logan" which was undergoing a regular maintenance refit. "Jessie Logan" is a very early example of Logan boatbuilding, launched about 1880.



"Jessie Logan" at Colin Brown's Kumeu facility

Whilst in Auckland Lean also had the opportunity to observe at Bayswater Marine "Ariki" (1904) and "Rawene" (1905). Both of these restored classics built by Logan.



"Ariki" above and "Rawene" below



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The previously mentioned “Windhaven” built by Colin Wild and launched in 1946 was interestingly also built by the “Logan” method of construction. At the time of my visit to Auckland Colin Brown and a number of other boatbuilders have 1 or more rebuild/restorations underway and one wonders when the number of eligible boats will dry up. At the time of my study trip interest was very healthy in traditional wooden boats. One feels that as time goes by the building of replicas will become more the norm, which raised the question of sustainability and availability of timbers traditionally used or will boat builders be forced to adapt to more modern techniques such as laminating, structural components with lesser grade timber and epoxy glues, or strip planking and epoxy/glass sheathing also with lesser grade timber. These issues affect any country that traditionally relied on old growth timber harvest. These timbers vary from country to country but the issue is universal and ever increasing.

For example:

- English Oak in Great Britain
- Kauri in New Zealand
- Australian Cedar, Huon Pine, Celery top pine in Australia
- Longleaf yellow pine in the USA

The interest in traditional wooden boats is alive and well in New Zealand, which will generate demand for boat builders like Colin Brown and his skilled employees for quite some time to come.

New Zealand Maritime Restoration School Trust

The aim of this visit was to observe the delivery of training of traditional wooden boat restoration and wooden boat restoration methods. The New Zealand Maritime Restoration School Trust is located at Haruru Falls in the Bay of Islands north of Auckland. At the time of my visit there were 3 students participating in a 6 month long course. Jay Lawry, CEO and shipwright maintains a firm belief in traditional values and boat building method. At this time the school has no accreditation. The current major restoration project is “Ngatira” (1904). During the 6 month program the students will do repairs and maintenance on a number of other boats. “Ngatira” was built by Chas Bailey in 1904 at Devonport, New Zealand using the same construction method that Logan introduced to Auckland. Once again her Kauri hull and keel were in quite good condition.



Image: Ngatira

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The New Zealand Maritime Restoration School Trust is a charitable trust but maintaining ongoing funding is an unending task. The school is very much a stand alone. The present facility is located some distance from the waterfront in a light industrial area. The longer term goal of the New Zealand Maritime Restoration School Trust is to relocate to larger waterfront premises.



Mullet boat awaits restoration in front of NZMRST

The New Zealand Maritime Restoration School Trust is facing many of the same issues that our own Wooden Boat Centre of Tasmania contends with. The largest issue is long term funding, either through government, local community support or philanthropy. Both of these boat schools rely on student fees and to a lesser extent by charging for work carried out. Both have an abundance of people either wanting to have boats restored or built. Schools like these can be the perfect vehicle to introduce people to traditional wooden boats through community training schemes, interpretation and visitor centres, sail training and the like. Lean believes that these schools deserve greater support from community and government to help them teach and preserve our maritime culture.

A key observation for Australia:

The implications here are that small private training organisations whether in New Zealand or Australia suffer from lack of funding and resources unless they are supported by philanthropy, industry and community. In Australia we would be better served by leaving the training of apprentices to the trade and TAFE and that private boatbuilding schools may ultimately be better for non accredited recreational courses.

Norway

Hardanger Fartøyvernssenter (Hardanger Ships Preservation Centre)

The aim of this visit was to see how to promote and present local culture, wooden boatbuilding methods and the training of apprentices. Hardanger Fartøyvernssenter in Bergen, Norway began in 1984 with the acquisition of the then 100 year old sloop Mathilde. The goal was to restore her to her original glory. The initial aim was to combine the renovation of old boats with the rehabilitation of youths with social behaviour problems. After 5 years and 50,000 man-hours Mathilde set sail, a new project was initiated and the centre became a permanent fixture. The main aims are to be a centre of expertise for the

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preservation of all sorts of wooden craft, the rehabilitation of youth, apprenticeships and tourism. In 1996 the Directorate of Cultural Heritage gave the centre status as a national centre of expertise for ship preservation and Hardanger Fartøyvernssenter became one of three national ship preservation centres in Norway.

One of Hardanger Fartøyvernssenter's primary purposes is to provide young people who, for one reason or another find themselves at odds with society, the opportunity to start anew. Here they can show their positive side through practical work. The main purpose is that the student, after his or her stay at HFS, will have distanced him or herself from drugs and criminal activities, rebuilt their self-respect, be ready and able to return to society at large, take a job or go back to school and function well socially.

Hardanger Fartøyvernssenter is a museum with a difference. Boats and vessels are the main themes. Many vessels have lived exciting lives that tell of the development of modern Norway. Lean didn't find just old boats and other vessels; he was also able to see living crafts and skills being exercised. Crafts will die if they are not practiced, and they have concentrated their efforts on creating a living environment where craftsmanship will live on contributing to keeping cultural history alive and thriving.

During Lean's visit he discovered that documentation is an integral part of the Centre's functions. The keywords in Norwegian ship preservation are the authenticity and integrity of the vessel. Any work and replacements to be carried out must take account of the vessel's history. This serves to stress the importance of documentation and will be the deciding factor in the planning and implementation of restoration projects. HFS has two full-time and one half-time positions dedicated to documentation and advisory services. The result of work carried out on documentation is distributed through reports, books, seminars and the annual magazine, *Fartøyvern* (Ships Preservation). "Gule sider" – yellow pages – for ships preservation is currently being compiled in the form of a data base. One very important task is to search for information on shipbuilding methods, both in general and in particular for vessels that are undergoing repair and restoration. Typical sources of such information are elderly craftsmen, archive materials, photographs, drawings, etc. The documentation is used by the workers engaged to carry out specific tasks and general commissions on the vessels.

Another important task is to carry out inspections of vessels commissioned by public or private clients. Documentation of disassembly and repair/rehabilitation processes provides valuable knowledge, and the material obtained is distributed through reports. The task of constructing a multi-faceted archive of information sources (photographs, books, drawings, interviews, and artefacts etc.) is ongoing and of great value in the work of ships preservation. Taking care of old vessels requires more than just keeping them afloat. Traditional skills are brought to life again. The boatyard at Hardanger Fartøyvernssenter has accumulated valuable skills and knowledge in wooden ship and boat building, rope-making, blacksmiths crafts, sailing, and the use of traditional methods of maintenance and upkeep. The field of boat preservation is therefore developing constantly, and the Hardanger Fartøyvernssenter wishes to contribute to the process both by placing emphasis on the importance of, and providing highly skilled expertise in, the field of ships preservation. The care and use of old vessels is not simply a lesson in how to perpetuate old skills and traditions; it is also a question of safety at sea. An essential component of any work involved in the conservation of maritime heritage is knowledgeable, competent craftsmen. This requires that the historical aspects of the work be taken into consideration at all levels of the organisation.

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The boatyard is the heart of Hardanger Fartøyvernssenter. This is where the practical side of the restoration process is carried out. The work covers a variety of tasks, from large scale and demanding major overhauls and restoration of large vessels, through the documentation of vessels and to answering queries and providing advice by telephone. All restoration work is carried out in accordance with strict antiquarian guidelines. As little of the original structure as possible is removed and any replacements are effected using the same materials and methods as were originally used. The aim is to preserve the vessels as floating, cultural monuments. Furthermore, it is a major task to maintain knowledge of crafts and skills that have little relevance in a modern, commercial context.

Thus Hardanger Fartøyvernssenter has created an environment where this knowledge can live on. The boatyard has 14 employees including a ship's engineer, boat builders, a ropemaker, boat preservation consultants, and a mechanic/blacksmith. In addition, there can be as many as five apprentices at the yard.

During the visit Lean was able to explore every aspect of the Centre's operation. In the boatyard he was able to discuss traditional boatbuilding and restoration methods with the shipwrights and apprentices.

It was noted that the boatyard runs on a commercial basis, with youth training schemes running concurrently with the large boat restorations and the small boat building operations. At the time of the visit a major restoration was being carried out on the MV "Faun". The large shed is very well equipped with hand tools, benches and static power tools. Of interest was extensive viewing areas including overhead mezzanine floors. The public can obtain excellent views of the work being carried out and the boat builders are encouraged to answer questions posed by the public.



M.V. Tyso in large shed showing mezzanine floors

The small boat workshop builds traditional Hardanger boats of various designs. The main objective of the small boat workshop is to construct boats from the Hardanger region. At the time of my visit a 4 oared faering was under construction.

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Faering on building stocks

She is being built from local Norwegian Pine and all of her fastenings are manufactured in the smithy shop.



Iron fasteners in plank join in Faering made in smithy shop

These Hardanger boats built in the small boat shop are built to local traditional boatbuilding methods that have been practised in the Hardanger fjord and surrounding districts for perhaps the last thousand years. Visitors can at first hand observe the boat builder, Peter Helland Hansen and his trainees perpetuating these skills and crafts. Not only are the boats built traditionally but so are the tools they use.

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Traditional Norwegian planking clamps on rack

The Hardanger Marine Preservation Centre is in Lean's opinion, one of the best boatbuilding and restoration boatyards he has ever seen. The same can be said of the museum and the interpretation activities.

The drivers for success are:

- The support of local government and community
- The relationship with the Ministry of Antiquities
- The location of the Centre
- The calibre of the Administration
- The variety of the programs and exhibits

Australia would greatly benefit from the establishment of a marine preservation centre of this standard. Such a facility would be the centre of learning for preserving our traditional wooden boats, our coastal culture and boatbuilding history. These centres are not just for the preservation of traditional wooden boatbuilding but also all the associated skills such as:

- Blacksmithing
- Ropemaking
- Traditional rigging
- Coopering
- Traditional handmade Sailmaking
- Traditional Sailing and Seamanship
- Traditional Lofting

The advantage of preserving and teaching these related skills in the context of a traditional wooden boat preservation centre is the flow on appeal to a wider range of people with a wider of interest in learning and perpetuating traditional trades and crafts.

A centre such as this would have many benefits:

- Educational
- Community involvement and understanding of our maritime heritage
- Tourism opportunities
- Employment opportunities for local community
- Preservation of crafts and skills
- Preservation of traditional wooden boats
- Compilation of historical fact of our maritime history

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Currently in Australia there are no marine preservation centres of this nature with documentation and historical display left to maritime museums, which needless to say are not always relevant to local coastal culture and traditional local boatbuilding methods. A centre like this would have the opportunity to provide specialised wooden boatbuilding training which is not possible in the more broad based training delivered by the TAFE system. It must be remembered that the Hardanger Fartøyvernssenter is one of 3 centres of excellence in marine preservation in Norway. With Australia's size and depth of maritime history there are opportunities for a number of regions to support such a centre. It is important that these centres focus on local culture and boatbuilding traditions. This will attract support from their local communities and develop opportunities to showcase local culture and tradition to national and international visitors.

A key observation for Australia:

There is a need in Australia to recognise and appreciate local culture and traditional crafts and skills. We need to encourage the formation of these types of facilities where we can incorporate a museum, training facilities and working boatbuilding/restoration yards which are centres of excellence.

The Kauri Museum, Matakoho, New Zealand

The objective of this visit was to learn more about Kauri as it is the best boatbuilding timber in the world. The kauri tree, *Agathis australis*, is New Zealand's largest and most famous native tree. It is a type of conifer or pine tree which grows in the subtropical northern part of the North Island. Ancestors of the kauri first appeared in the Jurassic Period 190 – 135 million years ago. The kauri – podocarp (cone bearing) – hardwood forests are among the most ancient in the world. The largest kauri in existence is Tane Mahuta (Maori for "Lord of the Forest"). It is 4.4 metres in diameter and 17.7 metres to the first branch. The museum has displays showing even larger trees which were growing in the past. The oldest tree is estimated to be 2,000 years old. This is Te Matua Ngahere (Father of the Forest) in Waipoua Forest. Larger trees from the past were even older. The timber was used for many purposes: ship building (including masts and spars of sailing ships), houses, furniture, bridges, fences, dams, patterns (used for metal casting), vats and tanks, barrels, large rollers (in the textile industry), railway sleepers, mine-props, carving, wood turning and many other uses. The Kauri Museum records aspects of the Kauri Industry and local Pioneers. Lean found this museum to be one of the best that he visited.

The New Zealand Maritime Museum

The objective of this site visit was to observe community involvement with New Zealand's maritime history. This museum was opened to the public in August, 1993 and proclaimed as a "new generation" museum with no precedent in New Zealand. The visit here offered a broad overview of New Zealand's rich maritime heritage. The Maori name of the museum is Te Hui-te-anau-i-A-Tangaroa (holder of the treasures of Tangaroa - of the Sea God), and this museum stores many of New Zealand's national treasures. The displays are original from boats to life size exhibits and include an amazing collection of models and artefacts.

"Cutty Sark" – The World's Last Tea Clipper

In 1869, when "Cutty Sark" was launched, the ship was expected to have a life of around 30 years. "Cutty Sark" has lasted 4½ times longer. Her 135-year history has been one of continual repairs, refits, maintenance, and ultimately restoration. Yet she still retains around 90% - 95% of the hull fabric that served her during her sea-going career, and this fabric continues to survive without significant loss of strength or integrity.

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“Cutty Sark” is one of only three surviving composite-built vessels – that is a vessel with a wrought iron frame to which teak and rock elm strakes were fastened. The fastenings were of Muntz metal (an alloy of copper and zinc in an approximate ratio of 60:40) bolts. To prevent worms, barnacles and other marine growths on or weakening the wooden strakes, the hull was sheathed below the waterline with Muntz metal plates, laid onto an impermeable layer of felt and bitumen and fixed with copper nails to the strakes. Examination of the structure reveals that the wrought iron is actively corroding: in places it has corroded away completely and in others it has become very thin, especially around the sides of the Muntz metal bolts, due to bi-metal corrosion. However, in 1998 Three Quays Marine Services, following a survey of the ship, suggested that if nothing were done to conserve the structure of the ship then she would become unsafe within approximately ten years. Consequently, if the ship is to survive, it is essential that the work to conserve the structure needs to proceed as soon as possible, but certainly within the next two years. “Cutty Sark” is in need of major conservation work on the composite hull where extensive and long-time deterioration of the wrought iron framework and timber planking has occurred. If the deterioration continues unchecked there is a real risk that the ship will disintegrate.

On the 5th November 2006, the “Cutty Sark” will be closed to the public until late 2008 due to conservation work.

There are many reasons why the “Cutty Sark” matters:

- She is the most famous ship in the world.
- She is the epitome of the great age of sail.
- She is the only surviving extreme clipper, and the only tea clipper still existing.
- Most of her hull fabric survives from her original construction and she is the best example of a merchant composite construction vessel.
- She has captured the imagination of millions of people, 15 million of whom have come on board to learn the stories she has to tell.
- She was preserved in Greenwich partly as a memorial to the men of the merchant navy, particularly those who lost their lives in the world wars.
- She is one of the great sights of London.

Statement of Significance

- She is the world’s sole surviving extreme clipper, a type of vessel that was the highest development of the fast commercial sailing ship, with the majority of her hull fabric surviving from her original construction.
- She is internationally appreciated for her beauty and is one of the most famous ships in the world.
- Her fine lines – a considerable part of her appeal – are defined by her frames which form part of the vessel’s composite construction; a construction technique of which she is the best surviving example and of which she is of exceptional quality.
- She has captured the imagination of millions of people, 15 million of whom have come on board to learn the stories she has to tell.
- She is a gateway to the World Heritage Site at Greenwich and is a key asset to both the World Heritage Site and the Borough of Greenwich.
- As a tea clipper, she is tangible evidence of the importance of tea in 19th century trade and cultural life.

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Fram Museum and the Viking Ship Museum

The Fram Museum shows the history of the polar explorers. Here you'll find the world's most famous polarship, "Fram", from 1892, the museums main attraction. The ship is displayed in its original condition with interior and objects perfectly preserved. Every visitor is welcome on board the "Fram". The polar ship "Fram" is the strongest vessel in the world, and the one sea-going vessel that has been the farthest both to the north and the south. "Fram" was launched in 1892, and was built by the famous ship constructor, Colin Archer from Larvik. Fridtjof Nansen got in touch with Archer in 1890, because he wanted to build a ship that would withstand the rough ice conditions on its way to the North Pole. Archer constructed "Fram" so that it wouldn't break as a result of the ice pressing together. "Fram" was built as a three masted schooner powered by a steam engine. Otto Sverdrup was ship inspector and came up with the idea on how to rig the ship. Already on its first expedition with Nansen, the ship demonstrates its capabilities in the ice. Where other ships had been smashed to pieces, "Fram" was pushed on top of the ice. The vessel came through with flying colours, and was back in Norway again in 1896. Two years later it heads out on yet another expedition, this time with Otto Sverdrup as leader. "Fram" was refitted for Amundsen's journey towards the north pole, the destination surprisingly turned out to be the south pole, instead. The ship was rebuilt and a brand new diesel engine was installed. Once again "Fram" withstands the strains and hardships of the polar oceans, and the vessel safely carries Roald Amundsen and his successful crew to the Antarctic and back again.

During World War 1, "Fram" was lying unattended, decaying. At the end of the 1920's, people who cared about the ship, started to take action in order to restore "Fram" to its original condition and have it placed in a "house of its own". Key persons in this work were Lars Christensen, Otto Sverdrup and Oscar Wisting. In 1935, "Fram" was towed to its own house on Bygdøy, outside Oslo. After toilsome work, "Fram" is safely placed on land, to be seen and respected for generations after generations. Visits to the "Fram" and Viking Ship museums were both invaluable to the overseas study program. At these museums Lean was able to study wooden ship construction and design concepts in great detail. All of the vessels were designed and engineered to perform their different functions perfectly. It is stated that "Fram" was the strongest wooden ship of her day. As a boat builder it was fascinating to study her construction details and the massive size of her timbers.

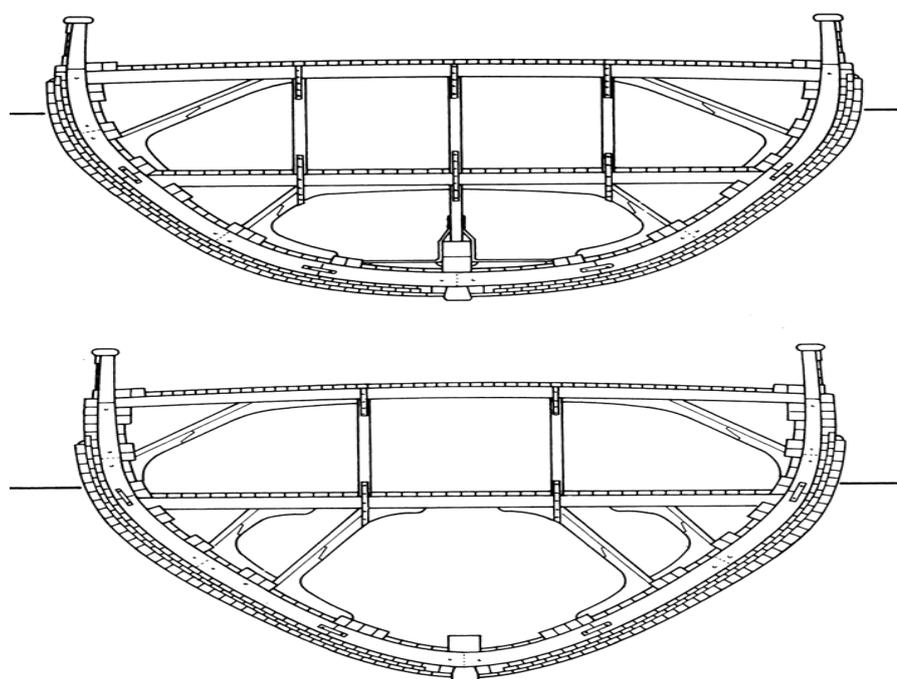


Fram bow portside

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“Fram” also had many design concepts and innovations to study. Her lines were of particular interest to the writer. Her sections and keel were designed so that as the pack ice tightened its grip on her she would pop out of the ice. Her massive structure was designed so that as the ice strengthened its grip neither would she crush. All of these design innovations affect the hydrostatic characteristics such as displacement, stability, sailing ability etc.



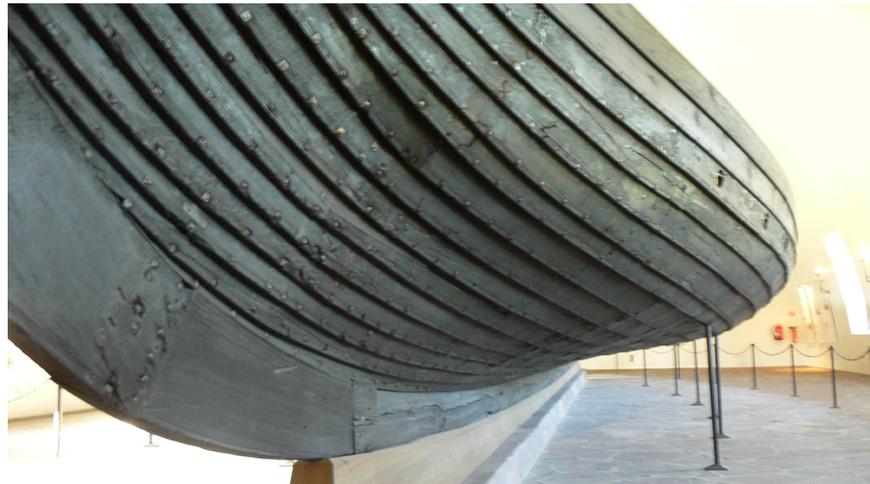
Fram construction drawings

The “Fram” is a priceless example of a purpose designed and built traditional wooden ship. Every student of naval architecture and wooden ship construction would benefit greatly in studying the “Fram’s” design and construction concept. The “Osberg” ship and the “Gokstad” ship are 1000 year old examples of clinker or lapstrake construction. This construction method of traditional wooden boatbuilding is probably the oldest method of traditional wooden boatbuilding construction still being practiced today. So it was with great interest to the writer to be able to observe the design concepts and construction details of both of these ships. The “Osberg” ship was an inshore craft, according to researchers she was for ceremonial purposes on inshore waters. The “Gokstad” ship was a cargo vessel with a wider area of operation. Being a load carrier the “Gokstad” ship has fuller sections and an extra plank on her topsides.

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Extra Plank



Heavier Keel

Firmer Bilge

Gokstad ship showing fuller sections extra plank

These 2 factors give her greater displacement or load carrying ability and also make her more Weatherly. Her scantlings (sizes of structural components) match her design concept with her main keel being heavier, her planking thicker and her stem and stern posts being heavier and less ornate than that of the "Osberg" ship.



"Osberg" ship showing finer sections and lower freeboard.

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Compare the number of planks on these two vessels. Note the ornate carving on her stem, the lighter keel and the slacker bilge section. As a student of wooden boat design and construction Lean found that both “Fram” and the Viking ship a perfect example of design concept and function. It must be remembered that when the Vikings were designing and building these ships it would another 600 or 700 years before the term naval architect was used.

Key observation for Australia:

In Australia we don't have vessels of the antiquity particularly of the Viking ships, but both museums are perfect examples of how historical wooden boats and ships can be presented to the public to study not only history, culture but also wooden boat construction methods designed to specific design concepts. The Fram Museum makes this one of the more user friendly and informative museums the writer visited on his overseas study program.

The “Colin Archer RS1”

This visit provided an opportunity to study the maintenance and preservation issues and of a hundred year old wooden boat. In 1891 ‘Norsk Selskab til Skibbrudnes Redning, NSSR (“The Norwegian Society for Sea Rescue”) was founded. A year later Colin Archer built the first rescue cutter. The result was a double-ender with a continuous deck. The length was 13.95 metres, beam 4.65 metres and draught 2.25 metres. Mainsail, mizzen, staysail, jib and a topsail made a total of 110 sq.metres. This prototype cost NOK 10.900,43, including beer for the workers. At the launch in late July 1893 the ship was called after its designer, Colin Archer. ‘RS1 Colin Archer’ proved convincingly during her first season and became the prototype for every rescue cutter built in Norway over the next 30 years. After 40 years of loyal service, the prototype was sold. The ship had an impressive record: She had saved 67 ships, 236 people as well as assisting 1522 vessels carrying some 4500 crew.

In 1961 “RS1 Colin Archer” was found in America in a terrible condition after many years in private hands. She was brought back to Norway, and became a scout's boat for some years, but was finally acquired in 1972 by the Norwegian Maritime Museum. 1973 the museum concluded a long-term agreement with the Seilskøyteklubben Colin Archer (SSCA). Knut and Gunn von Trepka took over the day-to-day responsibility, and have devoted much time to operating her as a living museum. The hull of ‘RS1 Colin Archer’ was comprehensively overhauled in 1977 and the interior was refurbished and restored to its original colours in 1993 with financial support from the Norwegian off-shore company Kværner.

The 117 year old Rescue ship “Colin Archer” is owned and operated by the Norwegian National Maritime Museum. Although not in my original itinerary the opportunity arose on the last day of the program in Norway. Her full-time caretaker is Knut Von Trepkin, engineer and master mariner. The “Colin Archer” has her permanent moorings on Ormøyer Island in Oslo Fjord in Oslo's eastern suburbs near her caretaker's residence.

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"R.S Colin Archer" on her moorings

Given the convenience of this arrangement, Von Trepkin has ample opportunity to lavish care and attention on the "Colin Archer". This arrangement is totally different to any small vessel management plan the writer has witnessed in Australia. Usually floating exhibits are displayed in static situations alongside museum pontoons with the vessels generally locked up. The "Kathleen Gillet" which is on display at the Australian Maritime Museum in Sydney is sometimes an exception to this rule as she occasionally day sails on Sydney Harbour, but these trips are generally set aside for VIP guests rather than the general public.



"Kathleen Gillet" alongside at the Australian Maritime Museum.

Another example of a sailing exhibit is the 1884 Robert Logan built "Waitangi". She is under the ownership of the Classic Yacht Charitable Trust of Auckland. She is moored alongside the National Maritime Museum of New Zealand's pontoons in Auckland. Her full-time skipper is Tony Blake, chairman of the Classic Yacht Association of New Zealand. Tony helms her in Classic Yacht Association races and other sailing activities. "Waitangi" is more accessible to the public than most museum exhibits.

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"Waitangie" in the background crossing tacks with "Waione" during a Classic Yacht Race on Waitemata Harbour.

The promotion of sailing programs using traditional and classic yachts owned and operated by Australian museums would be an invaluable opportunity to introduce and educate the public to not only traditional sailing skills but also promote interest in the history of the boats, their construction and their working history. It is a known fact that any wooden boat that is under utilised and kept closed up and left to sit deteriorates faster than a wooden boat that is regularly operated and maintained. The "Colin Archer" and "Waitangi" are examples of well kept and regularly used living pieces of maritime history.

Key observation for Australia:

Australia needs to find the means to fund restoration projects adequately to allow full restoration to occur. This is imperative to allow these restored vessels to function fully to their original operational capacity. We need to have more of our Australian museum vessels not to be static but to be of a living stature.

Findings:

The following observations encapsulate the information that was gained throughout the course of the Fellowship program:

- Traditional wooden boatbuilding or restoration is more widely practiced in New Zealand and Norway as a percentage of the boating industry.
- Wooden boat restoration appears to be recognised as a field of expertise in its own right in Norway and New Zealand.
- In Norway there is wide support for traditional wooden boats through government funding and public awareness. The Norwegians place great importance on all aspects of its history and culture.
- Norwegian owners of heritage craft have the opportunity to apply for financial assistance for restoration/preservation through the Cultural Directorate. The Cultural Directorate may provide funding to the less financially advantaged boat owners.

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- The Hardanger Fartoyvernssenter at Norheimsund in Norway trains boat builders in traditional wooden boatbuilding and restoration. These boat builders are the trainers of the future in this specialised field. In Australia the few trainee boat builders in traditional boat building sheds may not either stay in the industry or gain teaching qualifications.
- Marine preservation centres such as Hardanger Fartoyvernssenter provide a unique and important role in the preservation of Norwegian boats and boat building skills combined with museum displays and is an important training facility for young traditional wooden boat builders - we should endeavour to establish such an institution in Australia.
- In Norway there are smaller wooden boat festivals held at Risør on the southeast coast and also at Norheimsund on Hardanger Fjord on the west coast. The advantage of these is that local boat building customs and local marine heritage can be showcased.
- The same importance should be placed on showcasing local wooden boat classes or regional types at wooden boat festivals as is placed on overseas exhibitions. We need to appreciate our own local history and culture.
- In Auckland the traditional wooden boat sailing scene is very healthy, through racing, cruising and social events. This reflects directly to the repair/restoration industry.
- In Australia if wooden boat owners and associations worked with established sailing clubs to organise sailing events (either racing or cruising) this would raise the profile of wooden boats and highlight their cultural importance. The Classic Yacht Association of New Zealand conducts regular events in conjunction with the Royal New Zealand Yacht Squadron on Waitemea Harbour and can be easily viewed by a large number of people. In Australia with our harbour side cities we have an opportunity to showcase our classic and heritage boats.
- Federal and State governments can be lobbied by associations, festival organisers and individuals to provide more financial support to maritime heritage and culture.
- Traditional wooden boatbuilding training is more specialised in Norway and New Zealand because New Zealand has the National Certificate in Boatbuilding. Level IV is split into individual qualifications to match the medium the trainee is working in. Australian boat building qualifications are of a general nature.

Chapter 7

Knowledge Transfer

7.1 Applying the Outcomes

This fellowship program has provided many opportunities to study and observe traditional wooden boats and the methods of used to build, restore and preserve them. It is all very well to preserve and present traditional wooden boats of significance but equally important is preserving the skills of the trade's people. This can be done through various avenues. As stated in Section 8, Recommendations, the New Zealand National Certificate in Boatbuilding Level 4 is split into individual qualifications that reflect the medium the trainee boat builder is working in. This gives the traditional wooden boatbuilding trainee the focus on learning definitive skills passed on by an experienced trade's person/employer. In Australia this knowledge transfer is under threat as industry drives the boatbuilding training providers to deliver training packages to teach skills more related to GRP, plywood, aluminium, steel and composite boatbuilding. In Australia we need to model our boatbuilding training on the New Zealand system. This must happen sooner than later as experienced wooden boat builders will retire or leave the industry. The knowledge will become scarcer as time goes by. We need to transfer this knowledge and practical skills to the current generation before it can be found in texts on preserving wooden boats.

In Norway and particularly New Zealand changes to specialised training was developed in part due to supply and demand by traditional wooden owners and their associations; in other words their pride in their history and culture and its preservation. In Australia our various Wooden Boat Associations, Wooden Boat Festivals and individual boat owners need to lobby State and Federal Governments to implement changes to the training our boat builders receive to reflect their areas of specialty. This overseas Fellowship program gave the fellow many opportunities to observe the specialized transfer of traditional wooden boatbuilding, preservation and presentation. The fellow has many opportunities to transfer knowledge gained during his fellowship program through speaking engagements incorporating powerpoint presentations and question and answer forums, meetings of wooden boat associations meetings at their regular members nights and classroom workshops at TAFE and other training providers offering boatbuilding packages catering to both the recreational boat builder and those hoping to make a career in this field.

It is also very important to raise awareness that we are in danger of losing areas of expertise and this can be done by presentations to the wider general public on the above format at Wooden Boat Festivals and Boat Shows around Australia. The attendance at the Wooden Boat Festival at Hobart averages 45,000 people many of whom attend the organized presentations offered. There are many commercial publications in Australia that are marine related, and many Boating associations have a regular newsletter which are ideal vehicles for passing on knowledge to the wider community. The official newsletter from the BIA of NSW, "Logbook", would be an avenue to transfer knowledge gained through this fellowship program to the professional boatbuilding community through the publishing of articles. The SBA of NSW hold regular meetings in Sydney offering guest speakers the opportunity to transfer knowledge in their particular field of expertise to apprentice and tradesman boat builders.

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The author was recently able to transfer skills mastered as a traditional wooden boat builder during a visit to a steel fabrication plant building a steel fish feeding vessel for the local aquaculture industry. The vessel construction drawing had produced measurements for the shape of the frames provided in the form of CAD drawings. The builder found discrepancies in the frame offsets (measurements) and the author was able to make the correction to the offsets using fairing battens to average out the discrepancy thus correcting the CAD derived measurement to produce frames shaped to the correct dimension for fabrication. This experience underpins the importance of preserving and teaching traditional skills in all areas of endeavour and the transfer of knowledge from traditional to contemporary is invaluable.

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Recommendations

8. Recommendations

The following are recommendations to Government, Industry, and the Business sector, Professional Associations, Education and Training Providers, our Community and the ISS Institute.

8.1 Government - Federal, State, local as appropriate

In view of the findings, the Australian Federal Government is encouraged to:

- Create a National Funding Scheme to help individual owners restore heritage wooden boats.
- Develop a department to create a register of traditional wooden boats worthy of government funding and to administer the allocation of these funds.
- Accredite boat builders, marine preservation centres and museums etc as centres of excellence in traditional wooden boat preservation.

State and Local Government are encouraged to:

- Better resource TAFE Colleges to help develop specialised training for traditional wooden boat builders and repairers.
- Recognise the cultural significance of coastal or river regions and to protect their character, history and culture. E.G. Sydney Harbour, once a working harbour and now taken over by residential and non marine related business development.
- Develop a Foreshore Authority to manage planning schemes that reflect our marine heritage.
- Assist in the development of marine preservation centres to represent Australian maritime history and culture.

Industry is encouraged to:

- There is a genuine interest, even resurgence of interest in wooden boats in Australia. Wooden boatbuilding and restoration is only a very small percentage of the boatbuilding industry but Australian boat builders have established a fine reputation over a long period.
- Industry needs to develop and promote training that specialises traditional wooden Boat building. As already reported, wooden boat builders of the past were multi-skilled. The boat building industry would benefit in general by having more multi-skilled tradespeople to fill skills gaps in the wider industry.
- The developments of marine preservation centres such as Hardanger Fartoyvernssenter are important opportunities for not only promoting the wooden boatbuilding/restoration industries but also tourism.
- Traditional wooden boat restorations and boatbuilding projects generate business in many sectors. The timber that may be used is only one of the many types of materials needed; there are hundreds if not thousands of copper nails, silicone bronze boat nails, nuts and bolts. This generates business for suppliers of fastenings, paint, abrasives, tool sharpening and replacement and ships chandlery. Sail makers supply sails and riggers splice and swage rigging. Sometimes a new motor will be supplied or the old

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motor rebuilt. The services of a fitter and turner are needed for propeller shafts and cutting of threads on bolts. A foundry will need to cast bronze deck fittings, lead keel and nuts and washers for keel bolts.

- During the building/restoration project the vessel will need to be valued and have construction reports for the insurance company, this will require the service of a marine surveyor with a background in traditional wooden boatbuilding.
- If the traditional wooden boat is being built or restored in a boat school or marine preservation centre/museum then the business potential is there for the retailing of merchandise such as clothing, curios, books and literature as well as providing refreshments in cafeteria or restaurant.
- Business opportunities could be developed between tourism associations and the wooden boatbuilding industry: eg Forestry Tasmania, Wooden Boat Centre Tasmania, Tourism Tasmania, Events Tasmania, Hobart Chamber of Commerce, Australian Wooden Boat Festival Inc.

Professional Associations are encouraged to:

Boating Industry Association of NSW of which the Shipwrights and Boat builders Association is a subsidiary are the only two associations relevant to traditional wooden boats and they could be lobbying government to restructure boatbuilding training. These associations are the key to raising awareness in government of the need for specialised training for traditional wooden boat builders and restorers. The Shipwrights and Boat builders Association actively participate and display at the International Boat Show held annually at the Sydney Convention Centre. They have a marvellous opportunity to promote traditional boatbuilding. We need to make these associations aware of the ISS, its fellows and the programs promoted and participated in by the fellows so that they can be offered opportunities to access reports and be offered the opportunity to engage fellows for speaking engagements and workshops.

Education and Training - university, TAFE, schools are encouraged to:

Australian TAFE and tertiary institutions at present do not embrace or deliver specific training packages in the areas of traditional wooden boatbuilding and restoration nor do they collaborate with industry in the design of boatbuilding training. The course currently being offered in Australia is the Certificate III in Marine Craft Construction. The training package being the MEM05 – Metal and Engineering Industry National Code MEM30705. To achieve the Certificate III the candidate must complete a block of mandatory MEM units, completion of Marine Craft Stream Units to the value of 40 points and completion of Specialised Units to bring the total value of Marine Craft Stream and Specialised Units to a value of 76 points. In the fellow's opinion units of competency borrowed from other training packages with some specialised units tacked on do not deliver the best outcomes for the trainee. It is also the fellow's experience that the delivery of training packages to traditional wooden boat builders by private RTOs using MEM units and units taken from furniture training packages is unwieldy and difficult to resource not only the delivery of training but the assessment process.

During his overseas program, particularly New Zealand, the fellow observed wooden boatbuilding training being delivered to the trainee/apprentice by the employer using units of competence revised over the years from 1996 to 2001. These units of competency are endorsed by New Zealand's leading maritime companies and the New Zealand

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government through the NZQA. It is apparent that the New Zealand boatbuilding industry holds a high priority on quality of training including wooden boatbuilding. In reading the unit titles it is the fellow's opinion that these have designed to be totally relevant to the qualification the candidate is seeking. The assessment of these units is largely undertaken by BITO field officers on site and the place of employment with close collaboration between the apprentice, employer and BITO assessor.

At the end of the fellowship program there was an opportunity to visit the Solander School in Oslo. As it was summer holidays it was fortunate that the school director and some apprentices were there undertaking personal projects. Although the visit lasted only a couple of hours the fellow had an insight into training of traditional wooden boat builders with opportunities for apprentices to build their qualifications with the further study of advanced units to gain a Diploma or Masters in traditional wooden boatbuilding. Unfortunately the fellow's time in Oslo was very limited but he looks forward to returning to Norway to further study the training of traditional wooden boat builders and opportunities to advance their qualifications to the highest levels. In the short time the fellow was in Norway he had a glimpse at the drivers for success and identifies that there is enormous opportunity to transfer the underpinning knowledge and skills that preserves traditional wooden boatbuilding skills.

Industry and employers must take real interest and an active role in partnership with TAFE in designing training packages then the training packages may not be as effective as they could be. In Australia we need to recognise the need to extend the level of training beyond the Level III Apprenticeship. At this time it is possible for RTOs to deliver Level V Diploma Courses. The author has experience with a Level V course delivered by a private RTO. The units that brought the course to Level V dealt with boat design, small business management and the boatbuilding medium along with some personal projects. It is the fellow's opinion that this one stop qualification is inappropriate; but higher levels of qualification should be available to tradespeople who choose to advance or specialise their qualification. This should be done only after a suitable time has been spent gaining practical experience on the job in the boatbuilding industry. These Masters qualifications are vital for the future of trades, we need to further train tradespeople into the role of teachers and specialists in areas related to the core trade. In the case of a boatbuilding Masters course may include subjects such as small business management, marine surveying, marine insurance, loss adjusting and assessing, boat brokering and design modules which could be prerequisites to a Naval Architecture Certificate or Diploma. There is a real need in the industry for Masters recognition after a Level III trade qualification and the attainment of a Masters qualification may start during an apprenticeship but should only be achieved after a period of industry experience. In the authors opinion a Master should only be achievable after 10 years of the commencement of an apprenticeship.

In addition:

- If private training providers are to supplement TAFE in the training of professional boat builders they need to be better supported and resourced and the level of qualification that they offer should correspond to the same level as TAFE.
- In both Norway and New Zealand trainees gain their professional boatbuilding qualification after 9000 hours of mainly on the job training. They have the opportunity for further advancement by completing extra units such as small business management. There is no substitute for exposure to different and wide ranging experience. Training based on the New Zealand and Norwegian models is the most effective way of providing industry with multi skilled boat builders with the ability to problem solve. The

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restoration of traditional wooden boats requires design concepts and problem solving. These skills can only be gained by experience learnt by years of working alongside a skilled tradesman.

- Marine preservation centres such as Hardanger Fartoyvernseier combine the training of professional boat builders whilst providing a museum, recreational activities and training schemes for disadvantaged youth but they take no role in the training of amateur boat builders. Private providers and registered training organisations need to be advised to design their training packages to differentiate between the needs of the amateur and professional boat builder.

It is recognised that there is a growing interest in traditional wooden boats within the community. Many of these people would like to expand their knowledge through recreational training and activities. Most of these people have no intention of becoming a professional wooden boat builder/restorer but have a real appreciation of heritage and traditional skills. Non accredited courses of a shorter duration are an important vehicle to introduce people to the values and skills required to sustain our wooden boat heritage. Facilities offering non-accredited courses are in a position to provide activities associated with traditional wooden boatbuilding such as model making, traditional sail making, canvas canoe making. These recreational activities could make the attending of a wooden boat school more attractive to the aspiring amateur boat builder. Training of career boat builders should be left to facilities properly resourced and industry driven.

Whether it be a TAFE college or a private boat school both should be able to access appropriate funding.

Community is encouraged to:

The community's involvement and appreciation of wooden boat heritage is vital to the sustainability of the industry. To get people out messing about in boats, particularly traditional wooden boats is the driver to the success of sustaining a traditional wooden boatbuilding restoration industry. The wider the community involvement becomes with traditional wooden boats the greater opportunity to bring to government attention the importance of supporting our maritime heritage and culture.

8.2 ISS Institute Inc

The International Specialised Skills Institute has the potential to utilize its many contacts to attract funding and work with TAFE's to assist the growth of the traditional wooden boatbuilding industry. The International Specialised Skills Institute is in the position to promote its objectives through the arrangement of speaking engagements, presentations and seminars. The Institute's profile will open many doors to speak about skills gaps and shortages in my field of traditional wooden boatbuilding but also in other industry areas with the same training and heritage issues. I look forward to being involved as part of the ISS network.

8.3 Further skills gaps

One of the skills gaps that was unable to be researched during the current overseas study trip was traditional lofting techniques. Lofting is the process of drawing the boat full-size on the workshop floor to obtain patterns and templates of the component part of the boat under construction. This truly is a dying art since the development of computer assisted drawing with patterns and templates now arriving from a specialist profile cutting business

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to be assembled much like a Meccano set. Although this skill is taught at TAFE the unit addressing this skill is actually acquired from the metals industry training package (Unit Number MEM9.2).

Once again we get back to the importance of experience gained through repetition and one feels that when the trainee gains his qualification and has finished his training he will be most unlikely to experience the lofting process again. It is the position of this report that in the future replicas will be as significant as restorations and if we must rely on a computer to design and loft our traditional wooden boats the loss of the traditional skills would be significant. So while Marine Preservation centres have a vital role to play, lofting is not required for repairs or restoration as templates and patterns can be fashioned from the components to be replaced. We must not forget to promote the building of traditional wooden boats, large or small and the importance of lofting in this process rather than relying on computer assisted drawings. It should be remembered that the loftsmen will generally be the boat builder but unfortunately it is unlikely that a computer operator will leave the air-conditioned office for the atmosphere of a traditional wooden boatbuilding shop.

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