THE AUSTRALIAN NAVAL ARCHITECT

Volume 9 Number 2
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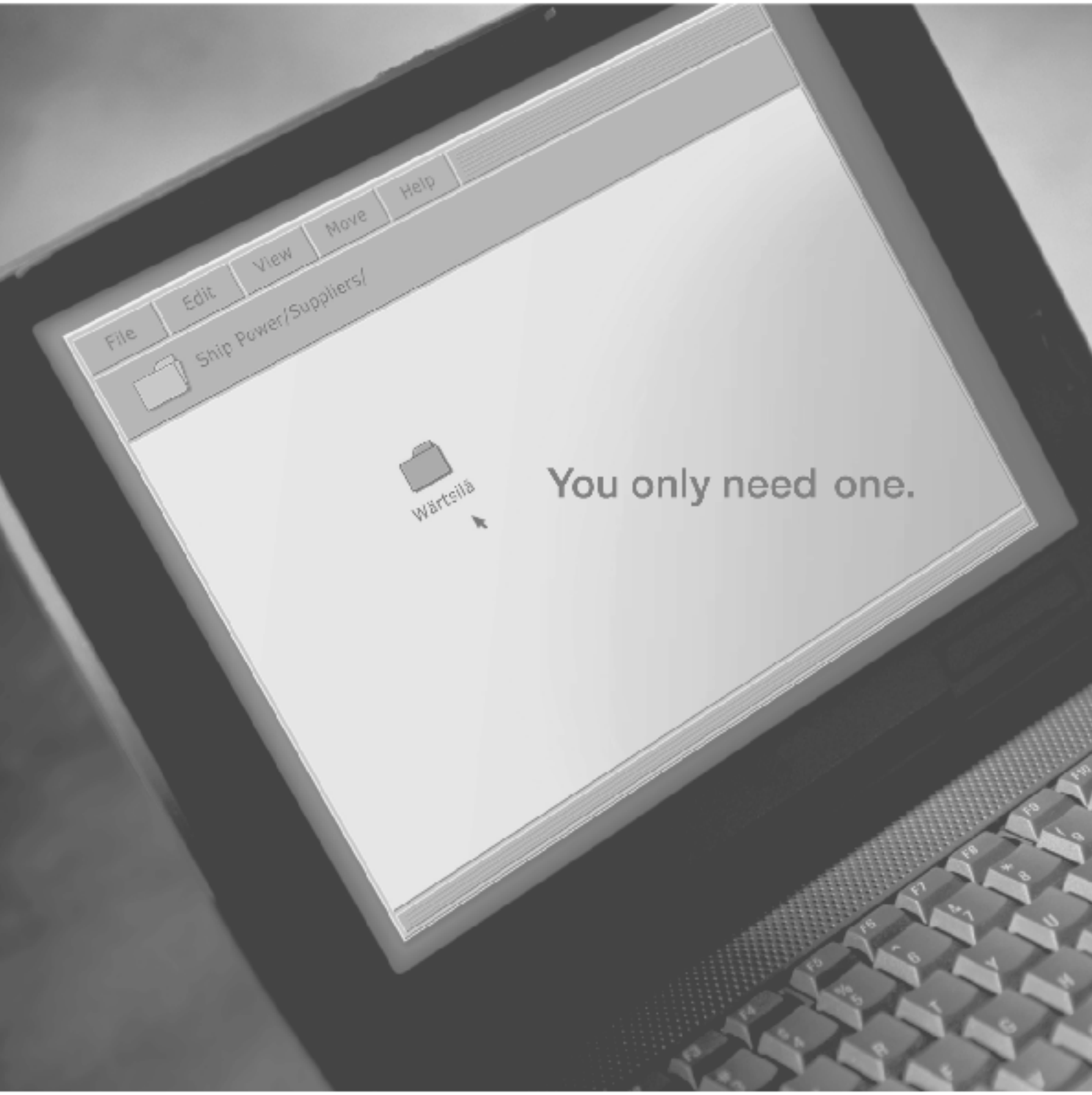

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(Australian Division)

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Cover Photo:

The magnificent 60-m trimaran motor yacht, first of the e-motion class, at sea during trials. She is the world's first trimaran super-yacht and was built by North West Bay Ships in Tasmania.
(Photo courtesy NWBS)

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From the Division President

I would like to start by thanking the Division Council and members in general for having had the confidence in me to extend my term as president of the Australian Division until the 2007 Annual General Meeting. That said, I need to get on with the work to be done in the intervening period, so here goes (with apologies to those expecting something light in this column).

Increasingly, over the past few months I have been asked about the benefits achieved for RINA members from our cooperative dialogue with Engineers Australia (EA), formerly known as the Institution of Engineers, Australia. So I thought I'd use this column to inform the Division's members of where we currently are and where we're going in this relationship.

In our Heads of Agreement with EA, which has been in force since 1998, RINA acknowledges that EA "is the paramount institution for professional engineers and engineering technologists in Australia". EA reciprocates in that document, stating that RINA is the paramount international learned society in the field of naval architecture.

But, despite the fact that both EA and RINA undertake in the agreement to encourage their members practising in naval architecture, it is up to individual members to make their own decision on whether to become a member of both bodies.

For those who choose not to join both institutions, it is well recognized that EA cannot service professional development needs in technical aspects of naval architecture, whereas this is one of RINA's strengths. Moreover, by being a licensed body under the Engineering Council of the United Kingdom, RINA can provide naval architects with similar "chartered engineer" professional accreditation to that of EA.

Specifically, the Heads of Agreement spells out this equivalence by stating that a member of RINA who is a Member or Fellow of the institution and who has also met the qualification and interview requirements for CEng will be admitted to EA without further examination or interview. Similarly, RINA undertakes to grant its membership to Members and Fellows of EA who have CPEng registration.

Members should note, however, that EA regards CPEng as its own brand and is not prepared to make this available to RINA members unless they are members of EA. Two alternatives to CPEng are therefore available for RINA members wishing to have their professional competence recognized without joining EA:

- obtain CEng registration through established RINA processes; or
- obtain registration on the National Professional Engineers Register (NPER), which is separate from but has closely similar criteria to CPEng (although administered by EA), and for which competencies for a "naval architecture" area of practice have been agreed following development by the Australian Division.

With regard to the first of these, I should point out that I have recently written to six leading employers of naval architects, who have expressed a preference for their professional engineer employees to have "chartered" status, to seek their acceptance of the equivalence of "MRINA CEng" with "MIEAust CPEng." Both the responses I have received by time of writing have been positive.

The NPER option is provided for in our Heads of Agreement. Recent discussions in the RINA/EA Joint Board (which administers the Heads of Agreement) have confirmed NPER registration as a real option for certifying the competence of RINA members, even though the original intention in establishing the register was for a rather different purpose.

It can be seen from the foregoing that, not only is EA a fact of working life for naval architects and other professional engineers, but that it is essential for the Australian Division of RINA to work with EA in ensuring that there is an appropriate professional framework established for RINA members to work within. A formal agreement, such as the Heads of Agreement, is pivotal to this framework. I should point out that the past 12 months or so have seen a number of misunderstandings between RINA and EA on the details outlined above — these have been resolved through dialogue, including Joint Board discussions, which would have been much more difficult without a formal relationship between the two institutions.

EA has similar cooperative arrangements with a number of other learned societies which are active within Australia. It would therefore like to standardise these arrangements and, since our Heads of Agreement has been in effect since 1998, this is likely to involve revision of that agreement before the end of next year. I have not yet received a proposal from EA and do not anticipate any fundamental changes to the arrangements outlined above, but will ensure that members are appropriately consulted in relation to any that may be proposed.

I trust that this is a useful explanation of the Division's relationship with EA and would welcome any comments you might have in relation to it. If you don't have my direct contact details, I'm sure Keith Adams would be happy to pass your comments on to me. And, if you were looking for something lighter in this column, maybe next time!

Rob Gehling

From the Chief Executive

May I take this opportunity to thank those members of the NSW, Tasmanian, Victorian and Western Australian Sections who made me feel so welcome when I visited the Division recently. I have said on many occasions that if the Institution is to succeed as a modern international professional institution, responsive to the needs of its members, it must seek their views on what those needs are. Even in this shrinking world of faxes and emails, I believe that there is still no substitute for that personal contact which I gain from meeting and talking to members. I was grateful for the positive and constructive feedback which I received, which I will take up where possible. Meeting members also gave me the opportunity to update them on recent and planned developments and, when I left, there were six more members than when I arrived!

Once again, my thanks to all those members who made my stay in Australia so enjoyable and, for me at least, worthwhile. I look forward to my next visit to the Division, hopefully for the Pacific 2006 International Maritime Conference.

Trevor Blakeley

Editorial

There are times when we wish that we could publish *The Australian Naval Architect* in colour. In this edition we report on the completion of a number of high-quality innovative ships from shipyards spread across Australia. The photographs of these ships and their interiors show the high standard of finish that has been achieved which is surely as good as could be obtained anywhere in the world.

Not only do these ships maintain the reputation for quality Australian shipbuilders have always had, they demonstrate a high degree of innovation in design — two of them are trimarans. Innovative designs from Australian shipyards and naval architects are not new phenomena. It is easy to forget that, in the 1970s, Australia led the world in the application of industrial gas turbines to ship propulsion. An Australian shipyard launched the world's first purpose-designed cellular container ship and the concept of the hatchcover-less container ship was also developed here. The big difference today lies in the extent to which the structure of our industry encourages innovation.

The history of shipbuilding and ship design in Australia is closely bound to the story of Australian industry as a whole. The changes to exchange rates and tariffs in the 1980s and the end to the shipbuilding bounty encouraged Australian industry to compete on international markets for survival, and those who can offer innovative, high-quality ships at competitive prices are survivors.

We have no monopoly on smart ideas or intelligent people. The search for excellence never ends. In this edition we also report on the graduation of a remarkable number of naval architects from Australian universities and colleges. Hopefully, many will find productive and enjoyable careers in Australian enterprises to meet this challenge head on.

John Jeremy

Letters to the Editor

Dear Sir,

I refer to the letter to the Editor in the February issue of *The Australian Naval Architect* from Mr Craig Birdsall and his interest in toed-in, lifting dagger boards in trailer-sailer yachts.

This is a very interesting subject, and such an arrangement would be a definite advantage in a boat working to weather. But there is 'nothing new under the sun'. I cite the Australian 12-foot (3.66 m) Cadet dinghy designed so long ago by the Sydney designer Mr A.C. Barber. These little boats, like our long-vanquished 'snub-nose' 14 footers, had steel centre plates with a long straight edge forward and a long curved after edge (see the sketch below). The centre plate in these boats was usually about 31/16 inch (4.76 mm) thick and, with the pressure on the lee side, the plate would bend slightly. With the long fore edge bending more than the shorter after edge, the plate developed a twist, causing the deeper fore edge to point up to weather; thus giving the same effect as the toed-in dagger boards as mentioned by Mr. Birdsall.

Unfortunately, in the case of the12-foot Cadet Dinghy, there have been certain alterations to the sail plan as designed. With the head sails and with the dagger plate lowered in the conventional way, the little boat becomes quite hard-mouthed when hard on the wind so, for many years these boats have been sailed with the straight edge of the plate facing aft which, of course, defeats the purpose somewhat.

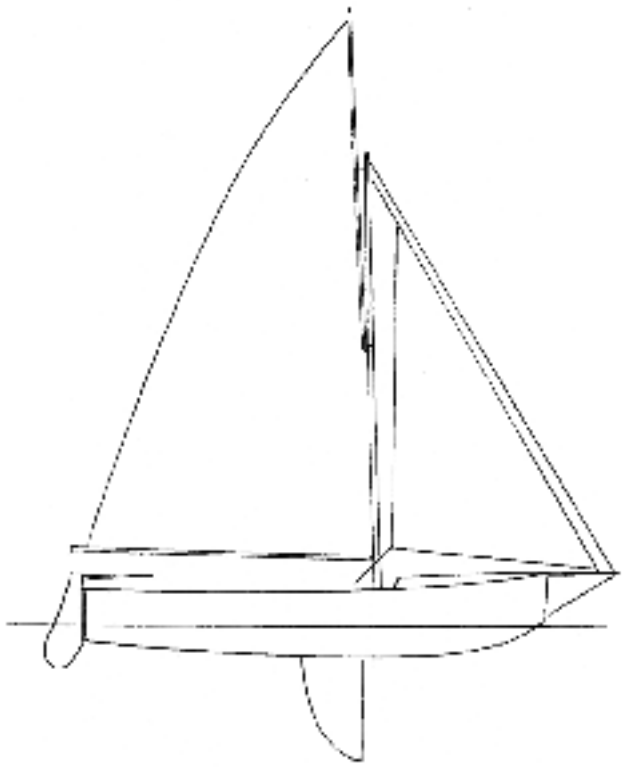
In the mid 1930s, South Australian boat builder, George Ross built the Restricted 21-footer, *Tern*. The wily old George had cut the slot in the keel in way of the centre case much wider at the fore end than the after end. Thus, when the plate was down and the boat 'hard on the wind', the pressure on the lee side of the plate would force it hard up against the weather side of the slot. In other words, the leading edge of the plate was to weather of the fore-and-aft centreline, thus creating the same effect as the toed-in dagger boards suggested by Mr Birdsall.

There is nothing new under the sun.

As for Mr Birdsall's concerns that such innovations would possibly be outlawed by a racing committee — why should they? To quote one of the modern naval architects and great yacht designers, J. Laurent Giles: "It takes a given number of years for a nation's Yacht Racing Committee to frame the Rules for a Class Yacht, and the nation's yacht designers to find the holes in the Rules and drive the horse and cart through them".

So it will always be.

Neil Cormack



A snub-nosed 14-footer
(image courtesy Neil Cormack)

Dear Sir,

When meeting new people I am often confronted with the question "What are you studying at university?" When I reply, "Naval architecture", I am often met with blank stares, so I hurriedly add, ""It's an engineering degree." Then follows one of two questions: "So are you in the navy?" or "Is that like architecture?"

Is it such that, in today's society, the art of naval architecture is a forgotten way of the past, is it ignorance, or am I not explaining myself properly. When pressed further, I elaborate by explaining that it is the design, but not the construction, of ships; a branch of mechanical engineering.

So just what is it that embodies naval architecture and how do I explain myself better? To my mind, naval architecture involves the design and fit out of a vessel that is fully contained, to support life at sea, while completing set tasks.

Although belonging to the School of Mechanical and Manufacturing Engineering, it involves just as much of all the engineering disciplines. A naval architect is a designer, an artist and, as Prof. Doctors puts it, "much cleverer than most people." Generally speaking, mechanical engineers deal with small things, machine parts, components and the like, whereas naval architects produce small floating communities sustaining life, more in the manner of civil engineers.

I consider myself to be a member of an elite group continuing the world's second-oldest profession into the future. Engineering and public ignorance aside, naval architecture is something I am passionate about.

Anderson Chaplow
UNSW Student

Dear Sir,

I am an international student, currently enrolled in the naval architecture degree plan at TheUniversity of New South Wales. I'm now in my third year of studies, going on to the final year next year.

The reasons I chose the naval architecture course offered by UNSW were two-fold. Firstly, I have been passionate about everything that floats on water, ever since I was a very young kid. I grew up in a town that thrived on the vitality of its river, the mighty Rejang River in the state of Sarawak, in East Malaysia, on Borneo Island. The first pioneers landed at Sibu, the place of my birth as well, on junks from Singapore after their long journey from Southern China during the late 19th Century. Since then, Sibu has grown steadily from a town of a mere few hundred people to what it is now a vital river port for transit of various goods from Kuching, the state capital, and Singapore, with a population of more than 500 000 people.

Almost ever since its conception, Sibu has counted on its shipping as the deciding factor in bringing prosperity and trade. Its indigenous shipbuilding industry has grown from private enterprise, building wooden express boats by trial and error, to what it has become now, building modern express boats, ferries and tugs, and exporting them all over the South-East Asian region. Those small enterprises have since became big corporate companies, employing professional engineers at their shipyards. The naval architecture firms have grown significantly over the years too. My interest in ships and vessels only intensified when I took up my course at UNSW. Now, I can count naval ships, luxury yachts and sailing boats among my favourites as well.

Secondly, there seemed to be few universities offering this particular degree in Australia. The only other place I had heard offering this degree was at the Australian Maritime College in Launceston. However, living in a quiet place was never really an option for me. That was why I chose UNSW over AMC eventually.

I certainly like the naval architecture course conducted at my university. I have had the chance to be guided by the smartest and most successful engineers-cum-lecturers in Australia. These are the people who never cease broadening my horizons in everything naval architectural.

However, on the downside, I think that we never really get enough exposure to real hands-on practical experiences, and that we aren't being taught on the latest in naval architectural software. Finally, the first two years of the degree plan which every naval architecture student goes through without a hint of anything "naval" is simply distressing, to say the least.

Constantine Ling
UNSW Student

[*You will find that you get plenty of hands-on practical experience when you come to do your ship design project in the final year of your degree. Most of the software provided (e.g. Maxsurf, Multiframe, Hydros, Nastran, Fluent, CFX, ProEngineer, Office, etc.) is updated regularly. The common first two years has pluses and minuses; not having any naval architecture in the first two years is a minus, but insufficient to change the UNSW system.* — Ed.]

THE AUSTRALIAN NAVAL ARCHITECT

Contributions from RINA members for *The Australian Naval Architect* are most welcome. Material can be sent by email or hard copy. Contributions sent by email can be in any common word processor format, but please use a minimum of formatting — it all has to be removed or simplified before layout.

Many people use Microsoft Word, but illustrations should not be incorporated in the document.

Photographs and figures should be sent as separate files with a minimum resolution of 150 dpi. A resolution of 200–300 dpi is preferred.

NEWS FROM THE SECTIONS

ACT Section

On 10 February Arthur Heather gave a presentation to the ACT Section on *The Roles, Responsibilities and Experiences of the Australian Search and Rescue Organisation (AusSAR)*. It involved a considerable presentation, an animated question time and a tour of the facility. Arthur is currently employed by the Australian Maritime Safety Authority (AMSA) as a Senior Search and Rescue Officer within the Emergency Response business unit whose responsibilities include all aspects of coordinating search and rescue for both aviation and maritime incidents within the Australian search-and-rescue region. AusSAR's responsibility in distress incidents is not to undertake the SAR effort but to coordinate the SAR response. The task involves receiving alerts to distress incidents, obtaining all available information to assist in the SAR effort, planning the search activity, identifying vessels and aircraft available to assist, directing the search activity and planning and directing the rescue activity once the aircraft or vessel is located.

Before joining AMSA, Artie Heather was a helicopter pilot with the RAN. When HMAS *Adelaide* went to the assistance of Tony Bullimore and Thierry Dubois in distress in the Southern Ocean, Artie was instrumental in their successful rescue.

Roger Duffield

Tony Armstrong, R&D Manager at Austal Ships, gave a presentation on 10 March entitled *The Design and Construction of the 127 m Trimaran* Benchijigua Express, updating his paper to last year's RINA conference in London on trimarans. Austal started work on this concept having seen the potential of this configuration as demonstrated by the UK experimental ship *Triton*.

The development work involved extensive analysis, computation and tank testing, resulting in the conclusion that the vessel's performance could be expected to significantly improve on that of other types of high-speed craft, especially with regard to resistance and seakeeping. Particular attention was paid to the design and positioning of the outer hulls or 'amahs'. Careful design of the amahs enabled the vessel's intact stability characteristics to be designed to meet the applicable stability criteria. The optimum longitudinal position of the amahs was given special consideration, but the final result was a compromise. Seakeeping work showed that the vessel's motions at various headings relative to the seas would generally remain within satisfactory limits in higher sea-states than, for example, a comparable catamaran. At the time of the presentation, the vessel had not yet completed sea trials or been handed-over pending repairs to some underwater ride-control equipment. This problem had resulted in Austal developing some innovative solutions for avoiding dry-dockings; the hardware associated with these solutions had already been bought from Austal by the vessel's owner.

Tony concluded his presentation by comparing *Benchijigua Express* with Austal's proposed design for the US Navy's Littoral Combat Ship. As this design is for a trimaran of similar dimensions to *Benchijigua Express*, much of the development work is directly transferable to the LCS. The design's sea-state serviceability characteristics are expected to constitute a major advantage in this regard relative to the competing design proposal.

Rob Gehling

Victoria

In February an excellent paper titled *Corrosion — Anticipate the Unexpected* was presented by Mr Don Bartlett. The talk highlighted the importance of good design, surface preparation, materials and coating selection for cost-effective corrosion control in any given service condition. Drawing on his 40 year career in corrosion protection, Don illustrated with examples from a diverse range of case histories that the unexpected can be anticipated by understanding the fundamentals of corrosion protection and by taking a prudent approach, in the knowledge that anything that can go wrong usually does.

On 22 March RINA Chief Executive Trevor Blakeley visited the Victorian Section and, as on previous visits, a social function was held on board HMAS *Castlemaine*. Approximately 25 members met with Trevor to discuss current issues. HMAS *Castlemaine* had been subject to a major refit since the last visit, which included some time spent in dry dock at the Tenix Williamstown yard. Also present was Dr Kevin McTaggart who is currently spending 18 months working at DSTO on exchange from DRDC Canada. Many people know Kevin as the author of the Shipmo computer code and he will present a talk on this later in the year.

Kevin McTaggart, Trevor Blakeley, Peter Williams (Host) and Bob Herd onboard HMAS *Castlemaine*.

On 14 April Mark Tostevin presented a paper entitled *Computer Synthesis for the Design of Marine Power Plants*. Mark described a method of computer synthesis already proven in industry ashore and suggested it as an aid to the design of marine power plants. From a stock of given information, the method produces and evaluates a range of alternative designs from which the best can be chosen. The form of both the given information and the computer simulation is universal, so it can be used for all kinds of power plants. The same method optimizes the subsequent

operation of the plant. The designs of a combined diesel and gas turbine plant were given as an example for both naval and commercial ships.

Stuart Cannon

Queensland

The Queensland Section held its 2005 Annual General Meeting on 1 March 2005 at the Gateway Campus, Brisbane North Institute of TAFE. The Chairman noted that a quorum of members was not present but it was agreed to continue with the meeting and that decisions could be considered for ratification at the next technical meeting.

The following Section Committee was elected:

Chairman	Bill Barlow
Deputy Chairman	Dion Alston
Hon Secretary/Treasurer	Brian Hutchison (brghutchison@hotmail.com)
Committee Members	James Stephen
	Mark Devereaux
	Brian Robson
	Tommy Ericson
	Gillian Carter

After the AGM a presentation was given by Dr Richard Goozee on the subject of *Computational Fluid Dynamics: its Implications on Naval Architecture*. Dr Goozee is a mechanical engineer with a Bachelor of Engineering degree from the University of Queeensland and a PhD in aerospace engineering, also from the University of Queensland. His areas of particular competence include computational fluid dynamics, numerical simulation, finite element analysis, parallel supercomputing and hypersonic propulsion in which field he acted as a CFD analyst for *Hotshot*, the first successful atmospheric flight test of a supersonic combustion ramjet (scramjet) at Woomera. He has previously worked for Energex and as a visiting researcher at NASA's Langley Research Centre in Virginia, USA

CFD is the solution of mathematical equations, which describe the behaviour of fluids, on computers. The geometry of the flow domain being modelled is divided up into small volumes, forming a computational mesh, in which the equations are then solved. This might be a three-dimensional model of a ship hull with a volume of water flowing around it.

Since the introduction of the digital computer, numerical simulation has been used very effectively in naval architecture; however, in the past, numerical simulations, limited by the computing power available, had to make significant assumptions. These assumptions affected the accuracy of the simulations, made interpreting results difficult, and often relied on idealisations or pre-defined empirical relations.

Modern CFD can be used to solve fluid flow in a more general-purpose way, where different scenarios can be modelled using only physical information: flow geometry, fluid properties, and boundary conditions, such as flow speeds and external pressures.

In the same way that fully-detailed simulations of the airflow around complete aircraft are now practical, the same technology can be used to build simulations of the flow around complete ships.

These simulations can model the free surface of the water, the viscous flow around the hull and account for turbulence in the ship's wake.

CFD can be used effectively to extrapolate from tank testing to full-scale vehicles or structures. This can be valuable in cases common to naval architecture where similarity between the model scale and full scale is incomplete. Simulations can also be used to analyse proposed designs and to optimize designs under development before expensive tank test models are built.

More recent advances in CFD of specific interest to naval architects are:

- Accurate free-surface simulations. Numerical techniques allow a distinct fluid surface to be modelled as it moves under the influence of the flow and external forces such as gravity. This can be done either by constructing a distinct fluid surface within the computational mesh or by new generations of techniques that model the fluid as particles of fluid.

- The simulation of fluids using meshes that move and deform in response to the flow. The meshed hull of a ship can move within the mesh being used to solve the fluid motion. This technology can also be used to model a ship hull with a rotating propeller.

The combination of these technologies has now made possible the computer simulation of full vessels in realistic ocean conditions: a ship hull model can effectively float on a rough ocean under an equilibrium of forces from wave and viscous drag, wave action, propulsion and buoyancy.

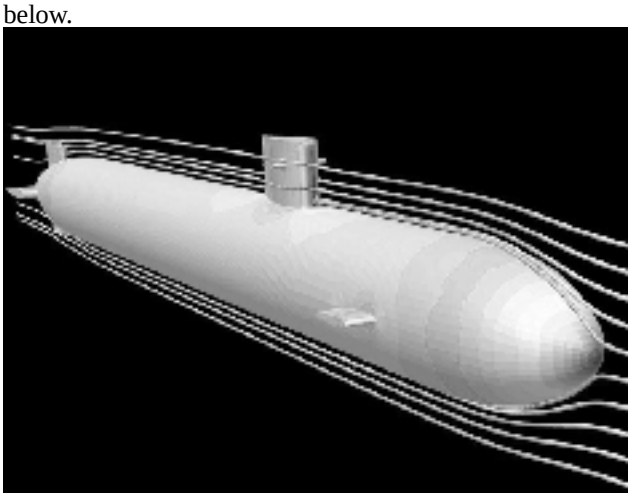
At the cutting edge of simulation technology are techniques that allow the simultaneous simulation of fluid dynamics (using CFD) and structural dynamics (using a coupled finite-element simulation). These simulations allow arbitrarily detailed structural simulations to be coupled with CFD simulations so that the deformation of the structure under fluid loading can, in return, influence the fluid motion itself. Stresses in flexible hulls can be predicted, or the flexural deformation of a keel can be modelled in a simulation coupled to the flow of water around it. This means that stresses can be predicted in components under realistic conditions long before a prototype is constructed and tested.

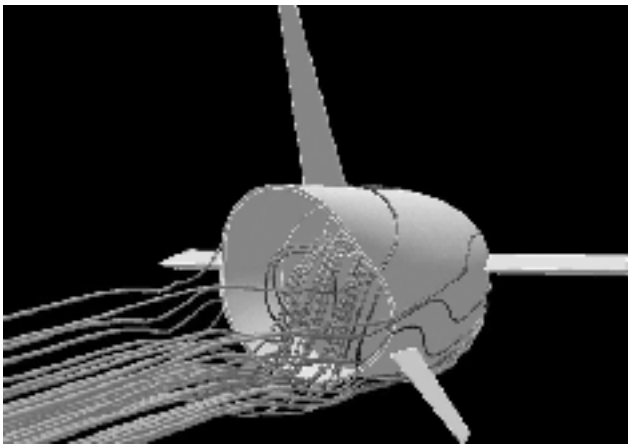
Building on techniques developed for simulating the deployment of airbags in car-crash simulations, the action of sails under wind loading can now be modelled directly. These simulations can include accurate fabric material models, running ropes, and the stresses developed in structural components and members.

In order to use such large-scale simulations in a time frame suitable for engineering development, WBM has formed an alliance with ISA Technologies in Perth. The aim of this alliance is to develop what is, in essence, a virtual hydrodynamic testing facility, combining the high-performance supercomputing infrastructure at ISA Technologies with the software and engineering expertise at WBM.

WBM has a strong history in engineering analysis using finite element analysis and computational fluid dynamics. This is combined with extensive shipping, offshore and port industry experience, including fast ferries, tugs and supply vessels,

bulk carriers and drill rigs, naval vessels, ship loaders and container cranes. Some typical flow diagrams are shown below.





Two typical flow diagrams (above and below)
(Images courtesy Dr Richard Goozee)

New South Wales

NSW Section Committee Meetings

The NSW Section Committee met on 8 February and, other than routine matters, discussed:

- SMIX Bash: The SMIX Committee had met separately and discussed and resolved many of the issues raised by the latest SMIX Bash. 1 December had been agreed as the date for SMIX Bash 2005. The venue would need to be investigated due to the numbers limit on board *James Craig*. The function had yielded a small surplus due to the raffle, and we are grateful to Bill Bollard for his continuing supply of models.
- TM Program for 2005: The program for the year had firmed up, but the first few meetings had changed from the proposed order due to commitments of presenters. The current program is as shown in *Coming Events* and on the NSW Section website.
- Committee Positions for 2005: Andrew Tuite had resigned from the NSW Section Committee, due to pressure of other things. Other committee members had signified their willingness to continue on the committee and with their current portfolios. David Firth agreed to take up the portfolio of Assistant Secretary.
- Visit of RINA Chief Executive in March 2005: Arrangements were in hand for the visit of the Chief Executive to Sydney.
- Finance: The NSW Section finances at 31 January 2005 had $199.24 in the Section account and the Social account includes some SMIX monies still to be squared away.

The NSW Section Committee also met on 14 March, with the Chief Executive, Trevor Blakeley in attendance and, other than routine matters, discussed:

- SMIX Bash 2004: Accounts for SMIX Bash 2004 had been finalised and showed a small profit (shared with IMarEST); other possible venues being investigated, as we now have a problem with numbers.
- TM Program for 2005: Changes to the program were discussed; all updates are noted in the latest issue of *The ANA*, and are placed on the NSW Section website.
- ASDE Share of Joint Meetings: The Australian Society of Defence Engineering now share some of our meetings, and the issue of cost-sharing was raised.
- EA Advertising of Joint Meetings: Engineers Australia do not advertise joint meetings with IMarEST as joint, but as IMarEST (alone) meetings; this should be corrected.
- Finance: The NSW Section finances were unchanged from 31 January 2005 and had $199.24 in the Section account. The Social account still has SMIX Bash 2004 finances to be completed (expected soon).
- Refreshments at Technical Meetings: It was considered that current coffee-tea-and-biscuits refreshments were unlikely to attract more people to technical meetings, and that efforts should be made to put on something more substantial, with maybe beer and wine. The Chief Executive was questioned about arrangements at other Sections/ Branches, and were advised that some have a voluntary donation for refreshments, some use Section money, but no branches have any form of compulsory payment. RINA by-laws on the subject of refreshments are provided that the refreshments are in line with the meeting, then it is OK to use Section/Branch funds. IMarEST concurrence to be canvassed and indicative costs determined.
- Presentation to Presenters: IMarEST in Newcastle, at the conclusion of their meetings, present the authors with a bottle of wine to thank them for their efforts in making the presentations. This was considered, and adoption generally agreed; IMarEST Sydney concurrence to be canvassed.

The NSW Section Committee also met on 2 May and, other than routine matters, discussed:

- SMIX 2005: Other possible venues were discussed at some length; some to be investigated.
- TM Program for 2005: Minor change to the program noted, and the issue of cost-sharing by the Australian Society of Defence Engineering discussed further.

- Vacancy on Committee: David Firth had resigned from the NSW Section Committee due to pressure of other things, and there is therefore a vacancy.
- Finance: The NSW Section finances at 31 March 2005 stand at $94 in the red (i.e. being supported by the Social account); however, we have reimbursements for several venue hires due which will put the Section account back into the black. The SMIX Bash 2004 finances were finalised on 18 March, and there is now a small surplus in the Social account with which to begin bookings for SMIX Bash 2005.
- Refreshments at Technical Meetings: The IMarEST Committee supports the proposal in principle; details to be investigated.
- Presentation to Presenters: IMarEST support to be determined and details to be investigated.

Annual General Meeting

The NSW Section held its seventh AGM on the evening of 8 March, following the March technical presentation and the Australian Division AGM at Engineers Australia, North Sydney, attended by twelve with Phil Helmore in the chair.

Phil, in presenting the Section's Annual Report, touched on some of the highlights of 2001, which included nine joint technical meetings with the IMarEST (Sydney Branch), with attendances varying between fifty-five (at Jon Clemensha's presentation on *The Armidale-class Patrol Vessel Project*) and eighteen (at Richard Hudson's presentation on *The Re-alignment Afloat of a Ship's Main Engine Crankshaft Using Liquid Nitrogen*). The NSW Section had held three additional technical meetings of its own during the year, and a forum (in concert with the National Maritime Safety Committee) on the Issues Paper on the possible ways forward for the drafting of the new Construction Section of the National Standard for Commercial Vessels. Our other major event was the fifth successful SMIX Bash in December 2004 which was attended by 223.

Adrian Broadbent presented the Section's Financial Report. During the year our finances had been separated into separate Section and Social accounts (starting from the formation of the NSW Section), and their operations will continue to be kept separate, and monthly statements will be more meaningful. As at 31 January 2005, we had $199.24 in the Section account. The Australian Division reimburses us for Section's share of the monthly technical meeting costs and provides us with a small float. The Section budget for 2005 is $1510, comprising mostly venue hire. The Social account includes all SMIX Bash finances, and now has a small surplus which allows us to plan for SMIX Bash 2005 with greater confidence. SMIX Bash 2004 generated a small profit which was split equally with the IMarEST.

All committee members were thanked by the Chair for their contributions, some for a number of years. During the year we welcomed David Firth onto the Committee, and Andrew Tuite has recently resigned. Current members have signified their willingness to continue in their current positions, obviating the need for elections this year. As a result, the committee for the coming year is as follows:

Chair	Phil Helmore
Deputy Chair	Graham Taylor
Treasurer	Adrian Broadbent
Secretary	Lina Diaz
Assistant Secretary	David Firth
AD Council Nominee	Martin Williams
Members	Craig Boulton
	Don Gillies
	Bruce McRae
	Grahame Parker

Visit of RINA Chief Executive

The Chief Executive of RINA, Trevor Blakeley, visited Sydney from Saturday 12 March to Wednesday 16 March. In a packed program, he managed to include the following:

- Visit to ADI Limited at Garden Island on Monday 14 March 1300—1600 for lunch (meeting and greeting the naval architects) and tour of dockyard.
- RINA NSW Committee meeting at Incat Designs on Monday 14 March at 1630.
- Dinner with RINA NSW Committee in Lane Cove on Monday 14 March at 1800.
- Lunchtime presentation to students at UNSW on Tuesday 15 March at 1300, and
- Attendance at UNSW Naval Architecture Student/ Staff get-together on Tuesday 15 March at 1800.

From Train Ferry to Hospital Ship

Alan Budd of Mercy Ships gave a presentation on *The Conversion of the Train Ferry* Dronning Ingrid *to the Hospital Ship* Africa Mercy to a joint meeting with the IMarEST and ASDE (the Australian Society of Defence Engineering) attended by forty-one on 8 February in the Harricks Auditorium at Engineers Australia, North Sydney.

Introduction

Alan began his presentation with an outline of the work of Mercy Ships, an international, non-denominational, Christian, humanitarian organisation which takes hope and healing to people in the world's poorest nations. The company itself lives on donations, and currently has two hospital ships operating and two land bases (in Sierra Leone and Nicaragua), with seventeen offices throughout the world. Working in partnership with local communities, churches, governmental and non-governmental agencies, the goal of Mercy Ships is to be a locally-relevant catalyst for transformational development. The ships are staffed by volunteers who pay to get there, pay to be there, and pay to get home again. They are prepared to give much of themselves, and are wonderful people to work amongst.

MV *Anastasis* ex *Victoria* is currently operating in Africa, and is now 52 years old. She is a 12 000 t vessel, has three operating theatres and a 40 bed hospital on board, and a crew of 350 people.

MV *Caribbean Mercy* is currently operating in the Caribbean, and is also 52 years old. She has one operating theatre and a crew of 150, but teams go ashore and work in local institutions.

MV *Africa Mercy*, the subject of the presentation, was one of three sisters; train ferries built for the Danish Store Baelt

(Great Belt) crossing of the 11 n mile wide stretch of water separating Jutland and Zealand for DSB Rederi (the Danish State Railways). *Dronning Ingrid*, *Prinz Jaochim* and *Kronprinz Frederik* were of 152 m length, 23.7 m beam, 6 m draft, had a gross tonnage of 16 070 and a speed of 14 kn. The design was done by the office of Knud E. Hansen, consulting to DSB, and the vessels were built in two separate yards at Helsingør and Nakskov. KEH did two slightly different sets of steel drawings to suit the differences in the production standards of the two shipyards. Able to do the work of five previous ships, the new trio were a great success on the Store Baelt route and, while they only marginally reduced the crossing times, their impressive range of passenger facilities at least made a welcome and relaxing break in long-distance train journeys.
Alan was pleased to note Hans Stevelt in the audience, as Hans had worked on the fire-control and safety drawings for these vessels as one of his first jobs when he started work as a graduate naval architect with Knud E. Hansen, many moons ago.

Video

Alan then showed a video of typical Mercy Ships operations, with *Anastasis* arriving in Freetown, Sierra Leone. Clips of some of the people waiting in line showed cleft lips and enormous tumours, for example. These are doubly difficult to live with as, aside from the difficulty of the deformity itself, the locals believe the bodies of the people bearing these deformities to be infected by evil spirits. Removing the deformity makes living easier, and gives them real hope for the future, free of evil spirits.

Ships have a number of advantages in this type of operation. With the hospital on board the ship, the health professionals are already at work (no travelling involved) and the people come to the ship. There, they line up to be screened and obtain a ticket for an operation. For eye surgery, they may have 3 000 people lining up, but only slots for 500 operations!

In addition to the health-care work, Mercy Ships also teaches building skills, agriculture, etc. They do not have money to throw at problem areas, but come in and leave a legacy. They are not an immediate-response group.

Acquisition

Mercy Ships was formed in 1978, and has been operating continuously since then. In order to expand their capability in serving over 90 of the poorest countries in the world, Mercy Ships' vision is to scale up its current operating capacity from two to five hospital ships over the next five years. Given the ageing of the two existing vessels, Mercy Ships' leaders in the mid-1990s commenced the search for a "new" ship to augment their operational capacity. However, Ms Anne Gloag, from Scotland, came to their aid and purchased *Dronning Ingrid* in the name of the Balcraig Foundation, and donated her to Mercy Ships.

Conversion

Although *Dronning Ingrid* did not meet the immediate requirements of Mercy Ships, it was evident that a suitable conversion would produce a highly-efficient vessel capable of maintaining the facilities to the high standards required by the organisation. The major changes were to provide a complete hospital, and accommodation to house all those involved in the operation of the ship, the hospital, and for the numerous outreach services.

Prinz Joachim, sister vessel to *Dronning Ingrid*
(Photo DSB Rederi)

The conversion from train ferry to hospital ship centred around the train deck, which consisted of four rail tracks running the length of the vessel, separated by a centre trunk structure. Into this centre trunk, and attached to the ship sides, were incorporated the passenger "platforms" and access to the ship's passenger areas via stairways and lifts, forward and aft of midships. The requirement for the fast movement of passengers from the trains to the ship's facilities and return necessitated an efficient "passenger proof" system. This was provided for by the concept of a "train square", a two-storey space off which the shops and fast food bars were accessed, not unlike the average city underground railway station. A new deck was inserted at mid-height on the train deck to provide double the original working area.

The conversion was done at Wallsend at Newcastle-on Tyne, UK with A&P Tyne the main contractor. The local council owned a graving dock, and this they provided free of charge to Mercy Ships for the conversion. Unfortunately, with the vessel now refloated, the dock has been filled in and blocks of flats are growing instead. Fitting out is currently progressing at A&P Tyne's yard at Hebburn. This yard was formerly Cammell Laird, and they went into receivership twelve months after starting work on *Africa Mercy* and cost the project two years in time and $A1 million in money.

This ship was renamed *Africa Mercy* to serve as the third and largest hospital ship in the Mercy Ships fleet. On completion she will be the world's largest non-government hospital ship with six state-of-the-art operating suites, 80 hospital beds and a total complement of 484. In addition to providing a wide range of healthcare services, she will facilitate the delivery of integrated community-development services with far-reaching impact in improving the quality of life for hundreds of thousands of Africans.

Layout

At the aft end, there was a docking bridge for the train operations. This was removed and replaced with family accommodation. Some of the professional people may work on board for twenty years, and their families grow up, going away to university and coming back to the ship for holidays!

Africa Mercy after refloating at Wallsend
(Photo courtesy Mercy Ships)

On the uppermost deck there is a roadway port and starboard, which can take up to 24 four-wheel drive vehicles, mobile drill rigs, mobile clinics, and any gear that needs to go ashore. There is also a swimming pool. The vessel can be alongside in one place for up to a year at a time. Many places are not safe, there are women on board, and the facilities provide safe places to exercise. Some comforts are needed for the long-term crew who give up so much to do the work they do. One of these is a doctor from Tamworth, NSW, with his wife and two children, the youngest of whom is 18 months old.

The vessel, fortunately, had many tanks. Fuel and water are both important, as the vessel needs to operate independently for long periods. The fuel capacity was increased from 900 t to 1500 t, including the conversion of the flume tanks to fuel, and the fresh water capacity was also increased. Local water may be used, but is usually filtered before taking on board.

The train deck occupied about two-thirds of the length of the vessel aft. The hospital and operating theatres were placed on the lower level, and the accommodation on the upper level. Operating theatres are on the starboard side forward, and the post-operative care on the port side forward, obviating a difficult change of decks after an operation as required on one of their other vessels!

At the aft end of the train deck there is stowage for two layers of 20 ft containers, and there are schoolrooms on higher levels. Because of the number of long-term volunteer staff in family groups on board, there is a need for schooling facilities for their children, which is not normally encountered in "conventional" ships.

Inspection of the photograph of *Prinz Joachim* will show the wings at the forward end of the train deck, and these were the subject of a smooth-water restriction by the Danish authorities. For the coming unrestricted operations, these had to be faired and stiffened.

Machinery

She is propelled by six B&W Alpha V16 U 28LU diesel engines, each of 3120 kW at 775 rpm, totalling 18 720 kW, driving two controllable-pitch propellers, to give a service speed of 19 knots. Fuel consumption of the main engines is 98 t/24 h of 200 sec R medium diesel oil. The main engines are configured with three to each shaft port and starboard, clutch-connected to an L&S gearbox driving each shaft, and also driving a Brown Boveri shaft generator of 865 kVA at 1000 rpm. Main and auxiliary engines are cooled by fresh-water systems passing through plate-type salt-water-cooled heat exchangers.

The major electrical work is being done by Peto (North East) Ltd. Main electrical current is 380 V 50 Hz three phase. This is reduced to 220 V single phase in the accommodation. Power is supplied by four Frichs A8.185CUS diesel auxiliary engines, each 736 kVA at 1000 rpm with a fuel consumption of 8.7 t/d MDO.

Calculations showed the existing four alternators to be insufficient for the anticipated maximum hospital/hotel loading of 2.6 MW, required in the new configuration. Two new ABB Automation auxiliaries of 3281 kVA at 750 rpm providing 2.6 MW and each fitted via direct coupling to the forward end of number one main engine port and starboard were fitted.

Air conditioning and ventilation requirements for the proposed area of operations indicated that the existing arrangements were inadequate and a major upgrade was found necessary. Two Carrier Transicold 30HXC310-PH3 Chillers, each with a cooling capacity of 1043 kW have been installed in Auxiliary Engine Room No. 3 by Kenmore. These will provide chilled water to the air-handling units. The outside temperature can easily be 36°, while a temperature of 22° is wanted inside.

With a maximum resident population of some 484 persons on board, sewage treatment is of vital importance. Servac is the contractor for upgrading the existing vacuum collection type sewage system which was sufficient for the original transient trade. The additional sewage treatment plant is Hamworthy Super Trident. This involves the fitting of additional vacuum pumps, and the installation of two Omnipure chlorine treatment units. The storage tank will be constructed of 8 mm steel plate with a capacity of six cubic metres.

For the disposal of waste, a Team Tech Incinerator will be installed in Auxiliary Engine Room No. 5. This unit has a capacity of 400 L, is oil fired and has an operating temperature of 1200°C. The efficiency of this incinerator is sufficient to dispose of all hospital waste, ensuring no possible contamination from disposed materials from either hospital or domestic sources.

The engine room fire protection is a CO_2 fixed smothering system supplied by Cosalt. It consists of twenty 45 kg bottles and some 62 nozzles. A high-fog mist system is fitted throughout the remainder of the vessel.

The vessel had a central bow rudder for precise positioning of the vessel into the loading facilities in her former role. However, in her new role there is sufficient manoeuvrability available with the twin bow thrusters, existing stern rudders, and twin screws. There being no further need for this bow rudder, it has been permanently and securely locked in line.

The company which owns *Prinz Joachim* and *Kronprinz Frederik* has recently re-engined both vessels, and donated one of those replaced to Mercy Ships as a spare. This lives in a base depot in the UK.

Video

Alan then showed a video of the ship, after refloating at Wallsend. The exterior shots showed the ship in her new white livery, and the video then continued to show the interior of the vessel, including the conference room, accommodation areas, dining room, hospital, operating theatres, etc.

Finance

The estimated cost for the conversion in 1998 was £28 million ($A75 million). The structural work is complete, and the fitting-out is proceeding, but with some way to go. Two 150 person lifeboats have been donated by a Swiss family, and the GMDSS communications system has been donated by the High Commissioner for Refugees. However, they still need approximately $A15.5 million in order to finish the fit-out and begin operation. They hope to complete by the end of this year.

You can find out more about the work of Mercy Ships, become a volunteer for a particular vessel or what you would like to do when, or make a donation online, at www.mercyships.org.au.

Questions

Question time elicited some further interesting points.

The vessels are diesel powered and burn light fuel oil. They have many volunteers and need engineers who know what they are doing; a turbine ship would be of no use to them!

Asked how they raise money, Alan advised that it was not easy. The big money is in the USA. However, there is no government funding for them, from anywhere. The Australian Government does not even allow donations to Mercy Ships as a tax deduction, although they are trying to gain approval for this for specific areas.

Asked how hard it was to obtain a position on board a ship, Alan advised that it was not difficult; they need all types of operators. When he found that the questioner was a marine engineer, he wanted to sign him up there and then! All applications can be made on the website.

The vote of thanks was proposed by Geoff Pearce of ASDE, and carried with acclamation.

Rogue Waves

Michael Banner of the Centre for Environmental modelling and Prediction in the School of Mathematics at The University of New South Wales gave a presentation on *A Current Perspective on Rogue Waves* to a meeting of the Maritime Panel of Engineers Australia attended by sixty-five on 21 February in the Harricks Auditorium at Engineers Australia, North Sydney.

What are "Rogue" Waves?

Michael began his presentation by reporting on the results of a recent meeting of wave researchers and noted ocean engineers in Honolulu, Hawaii. They had been unable to come to an absolute consensus on a definition of "rogue" waves, but had agreed that they were "freak" or "unexpected".

A working definition of $2.2H_S$, where H_S is the significant wave height, is advocated by many. The drawback is that this has no clear connection with the actual probability distribution for extreme ocean wave heights, since the distribution itself is not known. Thus, these large waves may simply belong in the tail of a probability distribution and, in that sense, are arguably not really "freak" or "rogue" at all. Possible mechanisms for rogue waves include:

- dispersion enhancement of transient waves (linear focussing);
- geometrical focussing in a basin of variable depth;
- wave interaction with a variable ambient current; and
- 3D non-linear wave-wave interactions, and most attention is currently being focussed in this area by experts.

The Draupner Wave

Michael then showed some details of a rogue wave measured at the Draupner platform in the North Sea. This wave was 26.5 m from crest to trough, and occurred in a sea of significant wave height of 10.8 m, with mean dominant wave length 260 m, mean dominant wave steepness $H_S k_p/z$ about 0.10 (which is quite steep), but local wave steepness about 0.32! This wave caused bending of the structure of the platform.

Inspection of the graph of wave elevation vs time shows that there is a significant concentration of wave energy in the major event compared to the mean energy; by a factor of about 18 in this case.

Michael then showed a series of graphs of wave elevations for different cases, including interactions of similar waves, and shorter waves being overtaken by a train of longer waves. All cases were capable of building up a single rogue wave, and then relaxing back to uniform waves. He then looked at the actual Draupner wave and, assuming long-crested non-linear behaviour and the non-linear Shrödinger wave equation, worked backwards and was able to show that the conditions merged back to an unnoticeable scenario. However, the reconstruction showed that a group of a couple of large waves is always visible up to several wavelengths upstream. Close to the extreme wave crest, there is always an almost equally-dramatic wave trough. An observer on the platform would therefore have seen a wall of water, twice the height of the other waves, approaching for about one minute prior to collision. The qualitative behaviour of the numerical simulation model is good.

Satellite Imagery

Some researchers have been looking at satellite images of sea-surface maps taken at different times during tropical cyclones. One approach is to assume that the greyscale in the photographs is proportional to wave slope, and to draw ellipses around the wave crests. Monaldo has done this for a series of patches of sea during tropical cyclones Josephine and Bonnie, and reported the dominant wave coherent properties for wind-generated waves based on their energy content. He found that, in both cases, ocean waves are significantly more long-crested, and exhibit more "groupiness" than would be predicted on the basis of a spectrum with Gaussian distribution. So dominant waves evolve from long-crested wave groups, and give rise to the possibility of rogue waves.

Rogue Wave Formation

At the Honolulu workshop, some of the principal researchers including Osborne, Janssen, Dysthe and Yue, described the theoretical modelling developments regarding the processes and parameters which appear to control the formation of rogue waves, focussing on non-linearity as the key mechanism.

The theoretical description via the non-linear Shrödinger (NLS) equation or its higher-order refinements is easier than the fully non-linear Euler equation. There is no dissipation in the equation, nor is the capacity to break indicated in the equation.

The common condition of these studies is the dominant role of non-linearity for wave-wave interactions, resulting in self-focussing of evolving wave groups.

Michael then showed two time series of wave-surface elevations obtained from a numerical integration of the NLS equation. Both started from the same energy distribution and amplitude as a function of wave number but, in the top panel all phases were equal initially, while in the lower panel the phases were chosen at random. The top panel clearly gave rise to non-linear wave groups.

Prediction of Extreme Events

Freak waves only arise when wave groups are sufficiently coherent. In these circumstances, when waves are sufficiently steep, non-linear focussing can do its work, giving an extreme sea state.

Note that the coherency of the wave system can be measured by the means of the width of the spectrum. Janssen has proposed the use of the Benjamin-Feir Index (BFI), which is the ratio of the steepness of the wave to the width of the spectrum. Large values of the BFI (about 0.5) give favourable conditions for the formation of freak waves.

However, prediction of individual extreme waves seems impossible at the moment, because generation depends on the initial phases of the waves, and this is unknown.

What wave forecasts *are* possible? Janssen has recently shown that when four-wave non-linear interactions are important, there is a direct correspondence between the wave spectrum (through the BFI) and the kurtosis, $<\eta^4>/<\eta^2>^2$, of the probability distribution of the surface elevation. When the BFI is small, the kurtosis is approximately 3, corresponding to a normal distribution. However, for larger values of the BFI, the kurtosis rises rapidly to approximately 4, suggesting a sharp increase in the probability of extreme events.

The ECMWF

The European Centre for Medium-range Wave Forecasting (ECMWF) provides a one-day forecast in the form of a map, with a coloured scale showing the areas most likely to experience extreme wave events. In most locations, the probability distribution of wave height is close to normal. However, in a few locations, extreme sea states are found where enhancement is a factor of five, and extreme events could be expected once in eight hours, rather than once in forty hours as obtained from the linear theory. The ECMWF website may be found at www.ecmwf.int.

Validation Issues

There are some validation issues outstanding.

The theoretical relationship between the BFI and the kurtosis of the surface elevation probability distribution needs to be checked.

A rapid increase of kurtosis has been observed as a function of fetch. The dependence of kurtosis on fetch was well simulated by an ensemble prediction system for waves using Monte Carlo forecasting of waves, together with the deterministic evolution equations. Kurtosis depends on the unpredictable phase of the waves, so only ensemble averages, temporal averages or spatial averages are meaningful quantities to verify.

However, in the field we only have wave-rider buoys measuring time series of about 10–20 min long, which corresponds to about 60–120 waves.

Conclusions

Non-linear self-focussing is the key mechanism underlying rogue wave formation in the ocean region. Statistical wave forecasting is available based on current techniques, and global wave forecasting is now available from ECMWF. However, confidence needs to be gained in this capability.

With all the caveats involved, it would be useful for marine forecasters to start checking the new wave parameters (e.g. BFI and kurtosis) in cases where ship masters report extreme events.

Questions

One questioner stated that engineers use the Raleigh distribution for many things, and asked was this an under-predictor for wave events? Michael replied that there is nothing intrinsically wrong with the Raleigh distribution for waves, but that there was not enough information to know which was best. Using other distributions sometimes gives more information than the Raleigh. The Dysthe equation is a higher-order of the NLS equation.

The vote of thanks was proposed by Doug Moore.

Practical Hydrodynamics

Magnus Lindgren of Det Norske Veritas gave a presentation on *Hydrodynamic Analysis — from a Practical Point of View* to a joint meeting with the IMarEST attended by forty-seven on 8 March in the Harricks Auditorium at Engineers Australia, North Sydney.

Introduction

Magnus began with an outline of his presentation, saying that he would be looking at what hydrodynamics can be used for. About every week, a ship is lost at sea. He then showed a slide of a ship with a broken back, followed by one of a wave towering over another ship on New Year's Day 1985 in the North Atlantic. Some wave heights cannot be explained by traditional wave theory. A "freak" wave was recorded at the Draupner platform in the North Sea, and in March 2001 two vessels experienced similar conditions. Cruise vessels have also experienced freak waves.

As a result, the European "max wave" research project was started, mapping occurrences to see if it was possible to

predict when and where large waves would occur. Det Norske Veritas became involved in the research program, took the measurements of the Draupner wave, and set up a time series for the wave measurements. A 300 m cruise vessel was then placed so that the wave would hit the ship when at maximum steepness. Magnus showed a hydrodynamic simulation of the ship encountering the wave and, more than just green water on the foredeck, the green water reached the top of the bridge structure forward, and the top of the superstructure aft as the wave passed. The simulation showed that there would be massive damage to the topsides.

Why don't we design the ship to withstand this type of wave? It is very hard to say exactly what the design load should be. Ships are currently designed to withstand the maximum wave encountered in 20 years of operation. But is it relevant to design for freak waves, such as the one-in-100 year wave, or the one-in-1000 year wave?

Container Ships and OBO Vessels

Magnus then showed a slide of the aft end of the vessel *APL China*, following loss of containers and damage due to abnormal roll motions in the mid-Pacific in tropical cyclone Babs in 1988. The vessel is a post-Panamax container ship, and encountered 100 kn winds and seas of 18 m significant height, and rolled to a maximum angle of 45°. She lost 406 containers over the side, and damaged 555 more, leading to an insurance claim which exceeded the cost of construction of the vessel!

He then showed a simulation of possible rolling scenarios with the ship advancing into head seas, and having no roll motion. However, once a slight roll motion began, if the frequency of roll coincided with the frequency of encounter, the motion built up to an alarming extent. This is referred to as parametric rolling, of which many people have heard, but the on-screen simulation brought it very clearly to life!

They followed this up with model tests of *APL China* in a towing tank, and the experimental results correlated closely with the numerical simulation. It therefore appears likely that this is what happened to *APL China*.

The ideal would be to give guidance to the operators of vessels, so that they would know when parametric roll was likely, and what to do if it occurred; i.e. active operator guidance. DNV therefore began development of a tool for onboard guidance. This would take input from the vessel speed log, wave radar and the like, and combine this with limiting criteria for ship accelerations, bow impact strength, seakeeping, etc., to give a bridge display of the data and a decision-support tool which would give guidance on safe/low-probability/high-probability of various scenarios, e.g. green water on deck.

The OBO (ore-bulk-oil) vessel *Derbyshire* disappeared with all 44 crew on 9–10 September 1980 about 400 n miles south-east of Okinawa, Japan. There have been many investigations into the loss of this vessel. Current thinking is that the forward cargo hatches were not strong enough to cope with the sea loads imposed in a tropical cyclone, after the forepeak hatch not being secured had allowed the forepeak to fill gradually with water. This and other bulk carrier losses have resulted in the construction rules being changed to increase the strength of the No. 1 hatches.

Multihull Design Loads

Magnus referred to the trimaran which had been launched by North West Bay Ships in Hobart two days previously. Trimarans are different from other vessels, and are generally more difficult to analyse structurally. Hydrodynamic tools can be used for the analysis, which is not difficult in head seas. However, in anything other than head or stern seas, trimarans roll and the water entrance and exit is difficult to simulate numerically.

There is a number of development projects under way for the analysis of trimarans, and it turns out that verification of numerical simulations by model tests is important. There are several factors to consider, including the effects of rudder and autopilot settings, the presence of active fins for ride control, and the like. Magnus then showed slides of model tests of trimaran roll being conducted in the towing tank at MARIN, and an on-screen simulation of the tests.

He then showed a slide of the non-dimensional roll amplitude for the bare trimaran hull, and with passive and active fins, vs wave frequency, showing the decrease in amplitude with the ride-control gear. A second slide showed the performance of a linear analysis vs a non-linear analysis, and the linear analysis does not perform well in the mid-range frequencies.

Seakeeping Performance

DNV had analysed two almost identical designs with respect to passenger comfort for an owner operating vessels between two Scandinavian ports. The criteria used were MSI (motion-sickness incidence), and acceleration levels. The numerical simulation showed that one design pitched significantly more than the other.

Magnus is of the opinion that linear hydrodynamic programs can (and should!) be used more in the design office to give a first estimate of performance.

LNG Terminals and Ships

There is pressure for liquefied natural gas (LNG) terminals to be removed from ports and placed offshore with pipes leading onshore, due to the risk of explosion of the stored gas. This comes from a risk-analysis point of view; terrorism and 9/11 were not the catalysts.

There are two basic designs of LNG carrier: the membrane tanks and the Kvaerner-Moss design. Membrane tankers have holds designed for either 80% (or more) full, or empty. Sloshing of the LNG in the tank causes high pressures, and this can lead to damage of the insulation. Magnus showed a simulation of the liquid sloshing in the tank based on CFD, and the liquid in the tank regularly put an internal pressure head on the deckhead!

Whipping and Springing

DNV had a case of a bulk carrier built in Korea to their class and, after two years of service, there were cracks appearing in the steel. What was the reason? Initial research showed that there was nothing wrong based on a traditional evaluation. However, digging deeper, they found that the length/depth ratio was large (i.e. the vessel was shallow for its length). The crew reported vibrations, even in calm conditions, and so they installed strain gauges to obtain further information. They found that vibrations arising from

the natural frequency of the vessel were giving rise to whipping and springing, and that this was affecting the fatigue life of the vessel. Whipping and springing are also known to affect the Great Lakes vessels in the USA.

They looked at a hydrodynamic analysis to determine the springing loads, assuming a flexible (rather than rigid) hull. They have now managed to determine which vessels are likely to have problems.

Cruise Ships

In cruise vessels looking for fuel economy, recent designs have tended towards flat aft-end sections, which lead to slamming. They therefore checked the effects of various aft end sections to minimise slamming of the aft end. In general, they found that, if the shape tends to lock air in, then this dampens the slamming pulse.

Load Transfer for Structural Analysis

Another use of hydrodynamic analysis is in providing the loads for input to a finite-element analysis of the ship's structure. A fully-integrated analysis would begin with the environmental data and progress through the wave loads to give pressure loads and accelerations; this would transfer loads to the finite-element model which would then give global loads and deflections, and pass on to a local finite-element analysis to give the local stresses. It turns out that verification of the results is important, because there are both internal and external pressures. The wave loads must be compared to the structural loads along the vessel for each load.

Detail Design Loads

The design loads for each item of structure may be difficult to define exactly. Magnus showed a cross section of a hold, and indicated the different areas which need attention: fatigue of stringer heels, the hopper knuckle, longitudinals subject to large relative deflections, and increased margins on the upper deck area and the inner bottom plating.

Why Use Hydrodynamic Analysis?

There is a number of benefits:

- a better understanding of seakeeping performance;
- cost-effective design optimisation (no need for model experiments);
- evaluation of designs early in the process; and
- determination of the ship response to complex environmental conditions.

Simple hydrodynamic tools are good for scanning through and evaluating designs.

Questions

In reply to a question on the likely costs of a hydrodynamic analysis, Magnus replied that it could easily reach $20 000 or more.

Interest was expressed in the difference in parametric roll between free and tethered models. It was also noted that it was more difficult to induce parametric roll in a vessel with a cruiser stern, compared to a vessel with a transom stern, such as *APL China*.

The vote of thanks was proposed by John Jeremy and carried with acclamation.

Business and Engineering Process Management

Peter Lucey, Director of Business and Systems Improvement, Defence Materiel Organisation, Department of Defence, Canberra, gave a presentation on *Challenges in Implementing Business and Technical Process in a Maritime Environment* to a joint meeting with the IMarEST and ASDE (the Australian Society of Defence Engineering) attended by twenty-seven on 12 April in the Harricks Auditorium at Engineers Australia, North Sydney.

Introduction

Peter began his presentation with an outline of the Maritime Systems Division (MSD) of DMO, indicating that they have a budget of $2.6 billion, staff (military and civilian) numbering some 10 000 , located Australia-wide, and with ten system project offices (SPO) and three business units (BU). The division provides project management and corporate governance for each of the projects.

He described his job by saying that they bring together people, systems and technology and make them work together. A bit like trying to herd cats. He then showed a five-minute video clip of men on horseback out on the plains, actually herding thousands of cats. Crossing a creek was hilarious!

Some of the issues addressed include:

- the fact that the requirements for good corporate governance necessitate the institutionalisation of process;
- the demand for standardisation needs a comprehensive developmental business process management mechanism that will tackle differences across different central organisations (e.g. land, sea, or air); and
- the aspirations for an effective business and engineering process management unit.

Among the lessons learned are the fact that culture is more important than anything else; a systems approach is more effective than a component approach; and any intervention must be tied to a business strategy and formal planning.

The Current Situation

Defence is a complex business, and there are many separate requirements — and expectations. For example:

- there is a Chief Executive Office requirement to implement a Materiel Acquisition Sustainment Framework;
- there is a Chief of Navy requirement to implement the Naval Technical Regulatory System (NTRS), where an accredited engineering organization accredits the system against the CMMI (Capability Management Maturity Integration; a US-version of ISO 9000, but more specific) framework;
- the problem with System Project Office and Business Office workload and change-weariness.

They need a MSD solution to satisfy *user* needs.

He showed a slide of what he calls "the process quagmire", with jigsaw pieces labelled Technical Regulations framework, CMMI, BU QMS (quality management system).

SPO QMS, ABEF, QEMS/SNMS/SMIS. Change to such a system only becomes possible when someone sees the next step. The vision is for all the pieces of the jigsaw to fit together. The principal benefits of a QMS lie in internal operational efficiency and/or reduced costs. For example, production costs may be lowered by standardisation leading to fewer non-conforming products, less rework and fewer mistakes. DMO/MSD was asked by one customer to obtain registration as a requirement for continuing in business, and they were able to do so.

Corporate Governance

Responsibilities under corporate governance include: compliance with laws, rules and regulations, prohibition of conflicts of interest, protection of MSD's confidentiality and proprietary information and that of customers and vendors, management of risk, compliance with OH&S issues, compliance with data management and record-keeping procedures, protection and proper use of corporate assets, and encouraging the reporting of any unlawful or unethical behaviour.

The Need for Standardisation

MSD is big business! It cannot operate at maximum performance levels without standardisation. They need:

- to address the variability within the Division and the SPOs;
- more than just performance targets, they need standards processes capable of meeting the targets;
- any approach which provides effective in-process measures and enables process control; and
- clear accountability for processes.

The drivers for standardisation include technical regulations, management systems, improved priorities, and people.

The process-management gap includes the fact that many processes are not documented, the roles for process owners are not defined, there is little understanding of process control, there is little standardisation, replication is not systematic, and there are few effective in-process measures.

What They Did to Sell and Launch

DMO developed the initial concepts. They then talked these up within the DMO quality forum, and presented them to the SPOs and BUs. They then integrated them with other key corporate initiatives for improved project status and scheduling reporting, the quality environmental system, the Naval Technical Regulatory System, and data management initiatives.

The critical elements of standardisation turned out to be process ownership, having targets from proven processes or related businesses, compliance with operating procedures, process certification, process assessment triggers (so that they knew when they were not on track), and corporate improvements.

By way of supporting infrastructure, they provided guidelines for the process owners (process instructions, templates, examples and pilots, design documentation tools for best practice, and design tools for new processes, and set up electronic communications via the web for both the process owners and field operators.

Implementation

In a standard implementation of a QMS, initiation and prototyping were handed down to the SP QMS for rationalisation and standardisation, and then to the deployment manager. So far, they have developed the corporate policy and processes, and these have been translated via computer into user manuals for use by the person at the desktop. Quality management certificates have played an important part.

The architecture of the system was portrayed as a pyramid, with the SPO QMS at the top (providing the quality guide), followed by Procedures (the "what"), Work Instructions (the "how"), and with Quality Records at the base (providing the SPO power base).

One of the features of a good QMS is that integrated work instructions are tied to QMS process pages, supported by a document management system.

Training was the next biggest item after documentation, and they provided formal QMS navigation training in a half-day course.

Data and Records Management

The software package Rapid Access™ has brought on-line competency testing to MSD. It has been developed to determine the application of NTRS within DMO, and is a two-part web-based process.

Peter then showed some of the NTRS competency delegations, such as for communications systems, hull engineering, etc., and some of the typical knowledge questions.

Competency in technical regulations were assessed against benchmarks in technical risk management and engineering change management.

Conclusion

Peter concluded his presentation with a summary of the most important lessons learned:

- culture is more important than anything else;
- a systems approach is more effective than a component approach; and
- any intervention must be tied to a business strategy and formal planning

and a quote from Henry Ford: "Failure is the opportunity to begin again, more intelligently".

The vote of thanks was proposed by Laurie Prandolini.

Phil Helmore

COMING EVENTS

NSW Technical Meetings

Technical meetings are generally combined with the Sydney Branch of IMarEST and held on the second Tuesday of each month in the Harricks Auditorium at Engineers Australia, 118 Alfred St, North Sydney, starting at 5:30 pm for 6:00 pm and finishing by 8:00 pm. The program of meetings remaining for 2005 (with exceptions noted) is as follows:

14 June *	David Meiers, David Meiers and Associates John Dransfield, H.I. Fraser *Replenishment at Sea and Conversion of HMAS* Sirius
12 July	Gregor Macfarlane and Alex Robbins, AMC *Low-wash Hullforms and the AMC Towing Tank Upgrade*
9 August *	Paul Elischer, Defence Science and Technical Organisation *Sea Trials of the Collins-class Submarines*
13 Sept*	Clive King, AWD Project *Design of the RAN's New Air Warfare Destroyer*
11 October	IMarEST AGM Rob Madders, Rolls Royce Australia *Zebra Batteries for Submarines*
1 Dec	SMIX Bash 2005

* Denotes joint meeting with the Australian Society of Defence Engineers

Victorian Technical Meetings

9 June	Dr Richard Hudson *John Lamb — Hero Marine Engineer*
11 August	Dr Kevin McTaggart (visiting Canadian Defense Scientist) *Hydrodynamic research at DRDC Canada*
13 October	TBA
8 December	TBA

Queensland Technical Meetings

The following technical meetings will be held by the Queensland Section during 2005 and early 2006. Interstate members are welcome to attend.

7 June	Michael Hollis, Tommy Ericson and Chris Ramsey *Brisbane Ship Construction — Design and Production Overview* Venue: Brisbane Ship Construction Pty Ltd, Unit 12, 621 Coronation Drive, Toowong, Brisbane at 6:30 pm.
13 September	Toby Blundell, Marine Matters Pty Ltd *Marine Surveying* Venue: Shipbuilding Section, Gateway Campus, Brisbane North Institute of TAFE, 776 Kingsford Smith Drive, Hamilton, Brisbane at 6:30 pm.
1 November	John Lund MRINA *The Design of a 3500 DWT Ore Transfer Vessel for Operation in Turkey* Venue: Gateway Campus, Brisbane North Institute of TAFE at 6:30 pm.
7 March	Annual General Meeting followed by Mark Devereaux, Maritime Safety, Queensland Department of Transport *Update on the Technical Sections of the National Standard for Commercial Vessels* Venue: Frazer/Eden Room, Level 22, Mineral House, 41 George Street, Brisbane, at 6:30 pm.

A social event is also planned for 13 December 2005.

Fourth King-Hall Naval History Conference

The RAN Sea Power Centre will host the fourth King-Hall Naval History Conference, Sea Power Ashore and in the Air, in Canberra on 21 and 22 July 2005 at the National Convention Centre. The cost for the two-day Conference including lunch, morning and afternoon tea is $200 per person, with a conference dinner at the Australian War Memorial Anzac Hall on 22 July for $75 per head.

For more information contact the Conference Coordinator, Sea Power Centre Australia, Telephone (02) 6127 6514, fax (02) 6127 6521 or email seapower.conferences@defence.gov.au.

Pacific 2006 International Maritime Conference

The Pacific 2006 International Maritime Exposition and Congress will be held at the Sydney Convention and Exhibition Centre, Darling Harbour, Sydney, from 31 January to 2 February 2006. It will include:

The Pacific 2006 International Maritime Exposition, organised by Maritime Australia Ltd.

The Royal Australian Navy Sea Power Conference 2006, organized by the Royal Australian Navy and the Sea Power Centre Australia. Further information on the conference can be obtained from the conference website www.seapower2006.com or by contacting the conference organizers, Tour Hosts Conference & Exhibition Organisers, GPO Box 128, Sydney NSW 2001, phone (02) 9265 0700, fax 9267 5443 or email seapower2006@tourhosts.com.au.

The Pacific 2006 International Maritime Conference is being organised by the Royal Institution of Naval Architects, the Institute of Marine Engineering, Science and Technology and Engineers Australia on the theme *Innovations in Maritime Technology — Visions and Progress*. Further information on the conference can be obtained from the conference website www.pacific2006imc.com or by contacting the conference organizers, Tour Hosts Conference & Exhibition Organisers, GPO Box 128, Sydney NSW 2001, phone (02) 9265 0700, fax 9267 5443 or email pacific2006imc@tourhosts.com.au.

The call for papers for the conference is now out, and the

THE INTERNATIONAL MARITIME EXPOSITION & CONGRESS

PACIFIC 2006

PACIFIC 2006

31 JANUARY - 3 FEBRUARY 2006 SYDNEY AUSTRALIA

INTERNATIONAL MARITIME CONFERENCE

31 January - 2 February 2006

INNOVATIONS IN MARITIME TECHNOLOGY - VISIONS AND PROGRESS

Organised by:

IMAREST

For further information visit:
www.pacific2006imc.com

ROYAL AUSTRALIAN NAVY

SEA POWER CONFERENCE 2006

Organised by:

31 January - 2 February 2006

For further information visit:
www.seapower2006.com

For further information on the above conferences contact:
Tour Hosts Conference & Exhibition Organisers
GPO Box 128 Sydney NSW 2001 AUSTRALIA
Tel: 61 2 9265 0700 Fax: 61 2 9267 5445

Email:
Pacific 2006 International Maritime Conference:
pacific2006.mc@tourhosts.com.au
Royal Australian Navy Sea Power Conference 2006:
seapower2006@tourhosts.com.au

schedule of dates is as follows:

- Receipt of abstracts 3 June 2005
- Authors notified of acceptance 23 July 2005
- Final submission of papers 31October 2005
- Author registration December 2005

Abstracts should be submitted online at www.pacific2006imc.com; further details are available on the website.

Second High-performance Yacht Design Conference

Timed to coincide with the arrival of the Volvo Ocean Race fleet in New Zealand, the second international conference on high-performance yacht design will be held in Auckland in February 2006 and will showcase the latest developments in yacht research from around the globe. This conference will be a venue where naval architects, engineers, designers and researchers can present and hear papers on the current state of high-performance yacht and power craft technology.

Advances in high-performance yacht design are being driven by a range of factors, including development of new racing classes and demand for increased size and performance of racing and cruising craft. Radical design concepts such as innovative hullforms, moving keels and masts and new approaches to sails and propulsions systems require innovative approaches to analysis, design and experimental verification.

Papers are expected on all aspects of the design and performance of high-performance power and sailing yachts, including:

- performance prediction and measurement;
- wind-tunnel and towing-tank technology;
- regulations and rating rules;
- computational methods;
- materials and construction; and
- hull and appendage design.

The conference will be held on 14–16 February 2006 and is being organised by The University of Auckland, The Royal Institution of Naval Architects, and Massey University.

For further information visit the website www.hpyd.org.nz.

HIPER 06 at AMC

The fifth International Conference on High Performance Marine Vehicles (HIPER) will be held between 8 and 10 November 2006 at the Australian Maritime College in Launceston. HIPER Conferences are held once every two years. The inaugural conference was held in South Africa in 1999; subsequent ones have been held in Hamburg in 2001, Bergen in 2002, and Rome in 2004. Dr Prasanta Sahoo is the Convenor of the fifth HIPER conference which will be held in late 2006. Watch this space for forthcoming details. In the meantime, for further information contact Dr Sahoo on (03) 6335 4822 or email p.sahoo@mte.amc.edu.au.

HMAS *KANIMBLA* HOME

Royal Australian Navy amphibious landing ship, HMAS *Kanimbla*, returned to her home port in Sydney on Saturday 30 April 2005, after a four-month deployment to the Banda Aceh and Nias Areas of Operations in Indonesia, on Operation Sumatra Assist I and II. She was welcomed by many small craft and a large crowd of relatives and friends at Fleet Base East

(Photo John Jeremy)

THE SECOND HIGH PERFORMANCE YACHT DESIGN CONFERENCE

www.hpyd.org.nz

14 to 16 February 2006 Auckland, New Zealand

First Notice and Call for Papers

ABSTRACTS DUE 30 APRIL 2005

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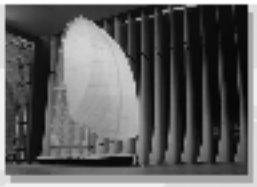
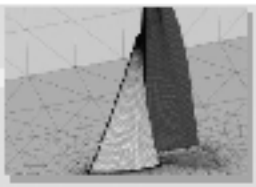



Papers are invited on all topics relating to the design of high performance power and sailing yachts including:

- Performance prediction and measurement
- Wind tunnel and towing tank technology
- Regulations and rating rules
- Computational methods
- Materials and construction
- Hull and Appendage Design

Feedback from HPYD1:

"The most informative technical conference I've been to as well as an exceptional opportunity to meet old friends and be educated at the same time" *Merfyn Owen, Owen Clarke Design, England*

"You managed to attract the most prominent researchers in the field from all parts of the world. This must be one of the best conferences in yacht design ever held" *Professor Lars Larsson, Chalmers University, Sweden*

THE UNIVERSITY OF AUCKLAND
NEW ZEALAND

The Royal Institution of Naval Architects

Massey University

GENERAL NEWS

Tasmanian Industry News

Sabre Engineering in Hobart have a 12 m catamaran workboat under construction. Designed by Michael Hunn for Tassal Limited this is a multi-purpose fish-farm workboat. Built in steel, the deck layout incorporates bolt-on foundations for the wide variety of auxiliary equipment used around the fish farms. It will also be used as a crew boat. The boat is powered by a Cummins 157 kW diesel driving a three-bladed propeller in each hull.

Cawthorn Engineering in Margate have just delivered to Tassal Limited a waterjet powered monohull workboat/feed boat. Designed by Michael Hunn, this is an aluminium boat with a single Cummins 157 kW diesel driving a Hamilton Jet HJ274.

Tri-Star in Hobart are now comfortably installed in their new facilities on the shores of Prince of Wales Bay. At present they have an enviably long order book producing a variety of aluminium boats. Tri-Star monohulls and catamarans can be built in either of all-pressed plate, plate hull and pressed topsides, or all-plate construction. Most boats are outboard powered but waterjet and surface-piercing propulsion installations have been delivered with excellent results.

Powercraft in Margate are about to hand over to the owner *Raptor,* a 7.5 m hardtop design by Adam Schwetz. Also nearing completion is a 9.5 m twin waterjet powered passenger monohull for Sydney Jet to be based in Darling Harbour. Also designed by Adam Schwetz, this high-speed harbour-tour boat will carry 24 passengers.

North West Bay Ships' second trimaran has completed sea trials. This is similarly styled to the first build which was a triple waterjet powered high-speed passenger ferry; but they are radically different craft. This twin-screw yacht version is 60 m long and operates at displacement speeds (see page 36 in this edition of *The ANA*) The next project for NWBS is a 28 m catamaran dive-charter boat destined for the Great Barrier Reef and the tourism industry.

Richardson Devine Marine Constructions in Hobart have just commenced work on a 30 m Crowther passenger catamaran. Due for delivery in November 2005, she will be delivered on her own bottom to her base in Doubtful Sound in New Zealand's Fiordland National Park.

Guy Anderson

Queensland Industry News

The annual Sanctuary Cove Boat Show is on again from 19 to 22 May. This year the show boasts over 370 exhibitors covering all areas of the marine industry including chandlery, equipment, sales, services and, of course, boats, with the largest on water display in the Asia-Pacific region. Local manufacturers will be strongly represented. Of particular interest will be the Mustang display, and the Riviera Group are launching two new models, the 3600 Sport Yacht and the Mariner M360. Azzura Yachts will be displaying the adjustable-keel Jutson 60, and Sunrunner Sport Cruisers will be launching their boat-of-the-year contender 2800 Sports Cruiser.

The Sea Transport Solutions-designed 64 m ro-pax ferry *Vlieland* was recently launched at FBMA in the Philippines. Designed to carry 54 cars and 1200 passengers, the vessel is headed for the Netherlands. Powered by four 620 kW engines the vessel obtained a better-than-anticipated speed of 15.1 kn in the fully loaded condition. Other designs currently on the go for STS include a 12.5 m pilot boat for Singapore and two ro-pax ferry designs of 47 m and 61 m.

Crusader Marine is eagerly awaiting the launch of their new motor-sailer catamaran. The 17 m composite vessel is being built in Toowoomba and was to be trucked down the mountain range at the start of May to take up residence on the Gold Coast where final fit out will be completed.

The marine industry on the Gold Coast still seems very healthy with lots of vessel upgrades and refits being organised at the Gold Coast City Marina and surrounding areas. Hopefully this strong interest will continue.

Very little has been happening in the Brisbane region except for the Queensland Police Service taking delivery of a new 10 m offshore patrol catamaran *D. A. Shean,* designed by Stephen & Gravlev Pty Ltd. The vessel is based at Southport on the Gold Coast.

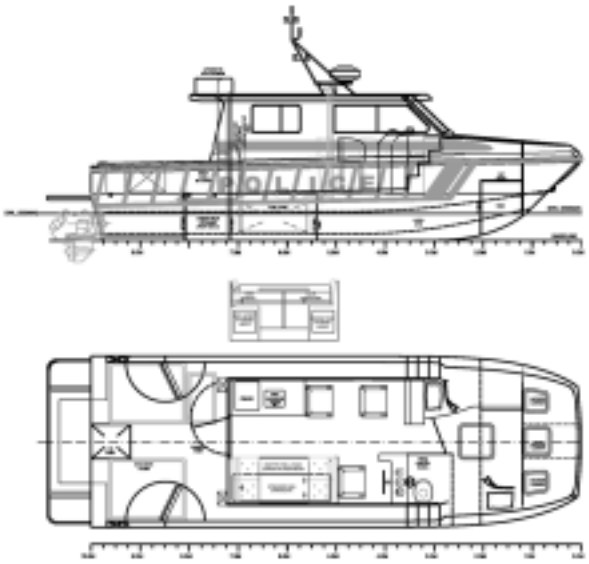
The catamaran is operated as both a patrol and workboat and will also be utilised as a medical evacuation facility. A standard QAS stretcher can be accommodated in the cabin, with access through a hopper style window aft.

The vessel is built of aluminium, with the bottom structure designed for a 4g loading as this boat will regularly "take-off" when driven hard in big seas.

A cuddy cabin is fitted forward with a WC also below deck forward. Aft of the helm and navigator seats is a dinette on the port side and a small galley area to starboard.

The aft cockpit deck is designed to take a small RIB, which can be lifted onto the boat via a hinged doorway/duckboard aft. Large flush watertight hatches give access to the engines. Mercuiser engines are fitted with jackshafts to the stern legs, in order to give better access for maintenance.

The Queensland Police launch *D A Shean*
(Photo courtesy Stephen & Gravlev)



General Arrangement of *D A Shean*
(Drawing courtesy Stephen & Gravelev)

For towing, the vessel is fitted with a Samson post with a safe working load of 5 t.

So far, reports from the Police have been favourable with the vessel feeling very strong and with excellent handling and banking into turns and remaining dry.

Principal Particulars

Length OA	11 m
Length measured	10 m
Breadth	3.5 m
Depth	0.95 m
Draft (loaded)	0.55 m
Displacement (loaded)	8.9 t
Fuel Capacity	1300 L (2 x 650 L)
Fresh Water	170 L
Engines	Two Mercruiser 496 MAG HO each 317 kW Bravo 2 Stern Drive Legs
Speed:	43 kn
Class 2C	8 Persons

First Steel Cut for New NZ Ships

Tenix Defence began cutting steel for the $NZ500 million Project Protector naval shipbuilding contract at its Williamstown shipyard in February.

NZ Secretary of Defence, Mr Graham Fortune, switched on computerised cutting equipment to begin manufacturing plates for two 85 m, 1500 t offshore patrol vessels for the Royal New Zealand Navy.

The ships are being constructed as part of a Royal New Zealand Navy seven-ship order, which includes four 55 m inshore patrol vessels and a 131 m multi-role vessel, as well as the offshore patrol vessels.

Tenix Defence CEO, Robert Salteri, said the ceremony at Williamstown underlined the skills and capabilities developed by Tenix Defence and its suppliers and subcontractors in Australia and New Zealand.

"Tenix Defence won the Project Protector contract last year in global competition, against shipbuilders from the UK, the Netherlands, Singapore and Germany," Mr Salteri said.

"This followed our successes first with completing two FFG frigates for the Royal Australian Navy, then the ten Anzac-frigates for the Australian and New Zealand navies.

"Tenix has assembled a team with the world-class skills to take on competitors from the leading shipbuilding nations, winning major domestic and export orders and providing jobs, wealth and training," Mr Salteri said.

The seven ships are being built at three locations. The multi-role vessel is being built in the Netherlands, with final fit-out at Williamstown. The offshore patrol vessels will utilise the modular construction method used with the Anzac frigates. Modules will be built at Williamstown and the Tenix facility at Whangarei in New Zealand, and the ships will be consolidated and launched at Williamstown. The inshore patrol vessels will be constructed entirely at Whangarei.

Commander Margareth Stumpel RNZN, Defence Adviser to the NZ High Commission in Canberra, riding the plate cutting machine at Williamstown
(Photograph courtesy Tenix)

Upgrade of Anti-ship Missile Defence Capability

A $260 million contract was signed in May with the Anzac Ship Alliance for the first phase of a major upgrade to the anti-ship missile defences in the Navy's Anzac-class frigates.

Defence Minister Robert Hill said that the ability to provide warships with protection against anti-ship missile attack was an essential element of Australia's maritime capability.

"The anti-ship missile defence upgrades will ensure that the Anzac-frigates have improved defences against modern anti-ship missiles," Senator Hill said.

"The contract is the first phase of the $500 million Anzac frigates Anti-Ship Missile Defence project announced in December 2003."

The first phase will implement the high-priority aspects of the upgrade and will be undertaken in parallel with consideration of the second-phase options.

The anti-ship missile defence upgrade for the Anzac ships is being contracted through Defence's Anzac Ship Alliance with Tenix and Saab Systems. Tenix and Saab will lead and carry out most of the design and systems integration work in their Melbourne and Adelaide facilities.

Under the contract, The Anzac Ship Alliance will upgrade the ships' command and control system and install an infra-red search and track system which will provide improved detection and indication of low-level aircraft and anti-ship missiles when close to land. The work will also complete the core platform design changes and studies.

The first of the upgraded Anzac frigates will be delivered to Navy in 2008. The remaining ships will then be upgraded over the period 2009 to 2012. All installation work will be carried out by Australian industry in the Navy's East and West coast fleet-support facilities during periods of scheduled maintenance.

First Armidale-class Patrol Boat Arrives in Darwin

The first of the RAN's new Armidale-class patrol boats arrived in Darwin on 10 May 2005 after completing most of its mission trial, Defence Minister Robert Hill announced recently.

Armidale, which was designed and built in Australia by Austal Ships, is the first of 12 Armidale-class patrol boats to have advanced systems and excellent seakeeping capability for coastal surveillance and protecting Australia's coastline.

Senator Hill said these vessels will replace the Navy's Fremantle-class patrol boats.

"This project is demonstrating the ability of Australian industry to design, construct and deliver an important class of ships for the Navy on time, on budget and with excellent capability," Senator Hill said.

"The Armidale-class patrol boats are at the leading edge of international patrol-boat design and construction, combining endurance, improved seakeeping and advanced onboard systems," Senator Hill said.

Defence Maritime Services (DMS) subcontracted Austal Ships to build the vessels at its Henderson shipyard in Western Australia. As well as the supply of 12 ships, the contract with DMS also provides for integrated maintenance, logistic and crew-training support to the vessels throughout their operational lives.

This first boat was launched on 5 January 2005 and formally named *Armidale* on 22 January. Since that time *Armidale* has been undergoing extensive harbour and sea trials.

The mission trial is the final activity under this trial program, which saw the vessel sailing from Henderson, Western Australia on 22 April 2005, initially undertaking a passage to 40 degrees south to test the ship and procedures in cold and potentially rough environments before sailing north with port calls in Dampier and Broome.

"In effect the vessel has been tested for its ability to conduct surveillance, patrol and response operations in Australia's Maritime Jurisdictional Zones," Senator Hill said.

"The prime contractor, project officers and military personnel have all been involved in the mission trial, which demonstrates the boat's suitability for operational use against the requirements in the ship build and support contract.

"Over the coming week DMS will fine tune equipment and systems following the trial, prior to presentation to the Commonwealth for formal acceptance on 17 May 2005."

Following acceptance from the contractor, *Armidale* will formally be commissioned as an operational ship of the Royal Australian Navy at a ceremony in Darwin on 24 June 2005. She will then undergo crew evaluation before commencing operational patrols to protect Australia's borders.

Following the completion of the design work in early 2004, the production work began in April 2004. Construction of the second and third Armidale-class vessels is progressing well and the construction of follow-on vessels has commenced.

The first of the RAN's new patrol boats, *Armidale*, arriving in Darwin for the first time
(Photo courtesy Department of Defence)

The old and the new — the Fremantle-class patrol boat HMAS *Gawler* reveals just how much bigger the new *Armidale* is than the ships she will replace
(Photo courtesy Department of Defence)

US Navy's First Littoral Combat Ship Named

United States Secretary of the Navy, Gordon England, has selected the name *Freedom* for the US Navy's first Littoral Combat Ship (LCS).

The future USS *Freedom* honours American communities from coast to coast which bear the name Freedom. States having towns named Freedom range from New York to California, and include Indiana, Maine, New Hampshire, Oklahoma, Pennsylvania, Wisconsin and Wyoming.

"These new, fast and capable ships will increase the effectiveness of our naval forces and provide us with an ability to operate in the littoral areas of the world where the enemies of freedom seek to operate and hide" England said. "USS *Freedom* and her crew will defend the noble cause for which they are named," he added.

The LCS is an innovative combatant designed to counter challenging shallow-water threats in coastal regions, specifically mines, submarines and fast surface craft.

LCS ships will be fast, agile and networked surface combatants and will utilize focused-mission packages that deploy manned and unmanned vehicles to execute a variety of missions.

In May 2004, the US Department of Defence awarded both Lockheed Martin and General Dynamics — Bath Iron Works, Bath, Maine, separate contract options for final system design with options for detail design and construction of up to two LCS ships.

In December 2004, the Department of the Navy awarded Lockheed Martin Corp., Maritime Systems & Sensors, Moorestown, N.J., a contract for detail design and construction of the first LCS. Lockheed Martin's team mates include Gibbs & Cox, Arlington, VA; Marinette Marine, Marinette, WS; and Bollinger Shipyards, Lockport, LA.

A keel laying ceremony is scheduled for 2 June at Marinette Marine, Marinette, WS.

Austal Launches Ferry for Greece

The Auto Express 85 fast car ferry *Highspeed 5* was launched at the Austal shipyard on 20 March 2005. The 85 m aluminium catamaran is the fifth fast ferry the shipbuilder has built for leading Greek ferry operator, Hellas Flying Dolphins, which has recently re-branded its operations under the new name Hellenic Seaways.

Scheduled for delivery in May, the custom-designed ferry will enter service following its delivery voyage from Australia to Greece. Its operations will include a new fast-ferry service linking Piraeus with Chania on the island of Crete, one of the most important routes in the Greek Islands trades. The Austal Auto Express 92 *Highspeed 4* (delivered in July 2000) inaugurated that service recently.

When complete, *Highspeed 5* will be able to carry 810 passengers and 154 cars and will be capable of 39 kn when loaded. The catamaran's propulsion consists of four Caterpillar 3618 diesels each driving a Rolls-Royce Kamewa waterjet via a Reintjes gearbox.

Highspeed 5 ready for launching
(Photo courtesy Austal Ships)

Benchihigua Express at speed
(Photo courtesy Austal Ships)

Austal Trimaran Completed

When Austal and European ferry operator Fred. Olsen, S.A. signed a contract in Santa Cruz de Tenerife in May 2003 to build a second high-speed vehicle–passenger ferry, it was the signal to start building a new hullform which would provide a quantum improvement in the performance and operability of large fast ferries.

Fred. Olsen, S.A. pioneered the use of large high-speed ferries in the Canary Islands and currently carries almost three million passengers, half a million cars and a quarter of a million cargo vehicles per year. Since 1999 it has been operating large fast catamarans and, while happy with the results, the company identified some limitations in terms of capacity and especially passenger comfort when operating in rough seas.

This led to the conclusion that further research was needed in order to develop a new concept for high-speed vessels, combining the softer roll of monohulls with the low resistance, very good stability and carrying capacity of catamarans.

With these objectives in mind, Fred. Olsen, S.A. and Austal cooperated on an extensive programme of research, tank testing and analysis, firstly to develop a new design and then to ensure that it would meet Fred. Olsen, S.A.'s requirements in an efficient and cost-effective manner. The result is correctly described as a slender stabilised monohull, but more commonly referred to as a trimaran.

Austal Chairman, Mr John Rothwell, is confident that the superior seakeeping performance of the trimaran will provide Fred. Olsen, S.A.'s passengers with significantly-enhanced levels of comfort compared to the company's existing fast ferries, and is also expected to result in noticeably higher levels of operability.

"Studies based on actual sea conditions found in the Canary Islands enabled Austal to accurately model the vessel's performance on each leg of the proposed route. The final report showed that the trimaran would offer a 26% improvement in operability compared to existing hullforms," he explained.

Fred. Olsen, S.A. Chairman, Mr. Fred Olsen Jnr said that through the close cooperation with Austal a highly versatile vessel with many improvements over his current fast ship fleet has been developed.

"The characteristics of this new vessel, with a length of 126.7 m and beam of 30.4 m, will improve overall efficiency in terms of passenger capacity, deadweight and freight lane metres by more than 35%. At the same time, passenger comfort will increase by 25% to 40% depending on the routes we operate", Mr. Olsen said.

"This trimaran should, for us, be the solution for many years to come and could very well set the standard for a new generation of large fast ferries. We believe our customers deserve the best".

During sea trials with operating ride control, *Benchijigua Express* achieved a speed of 40.4 kn whilst carrying deadweight of 500 t. With a capacity to carry 1350 passengers and 341 cars, the ferry will operate between Los Christianos in the south of Tenerife and the islands of La Gomera and La Palma.

An engine room in *Benchijigua Express*
(Photo courtesy Austal Ships)

Arranged in two separate engine rooms in the trimaran's central hull are four MTU 20V 8000 diesel engines, each rated to 8 200 kW which will be upgraded to 9 100 kW during the first quarter of 2006. Those in the aft engine room each drive a Kamewa 125 SII steerable waterjet from Rolls-Royce, while the two forward engines deliver their combined power to a Kamewa 180 BII booster waterjet. Each of the three drivelines features Renk transmissions, with lightweight composite shafts fitted between the waterjets and gearboxes and on the output shaft of the forward engine. The exhausts for the outboard-aft engines are dry type exiting the vessel at the bridge deck through a funnel casing. The inboard engines have a wet-exhaust system exiting between the hulls.

Initial full-power sea trials in conditions of up to four-metre significant wave height and 45 knots wind speed confirmed Austal's confidence in the 127 m trimaran.

Whilst the vessel met the key contract performance requirements, most importantly, it also demonstrated the trimaran's ability to exceed the operability and comfort levels of existing large catamaran designs at the upper end of the weather spectrum.

The wheelhouse
(Photo courtesy Austal Ships)

Two unforeseen challenges were encountered during the sea trials. The first was the failure of the composite ride-control surfaces initially supplied to the vessel. An investigation is currently underway to determine the cause of this failure. Permanent replacement metal alternatives have been supplied and fitted.

Secondly, while the trials conducted at full speed in sea conditions of up to four-metres significant wave height and

Passenger seating
(Photo courtesy Austal Ships)

45 knot winds confirmed the trimaran's superior seakeeping and habitability, they also revealed that this capability could be improved in these and even more onerous conditions, with improvements to the software and hardware controlling the steering and ride-control surfaces. With the cooperation of the customer, Austal has now developed these items in conjunction with additional sea trials.

Austal Chairman, Mr John Rothwell, commented: "Following an unprecedented five-year program of research and development, we are delighted to see this new fast-ferry design exceeding our expectations. Having tested the vessel in conditions in which most current-generation high-speed vessels would have ceased operations, we recognised the opportunity to further improve our trimaran technology to deliver to our customer and the ferry market a proven solution for routes beyond the ability of existing fast-ferry designs".

Austal is now working closely with flag states to achieve operability certification for the Auto Express 127 trimaran in 4 metres, or more, significant wave height.

"Even though the trimaran is very much larger in terms of both length and capacity, the challenge for Austal has been to deliver manoeuvring characteristics equivalent or better than Fred. Olsen S.A.'s existing vessels," said Mr. James Bennett, Austal's Technical Manager.

"This has been achieved by fitting two Ulstein Aquamaster UL601 azimuthing bow thrusters supplied by Rolls-Royce. The ability to synchronise the thruster and waterjet control systems will give the vessel's captain excellent control to ensure fast, efficient and safe operation in port. Once in open water the electrically-driven thrusters are retracted into the hull to reduce drag and thus maximise the vessel's speed and efficiency," he explained.

Restaurant
(Photo courtesy Austal Ships)

With electrical power provided by the vessel's diesel generators, the bow thrusters can be integrated into the harbour mode of the waterjets to provide a single point of control for both systems. Alternatively, the Captain can choose to operate the bow thrusters independently. Keeping maintenance costs to a minimum, the bow thrusters are designed to be lifted out onto the vehicle deck for inspection whilst the vessel remains afloat.

Vessel motions are controlled by the movement of three sets of control surfaces fitted to the centre hull. The system consists of a single T-foil forward, two anti-roll fin stabilisers at about two-thirds of the length aft and, finally, two interceptors at the transom.

Benchijigua Express has a transverse metacentric height similar to a monohull ferry and is therefore fitted with a ballast and heel control system consisting of two ballast tanks and two heel control tanks. Both sets of tanks are designed to be filled as the vessel slows down on entering port. The tanks can be filled in about 5 minutes. The ballast tanks have been designed to cause parallel sinkage to lower the vessel into the water increasing the waterplane area and therefore the transverse stability. Each heel-control tank is connected to two transfer pumps that can rapidly pump water from one tank to the other. The pumps are run from a variable-speed drive, which in turn receives signals from a PLC-based control system.

With the tanks filled upon arrival, the control system senses any change in heel angle during loading and unloading and rapidly transfers ballast to maintain a level deck. When the vessel is loaded with vehicles and passengers, the ballast and heel control tanks are pumped out.

Close inspection of the eye-catching Fred. Olsen Express livery of *Benchijigua Express* reveals the hull and superstructure are not in fact protected by paint but by a self-adhesive film. Orca Marine's Offshore Film is a pure vinyl product which protects a surface much in the way paint works. Nevertheless, the film is unique in that it has an expected lifespan of 10 to 12 years service, depending on conditions. For conventional paint coatings in a marine environment, 3 to 5 years is relatively normal under comparable conditions. The use of protective film on areas above the waterline normally covered by paint is expected to deliver substantial economic benefits, thanks to a significant reduction in work and time involved in application and a reduction in routine maintenance costs by up to 50%.

As a further item of interest to this already milestone project, Fred. Olsen, S.A. had a requirement that the waterjets could be accessed for inspection and replacement of the thrust bearing given the lack of local shipyard resources suited to a 127 x 30 m vessel, and the potential for this relatively minor servicing problem to interrupt operations.

To this end a transportable cofferdam or caisson matching the unique shape of the centre hull's transom has been

designed, built and tested, creating a dry working environment around and under the waterjets. Operated by air supplied by the vessel and with customised mounting points on the ferry, it has proven to be a straightforward and successful solution to the original concern and another example of Austal's reputation for working with customers to creatively overcome problems to maximise operability and serviceability.

"While the Auto Express 127 trimaran *Benchijigua Express* set new industry standards for commercial-vessel performance, its design and construction are both soundly based and the technology has been identified as having military application", said John Rothwell.

A team led by the US military supply company General Dynamics and including Austal has been selected to provide a trimaran-hull-form based design for the US Navy's Littoral Combat Ship (LCS) project. A decision on the option for the construction of an initial two 127 m vessels is expected in October 2005, with a potential 60 of these combat ships built over a forecast 15-year period for future navy requirements.

Austal has already built two high-speed catamarans of over 100 m in length. One of these, the 101 m *WestPac Express*, has already proved highly successful in carrying out Theatre Support type duties for the US Marine Corps in the Western Pacific region.

Two further 105 m catamarans are currently under construction at Austal's Mobile, USA, shipbuilding facility.

Principal Particulars

Length OA	126.7 m
Length WL	114.8 m
Beam moulded	30.4 m
Hull depth moulded	8.2 m
Hull draft (maximum)	4.0 m
Deadweight (maximum)	1000 t
Crew	35
Passengers	1350
Vehicles	341 cars or 450 truck lanes metres and 123 cars
Axle loads	15/12 tonnes (dual/single axles) on central lanes 9/12 tonnes (dual / single axles) outboard 1 tonnes on forward ramps 0.8 tonnes on mezzanine decks
Vehicle deck clear height (max)	4.60 m
Speed	40.4 kn at 500t dwt and 32.8 MW

Tankage

Fuel	145 000 L
Fresh water	7000 L
Black & grey water	7000 L
Lube Oil	2 x 600 L
Hydraulic Oil	2 x 600 L
Sludge	1000 L

Propulsion

Main engines	4 x MTU 20V 8000; 8 200kW at 1150 rpm each
Gearboxes	2 x Renk ASL65; 1 x Renk ASL 2X80
Waterjets	2 x Kamewa 125 SII; 1 Kamewa 180 BII
Azimuthing bow thrusters	2 x Ulstein Aquamaster UL601
Generator sets	4 x MTU 12V 2000 M40 540 kW each.

Survey

Classification	Germanischer Lloyd ✠100A5, HSC-B OC3 High Speed Passenger/Ro-Ro Type ✠MC, AUT

Benchijigua Express
(Photo courtesy Austal Ships)

Cruise Ship *Oceanic Princess* Completed by NQEA

NQEA Australia's latest creation, the 63 m luxury cruise ship *Oceanic Princess* was handed over to Coral Princess Cruises based in Cairns, North Queensland on Thursday 28 April 2005 for cruise operations locally and internationally. Cairns-based CPC have two other cruise catamarans which operate the Great Barrier Reef and the Kimberley area in season.

NQEA believe that *Oceanic Princess* is the first Australian built, owned and flagged passenger cruise ship for international voyages.

The vessel is classed by ABS for unrestricted operation (excluding ice class). ABS also acted on behalf of AMSA for statutory requirements which include SOLAS, stability assessment, load line, tonnage measurement, MARPOL and fire and safety equipment.

The intended operation areas radiating from her base in Cairns are numerous and varied to suit seasonal weather and optimum time to experience the region's attractions.

The maiden voyage on 8 May to Darwin began ten-night cruises to Broome and the Kimberley coast until October. A cruise from Cairns to Sydney will lead into a voyage to follow the Sydney-to-Hobart yacht-race fleet. She will then have two months in New Zealand, cruising Milford Sound to Auckland, before returning to Cairns via Noumea and PNG.

The hull form was developed by SSPA in Sweden with extensive model testing at the Tasmanian-based Australian Maritime Hydrodynamics Research Centre.

The hull features a bulbous bow and twin aft skegs. Construction is almost entirely of steel, with only the masts in aluminium. Primary structural design was contracted to Shiptech Pty Ltd in Singapore; however most other engineering, naval architecture design and drafting work were undertaken by NQEA's in-house design team.

Stability calculations were prepared by Lightning Naval Architecture, based in Sydney. The vessel can withstand two-compartment flooding although one-compartment subdivision was required for SOLAS compliance.

As *Oceanic Princess* will frequent remote destinations, the fuel, water and provisions are adequate for a 5 000 n mile range and several weeks underway.

On sea trials the vessel achieved 15 knots in the loaded condition at full power, with 12 knots at 70% MCR as the chosen optimum cruising condition.

Propulsion power is provided by two Caterpillar 3512B fully-electronic main engines, each rated at 1119 kW at 1200 rpm. The main engines and Hitachi MGN 1224V gearboxes are housed separately in twin deep skegs, allowing a flat angled shaftline to the Stone Marine 5-blade contra-rotating fixed-pitch propellers. Propulsion controls are from Stork-Kwant and exhausts are Colpro.

The 200 kW HRP bow thruster is driven by a TECO variable-speed drive unit and provides added manoeuvrability when berthing.

Other main service machinery items include Davey Monsoon pressure sets, EVAC waste collection and treatment plant and toilets, Water Witch assembled 50 t/day reverse-osmosis desalinator, Haden cool and cold rooms and RWO Water Technology 1 t/hr oily-water separator.

Deck equipment includes two Palfinger hydraulic-knuckle cranes to launch the rigid-inflatable boats, Jaden anchor

Oceanic Princess at sea off Cairns
(Photo courtesy NQEA Australia)

Starboard quarter view of *Oceanic Princess*
(Photo courtesy NQEA Australia)

winch and Muir deck capstans. An NQEA-designed-and-built transom platform, accessed from an open transom pocket near the waterline provides access to the water and can lift or lower the 80-person excursion/transfer vessel made by Profab in Cairns.

To cater for the scuba divers, complete sets of personal equipment and a bottle filling station is provided.

Teak decking is fitted on the aft part of the three deck levels by Northern Boat Builders. NQEA made the extensive stainless-steel railing and gates which feature prominently throughout the vessel.

Windows and portholes with deadlights were supplied by Het Anker, with Kontrail and Apco supplying many of the watertight and weathertight doors and hatches. Two IMS sliding watertight doors and an Edington/NQEA weathertight sliding door were installed.

The engine room and accommodation fire suppression mist systems were supplied by York Novenco.

The shipyard-based Northern Insulation Services installed the many acoustic, structural fire and thermal insulation products, as well as exhaust lagging and air conditioning/ventilation ducting. Structural fire protection insulation features Firemaster products from Thermal Ceramics.

The high-quality paint finish results from the application of Jotun marine paints by on-site local contractor Luxury Yacht Refinishers.

Exterior superstructure styling and interior conceptual layouts were prepared by Bernie Cohen with Limecut (Cairns) and Coral Princess Cruises defining the interior décor.

The interior features 40 luxurious stateroom cabins with two being family staterooms (all with own ensuite facilities), open-plan dining room and lounge with bars, commercial galley, reception, ship's office, day WCs, crew accommodation and other service areas. Large open deck areas on each level and a spa on the Sundeck provide space for passengers to enjoy the cruising scenery.

Cabin and common spaces fit-out fine cabinetry was designed and manufactured by Brisbane based FMCA with Cairns Cabinet Works completing the bars, crew quarters and office fit-out.

The MBM fire-rated wall partitions, cabin doors and Isolamin ceiling were supplied by IMAC Australia. Ceilings in lounge and dining areas are Dampa lightweight tiles supplied from Ceiling Works.

Toilet integral modules from Giumma Spa were installed as the vessel's structure was being assembled.

NQEA's shipyard-based cabinetmaker team installed all the interior fit-out materials supplied by sub-contractors as well as making the external deck capping rails.

Other items used in the general fit-out included Amtico and ASF Altro flooring, Brintons carpets, Orford display refrigerators, Verosol blinds and Maytag washers and dryers.

Galley equipment, benches and stainless-steel cladding were supplied and installed by Curreys of Cairns.

Each cabin and public space has individually-controlled air conditioning for selection to suit guest requirements. NQEA designed the air-conditioning system which included MTA sea-water-cooled liquid chillers and Greenhalgh air handlers.

Safety equipment was sourced through NQEA Marine Safety Division and consists of RFD liferafts, Acebi rescue person life boats and davits.

Electrical power generation is provided by two Caterpillar C18 diesel generators producing 400 kW(e) each. These are the first fully-electronic C18s in Australia. A 145 kW(e) Caterpillar 3306 emergency generator set is housed on the Sundeck.

Main switchboards were designed and made by IME, and incorporate Dief control units which allow full power management seamless transfer between generators.

Navigation and communications electronics were supplied and commissioned by AMI Sales and features Kelvin Hughes radars, plotters, Satcom, DGPS and VDR as well as Sailor radios and A3 GMDSS suite. A TMQ AP9 autopilot commands the Hydrive twin-rudder hydraulic system. Other equipment includes JMC weatherfax, Skipper depth sounder, Meridian magnetic compass and SAAB AIS.

The entertainment system by Progear has audio and visual distribution throughout the common spaces.

Servowatch general alarm with 110 alarm points and Consilium fire alarm systems were installed.

Principal Particulars

Length OA	63.1 m
Beam moulded	13 m
Draft	2.95 m
Depth	5.5 m
Fuel	145 t
Gross Tonnage	1779
Deadweight	370 t
Propulsion	2 x Caterpillar 3512B
Generators	2 x Caterpillar C18 3306 emergency
Cruising speed	14 kn
Range	5000 n miles
Classification	ABS +A1 Passenger Vessel +AMS
Flag	Australian
Passengers	78
Crew	over 20

Marc Richards

The bridge of *Oceanic Princess*
(Photo courtesy NQEA Australia)

New South Wales Industry News

Crowther Designs

The 22 m catamaran *Peppermint Bay II* (see *The ANA*, November 2004) has been launched and delivered to operator Peppermint Bay Cruises for operating a combined commuter and cruise service around Peppermint Bay and the surrounding area from Hobart. This is the second Crowther vessel designed for the operators at Peppermint Bay. The previous vessel was a 24 m catamaran with similar layout and operating parameters. The vessel was built at Richardson Devine Marine in Hobart.

Principal particulars of the vessel are:

Length OA	22.00 m
Length WL	19.57 m
Beam OA	7.50 m
Draft (prop)	1.50 m
Draft (hull)	0.85 m
Pax seating	
Internal	107 main deck
	28 upper deck
External	38
Total	173
Fuel	4800 L
Fresh water	1840 L
Deadweight	16.72 t
Engines	2 × Caterpillar 3406E
	each 520 kW @ 2200 rpm
Gearboxes	2 × Twin Disc MG 5114
Gensets	2 × Perkins/Stamford 40 kVA
Speed	> 20 kn
Construction	Aluminium
Survey	USL Code Class 1D

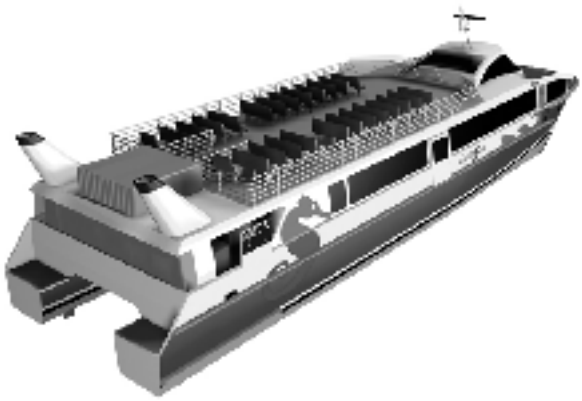
Crowther Design's *Peppermint Bay II*
(Photo courtesy Crowther Design)

Crowther Designs have just signed a contract with Fantasea Charters for the design of a 34 m catamaran for operation in the Whitsunday Islands in Queensland.

Principal particulars of the vessel are as follows:

Length OA	34.50 m
Length WL	31.25 m
Beam OA	9.00 m
Draft (prop)	1.80 m
Passenger Seating	
Internal	200 (main deck)
External	100
Crew	5
Fuel	5000 L
Fresh water	900 L
Deadweight	32 tonnes
Engines	2 × Deutz 616 V16
	each 1107 kW @ 2200 rpm

Gearboxes	2 × ZF2550A
Speed	28 knots
Gensets	Cummins 60 kVA
Survey	Queensland Department of Transport
Operation	Class 1D
Construction	Aluminium



Starboard Quarter of Crowther Design's 34 m Catamaran for Fantasea Charters
(Image courtesy Crowther Design)

Starboard Bow of Crowther Design's 34 m Catamaran for Fantasea Charters
(Image courtesy Crowther Design)

Peter Lowe Design

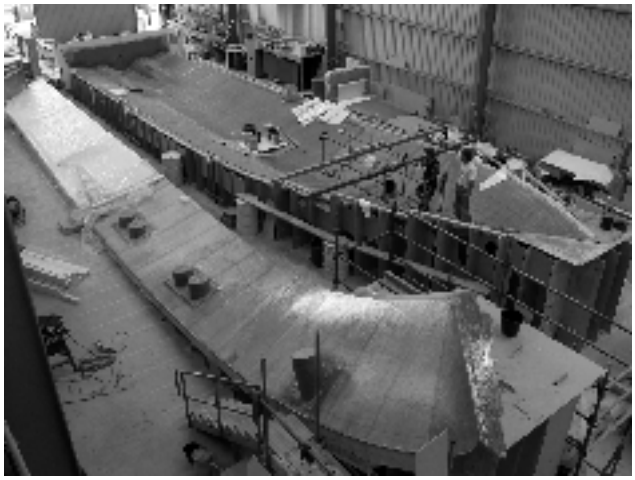
It has been a hectic beginning to the year for Peter Lowe Design. The office has now grown to six people to cope with the increased workload, and the team is about to tackle its largest project to date. This takes the form of a 50 m motor yacht, designed in conjunction with a US-based interior designer/stylist, to be built in Western Australia. The vessel will have a steel displacement-type hull with composite superstructure, and is being designed to Lloyd's SSC Rules.

Principal particulars are as follows:

Length OA	50.0 m
Beam OA	9.11 m
Draft	2.70 m
Power	2 × 1044 kW
Max. Speed	16 kn
Gross tonnage	500

The Evolution 110 (see *The ANA*, November 2004) will be launched in May. Keep your eyes out for this iridescent blue sports cruiser in the yachting press.

Meanwhile, construction of the Evolution 80 is well under way with the bottom and topsides laid up, ready to assemble. The topsides were completed using the resin-infusion process with vinylester resin. A considerable amount of the bottom structure and tanks have been completed prior to the topsides being joined.



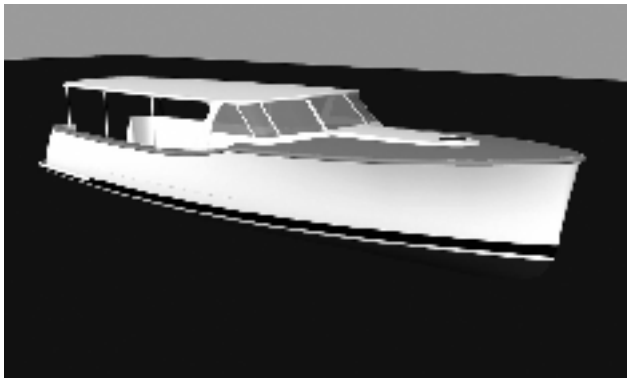
Evolution 80 Hull Bottom and Starboard Topsides under Construction
(Photo courtesy Peter Lowe Design)

Design work has just commenced on a 38 m game-boat style motor yacht, to be built in Queensland. This vessel features a semi-displacement hull and clean, simple exterior lines. Construction will be composite GRP to ABS classification. At the smaller end of the scale, preliminary design work has been completed on a retro-style production launch, for a local client. The office has been delighted to design a sensible, round-bilge displacement boat that does not have to carry a huge amount of power. Primarily intended to be a floating entertainment platform with a massive aft deck area, this vessel also has adequate overnight accommodation for a couple. Aesthetics have been a major focus and, with only a small engine required to achieve displacement speeds, the whole deckhouse and roof have been set lower to achieve a more elegant profile.

Principal particulars of the launch are:

Length OA	14.0 m
Beam	4.38 m
Draft	0.67m
Displacement	10 t
Power	75 kW
Speed	10 kn
Construction	GRP

Phil Helmore



Retro-style Launch from Peter Lowe Design
(Image courtesy Peter Lowe Design)

Austal Delivers *True North*

Following successful sea trials, Austal's latest cruise yacht, the 36 passenger *True North* was handed over to its owner and operator, North Star Cruises Australia, in March.

Several high-profile promotional events for local media were held whilst the vessel was in Fremantle, including a visit from rock music legend, Sting. North Star Cruises Australia Director, Craig Howson commented "*True North* appears to have captured the imagination of the luxury adventure cruise market. We are thrilled with the early response of both passengers and industry alike. We are particularly thrilled with the current level of enquiry and everyone at North Star is looking forward to a very successful year".

The winner of multiple tourism awards, North Star Cruises Australia is the longest-established charter-cruise operator originally covering the vast wilderness of the far north of Western Australia. The arrival of this new vessel, with increased range and facilities, will now see the schedule expanded with a 7-night, 8-day cruise in the waters of Papua New Guinea and an "Over the Top" cruise linking Darwin and Cairns/Great Barrier Reef to the legendary diving and adventure-tourism cruises provided in the Kimberley and Rowley Shoals.

"This repeat order is testimony to Austal's ability to develop custom design solutions within budget guidelines and always deliver a high-quality reliable product that is able to attract discerning passengers for the operator" said Austal Sales Manager, Mark Stothard.

With seven similar deliveries to its credit, Austal is the established leader in adventure-tourism and live-aboard diving vessels for private and commercial owners. All of this experience and expertise has been utilised in the creation of *True North*, which is replacing the 34 m vessel of the same name delivered by Austal in 1999.

So successful was that 30-passenger vessel in achieving excellent sales in the luxury cruise sector, it prompted its owners to make the new *True North* larger and even more luxurious to meet customer demand. Features onboard which reflect this focus include:

- All passenger accommodation staterooms and cabins have en-suites.
- 10 out of the 18 double staterooms and cabins have king size beds, seven have standard-size single beds and only one cabin has bunks.
- All stateroom and cabins have slimline LCD television screens and DVD players with connection inputs for passenger's digital cameras.
- 12 staterooms and cabins have full size windows.
- All staterooms and passenger cabins have telephones with a capability to phone anywhere in the world whilst at sea as well as alongside. This telephone system is fully computerised with a hotel-style passenger-billing system.

On the main deck there is a dedicated passenger dining room with seating for 40 passengers, together with a galley which is comprehensively equipped to efficiently provide five-star, fully-plated meals for the entire passenger complement in a single sitting. The main lounge, located on the upper deck,

True North
(Photo Courtesy Austal Ships)

can comfortably seat 50 people and is served by a fully-equipped bar. The lounge is complete with twin 46-inch plasma screens, full audio/visual facilities and features a passenger Internet station. A forward observation lounge provides a more subdued area for relaxation.

The upper deck aft alfresco area is larger than on the previous vessel and is served by the bar adjoining the internal lounge bar. This area has its own audio system and connects with the internal main lounge by way of a four-leaf concertina glass door, thus providing a number of lounge/bar configuration options.

The walk-in cool room, freezer and store is more than double the size of that in the previous vessel, and includes both cool-room wine cellaring and ambient temperature wine cellaring. Reflecting Austal's experience in designing and building this type of vessel, these areas were specifically located to provide a sound buffer between the engine room and lower passenger accommodation. As a result, noise levels throughout *True North* are significantly lower than those on the previous vessel.

Because the new vessel will operate on a 24 hours-a-day, seven days-a-week basis for 11 months of the year, improved accommodation and other facilities have been provided for the 18 crew. This includes much larger cabins, more spacious toilet/bathroom facilities and a laundry that is five times the size of the previous vessel and which is fully insulated and air conditioned.

External features include a helicopter-landing pad capable of taking a Bell 407. The heli-deck has a full-perimeter fold-

Lounge in *True North*
(Photo courtesy Austal Ships)

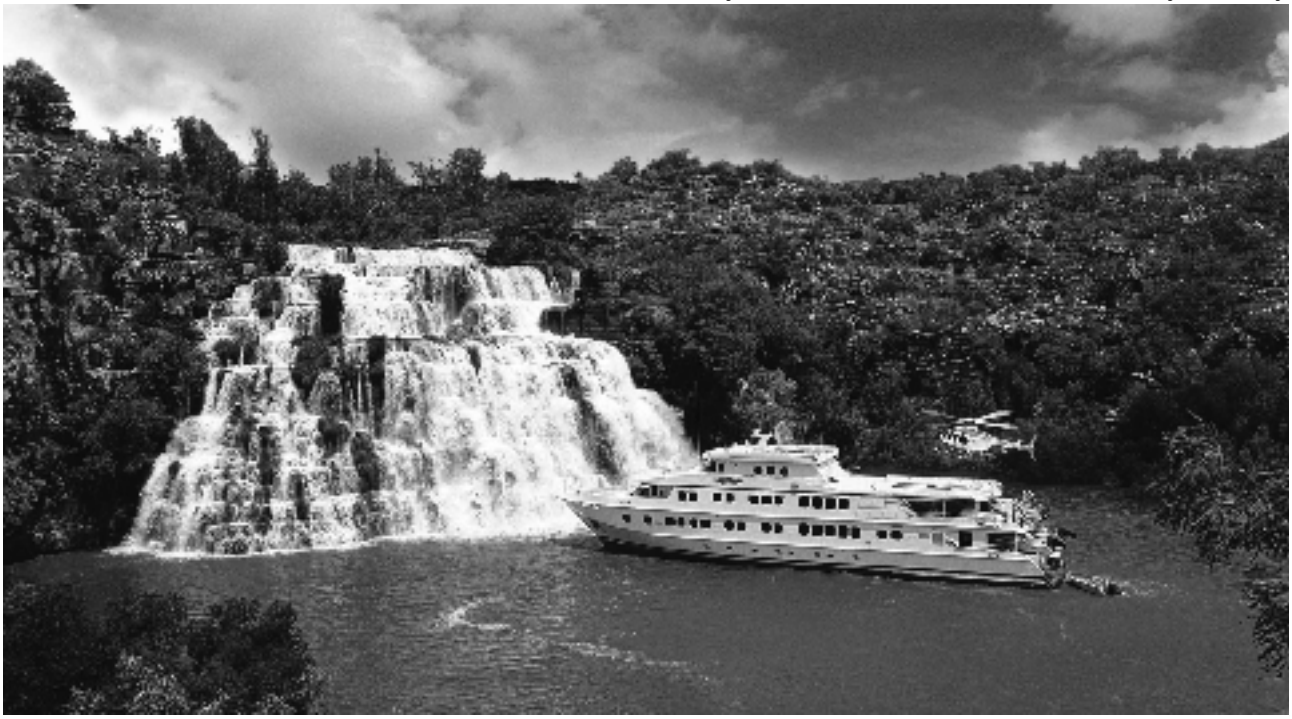
down handrail system that allows the helicopter to operate from a clean deck as well as providing a large safe area for guests when the helicopter is not operating.

True North carries a fleet of six tenders used primarily for passenger excursions. The tenders are launched using two dedicated hydraulic deck cranes; notably, the starboard-side crane is equipped with its own emergency power system to allow the launching of one of the tenders as a rescue boat.

Top deck external walkways, upper deck alfresco area external stairways and the swim platform are laid with marine decking in keeping with the luxurious finish of the vessel.

At 50 metres in length, *True North* has been skilfully designed to accommodate all of the above facilities and improvements giving passengers "big boat" atmosphere and ride comfort whilst retaining the ability to explore the highly-regarded secluded, difficult-to-access locations that have helped establish the North Star Cruises Australia experience as one of the world's most sought-after cruising experiences.

Principal Particulars	
Length OA	49.9 m
Length WL	44.6 m
Beam moulded	10.0 m
Hull depth moulded	4.05 m
Maximum draft	2.2 m
Passengers	36
Passenger cabins	18
Crew	18
Fuel	40 000 L
Propulsion	
Engines	2 x Caterpillar 3508B – B 2 x 783 kW @ 1600 rpm
Gearboxes	2 x Reintjes WVS 430/1
Propellers	2 x fixed pitch
Service speed (at 90% MCR)	13 kn
Survey	
Structure	Lloyds Register
Survey	Australian Maritime Safety Authority



True North at work — how does your office compare?
(Photo courtesy Austal Ships)

New Contracts for Austal

Following on from the recent successful delivery of *True North*, Austal confirmed on 12 May the signing of two new contracts for the construction of vessels to a similar theme configured for private and charter use.

With a combined contract value in excess of $30 million, the vessels will both be delivered within 19 months. Both vessels will be built by the Austal-Image shipyard that specialises in this market segment.

Austal Chairman, John Rothwell said "The contracts follow a detailed design and development period with the ability to reference the 50 m *True North* providing a significant competitive advantage.

Securing these contracts brings the total number of recreational vessels built for private and corporate operators to 13 making Austal-Image a leader in this category."

Starboard quarter view of *True North*
(Photo courtesy Austal Ships)

NWBS Unveils First-of-class — 60 m Trimaran Superyacht

North West Bay Ships are better known for their high-speed commercial ferries, three of which are currently under construction. In a daring debut, NWBS have just completed sea trials of the world's first trimaran superyacht and, in the process, joined a select group of world-renowned shipyards able to build five-star quality motor yachts of this size.

The e-motion trimaran at sea
(Photo courtesy NorthWest Bay Ships)

Hull

The "e-motion" class superyacht is the second trimaran to be built by NWBS. The first, *Dolphin Ulsan*, was launched four years ago in 2001 and has completed three gruelling seasons running daily services across the Sea of Japan. *Dolphin Ulsan* is a high-speed commercial ferry, designed to carry 450 passengers at 40 kn on relatively rough-water routes.

During sea trials of *Dolphin Ulsan*, it was immediately apparent that the generous beam and excellent seakeeping characteristics of the trimaran platform would be ideal for motoryacht applications. Impressed with *Dolphin Ulsan*'s performance in heavy weather trials, an experienced motoryacht owner requested NWBS to investigate the feasibility of a motoryacht of a similar size. Several months later, NWBS embarked on a two-and-a-half year mission to design, build and deliver their first superyacht.

The e-motion trimaran is approximately double the displacement of *Dolphin Ulsan*, and operates at a reduced Froude number of 0.44 (compared with 0.91 for *Dolphin Ulsan*), resulting in significantly different center-hull and side-hull shapes designed to optimise hull resistance and fuel economy. Tank testing was conducted at the Australian Maritime College, with additional testing conducted at a later date to examine the flow lines in order to design and install an underwater exhaust system.

Both hull and superstructure are fabricated from aluminium. External styling work was undertaken by Sam Sorgiovanni Designs in Western Australia. Extruded aluminium shapes feature heavily in the vessel, including the decks, resulting not only in a stiffer and lighter structure, but significantly reducing manhours compared to standard plate-and-stiffener construction. A number of new extrusions were developed by NWBS to meet the artistic requirements of the stylist.

Machinery

The e-motion trimaran is powered by two Caterpillar 3512BTA main engines, each developing 1566 kW brake power at 1880 rpm. Bruntons five-bladed custom propellers are driven via ZF 4660 gearboxes, equipped with autotroll to enhance slow-speed manoeuvrability. Rubber Design of Holland provided the flexible engine and gearbox mounts to reduce any noise and vibration. The engines are installed in a tandem arrangement, to provide better access space within the confines of the slender centrehull.

At full power, the vessel achieves a speed of 20 kn and the main engines consume a total of 780 L/h. However, at a long-distance cruising speed of 12 kn, the total fuel burn is less than 160 L/h.

Two MTU/Detroit 6062-HK53 generators are fitted, each capable of meeting the entire ship's load. Both gensets are encased in custom sound enclosures. An emergency genset with autostart facility is fitted on the sundeck.

Ancilliary equipment includes Muir anchoring and mooring equipment, two fresh-water makers capable of making 14 000 L/day, vacuum sewage collection, a sewage treatment plant, a tunnel thruster forward, a retractable stern thruster aft, a McGregor lift servicing all three passenger decks, and fully-equipped galley, laundry and dive rooms.

Accommodation

The trimaran platform compels a somewhat radical departure from the standard monohull yacht layout, where passenger cabins are typically located below decks forward of the engine room. The 15.2 m beam of the trimaran offers enormous deck areas, enabling sophisticated layouts previously unobtainable in all but the very largest monohulls.

The main deck provides a substantial external area aft, housing two tenders (5.5 m and 6.1 m) port and starboard, together with their dedicated launching cranes hidden in the deckhead above. Also on this deck is a 1200 L glass fish tank, enabling the catch of the day to be kept fresh and on display. Integrated with the fish tank is refrigerated storage for other "lesser" fish, a large cleaning and scaling station, and a sweeping J-stair leading to the upper deck. Spiral stairs port and starboard lead down to the aft boarding platform. A small bar area, sink and external shower complete the aft deck arrangement.

Entering via automatic sliding doors, the main saloon is dedicated to guest enjoyment, with a large lounge area to starboard, and dining room and informal lounge to port, separated by a large stairway leading to the upper deck. The oval dining table has seating for 16, but can be separated into two circular tables for more intimate 8-seat dining. A fully-equipped bar located at midships serves both areas. A formal entry lobby is located forward of the saloon to port,

and provides access to the spacious galley with walk-in dry store, cool room and freezer. As our client enjoys cooking, the galley is also beautifully finished in dark timbers and stainless steel. A large crew mess is found forward of the galley on the port side, housing lounge seating, another large dining table for ten (again split to two smaller tables when required), a kitchenette area and study.

The starboard side is dedicated to the truly-impressive owner's suite. Covering more than 110 m^2, the owner's suite is accessed via a private library and study area. The full beam is utilised for two queen-size beds, a small lounge to port, a writing desk to starboard, walk-in wardrobe, sauna, private gynasium and ensuite featuring twin vanities, WC, shower and full-size marble spa bath.

The upper deck combines accommodation spaces and a large karaoke lounge. Five guest rooms are located on this level, two with king-size beds, while the remaining three each have king-side beds, a single bed and a concealed pullman bunk-style bed. All guest rooms have their own ensuites. A captain's cabin, first mate's cabin, and hostess crew cabin for four are located forward of the guest spaces. Again, each of these cabins have their own ensuites attached. The wheelhouse completes this deck. External walk-around is provided, leading to access to the foredeck past yet another intimate seating lounge.

The impressive seakeeping of the vessel, with reduced pitching and little or no slamming forward, enables the foredeck to be utilised as a storage area for more toys. An 8.5 m Boston Whaler, set up for game fishing, is neatly recessed into the foredeck, together with three jet skis. A RIMS crane, rated for 4.3 t, folds neatly into the side bulwark, giving an air of simplicity to the whole arrangement. With the Boston Whaler at full outreach, the e-motion trimaran lists by less than one degree, allowing the tender to be launched and retrieved by the crew in all reasonable weather conditions.

The fly deck offers 150 m^2 of sun-worshipping space, and a small intimate coffee room covered by a glass atrium ceiling. Access is provided by a lift, plus internal and external stairs. Removable carbon-fibre spars enable shade sails to be rigged over the fly deck.

Below decks, the side hulls are utilised for storage, whilst the long slender centrehull accommodates a dive room, engine room, crew accommodation, plant room and laundry. Tank spaces are located below the crew accommodation deck.

The vessel's interior was designed by Sam Sorgiovanni, and links the large spaces together in an art-deco style. Myrtle burl is utilised in the owner's suite, with Madrona burl veneers from Italy used for the guest cabins and entertainment spaces. All cabinetry is trimmed with stainless inserts, and all timbers are grain filled and highly polished in a satin finish. Interior floors are presented in a cream-coloured, custom-embossed carpet from the Phillipines, or in polished teak. Teak floors are highlighted with celery-top pine splines in a straight or parquetry format. Leathers, silks and fabrics are used extensively in the wall panelling and ceilings to complement the exotic burl veneers.

The 480 m^2 of external decking are clad in Burmese teak.

Captain's View of the Foredeck
(Photo courtesy NorthWest Bay Ships)

Dining Room
(Photo courtesy NorthWest Bay Ships)

Handrails and fittings are all highly-polished stainless steel.

Wheelhouse and Electrical

Satellite TV and Internet services are available in all passenger cabins and throughout the entertainment spaces. Large plasma screens are concealed behind sliding tapestries.

Wheelhouse equipment is modest but functional, including two radars, a Navi-Sailor electronic chart system, gyrocompass, autopilot, two GPS units, speed log and echo sounder. Perhaps of more interest to those guests seated behind the helm is a 360° underwater sonar system, able to scan ahead and down to the ocean floor. The sonar automatically retracts at speeds greater than 15 kn. A sonar repeater is fitted on the aft main deck to allow those fishing on the aft deck to see what the surrounding waters have to offer.

Over 700 internal and 300 external lights are utilised in the vessel. In a testament to today's reliance on all things

Owner's Suite
(Photo courtesy NorthWest Bay Ships)

Wheelhouse
(Photo courtesy NorthWest Bay Ships)

electrical, over 43 km of cabling was installed in the vessel.

Sea Trials

Sea trials were conducted within the d'Entrecasteaux Channel, extending out to Storm Bay and the entrance to the Southern Ocean for ride-control performance trials.

NWBS reported "The sea trials program went exceptionally well, with the vessel easily exceeding her contractual requirements. We are ecstatic with the results; the vessel's manoeuvrability is excellent and the ride-control performance is exceptional".

- **Performance**

At full power, the e-motion trimaran slips along at a comfortable 20 knots. Perhaps more impressively, at a mere 50% power, cruise speed was 16 knots allowing the vessel to easily achieve her contractual range of 5000 nmiles.

- **Manoeuvrability**

Docking is a simple exercise, reports Captain Mike Jackson. "Utilising both engines and the large bow thruster, the vessel simply "walks" sideways through the water. In 20 kn of breeze we found that we did not require the retractable stern thruster".

Turning trials demonstrated that a turning diameter of less than five ship's lengths was achievable. Like the previous NWBS commercial trimaran, the vessel banks into the turn. Speed loss in the turn is negligible, with an entry speed of 18 kn reducing to an exit speed of 16 kns.

The three hulls enable the vessel to track straight, with the autopilot comfortably holding a course in a seaway with the helm angle reduced to a maximum of 5°.

- **Ride Control**

The immense size of the wide trimaran deck certainly makes this vessel stand out from the crowd. However, its what's under the water that gives the e-motion trimaran a real performance edge. The ride-control system is simply enormous compared with the fins found on similar-sized monohulls. The vessel has four active foils spanning between the side hulls and the centre hull. With each foil individually controlled by a Maritime Dynamics ride-control sensor and electronic package, the potential to calm all but the mightiest sea is realised. Trials, conducted in 1.8 to 2 m significant sea height, demonstrated that with the ride-control system active, the vessel's motions were reduced by 70%. At slow speeds or even at rest, the passive effect of the foils is still significant, damping the motion of the vessel.

- **Noise**

Not surprisingly, the vessel is exceedingly quiet. Van Cappellan, a Netherlands luxury motoryacht noise specialist, was engaged to detail noise treatments in almost every area of the vessel. In the entertainment spaces directly above the engine room, the noise measurements were less than 65 dBA at full power. Guest cabins were around 45 dBA, and the first mate's cabin was a deathly-quiet 40 dBA! All measurements were conducted with the vessel steaming at 18 kn, with all air conditioning and ship's services running.

Summary

"Overall, this was a very challenging and rewarding project", reports NWBS. "It opens a new market segment for us and we are very hopeful that this vessel will revolutionise the custom-yacht industry, leading to a series of these unique and exciting vessels being built here in Australia".

Principal Particulars

Principal particulars of *e-motion* are as follows:

Length OA	61.4 m
Length WL	56.0 m
Beam OA	15.7 m
Draft (maximum)	3.5 m
Deadweight	125 t
Range at 12 kn	> 5000 nm
Speed	
@MCR	20 knots
@50% MCR	16 knots
Guest Cabins	Owner's suite, VIP suite, and four guest suites
Crew Cabins	9 (total 16 crew berths)
Material	Aluminium hull and superstructure
Class	DNV ✠1A1 LC Yacht R0 E0
Main Engines	2 × Caterpillar 3512BTA each 1566 kW @ 1880 rpm
Gearboxes	2 × ZF 4660

Propellers	2 × Bruntons custom five-bladed fixed-pitch
Generators	2 × MTU/Detroit 6062-HK53 each 350 kVA @ 50 Hz
Ride Control	Maritime Dynamics four active-foil system
Fuel	94 500 L
Fresh Water	18 000 L
Lube Oil	220 L
Hydraulic Oil	220 L
Bilge	200 L
Sludge	500 L
Petrol	1200 L
Raw Sewage	3000 L
Treated Sewage	3000 L
Grey Water	3000 L
Tenders	1 × 8.5 m Boston Whaler Conquest 1 × 6.1 m Nautica International RIB 1 × 5.5 m Boston Whaler 180 Dauntless 3 × Jet skis

CLASSIFICATION SOCIETY NEWS

Germanischer Lloyd Construction Rules for Naval Ships

For the first time, Germanischer Lloyd has developed guidelines for the classification of naval ships. With the construction and operation of naval vessels, the classification society can now offer its clients in the naval sector all the benefits that are usual in merchant shipping. The classification of naval vessels improves the reliability of fabrication and operation, and also reduces the life-cycle costs. Thanks to the installation of commercial, GL-certified components and units, it is possible to attain considerable savings in expenditure. Naval vessels built according to the new GL Rules can be granted internationally-valid environmental and safety certificates, such as MARPOL and SOLAS.

With the new classification rules, GL is responding to the increased demand from military procurement agencies both at home and abroad who, faced with sinking defence budgets, rising procurement costs and a lack of specialized personnel, are looking for more economical alternatives.

Newly-created characters of class describe and identify the ships and propulsion plants according to type and technical equipment. Through a number of notations, other important properties of the ship are specified, e.g. facilities for protection against ABC weapons, damage stability, etc.

GL offers its naval customers the comprehensive examination of the ship design in accordance with the new Rules — even during the project phase. To optimize the design, GL utilizes findings from the extensive research activities it conducts in the areas of hydrodynamics and strength, amongst others.

For newbuildings, GL provides the competent construction supervision at the shipyards through its worldwide network of surveyors. Following the initial acceptance of the newbuilding, the vessel is examined at regular intervals within the scope of periodic technical inspections. These surveys, which are standard practice worldwide for merchant vessels, are an effective means of detecting wear and damage at an early stage, before costly repairs become necessary.

Over the last three decades, Germanischer Lloyd has provided technical support and advisory services for more than 300 naval ships at home and abroad.

For advice and ordering of the Rules (in English), contact Lorenz Petersen by phone on +49 40 36149-254, fax +49 40 36149-166l or email pet@gl-group.com.

New Germanischer Lloyd Rules for Large Yachts

New Germanischer Lloyd rules for large motor and sailing yachts (L > 24 m) came into force on 1 October 2003, defining a modern standard for classification and construction in this multi-faceted segment of shipbuilding. Hull structural and other design criteria related to safety cover a broad range of yacht characteristics such as size, propulsion, speed, operation, etc. The requirements also account for a variety of construction materials, i.e. steel, aluminium, FRP-composites and wood. In addition to material and scantling requirements, the rules contain design criteria regarding other essential safety matters with a particular focus on structural fire protection as well as closure conditions, buoyancy and stability.

Germanischer Lloyd Electronic Data Exchange

Through the introduction of electronic data exchange with shipyards, engine manufacturers and other suppliers, Germanischer Lloyd will be accelerating the plan approval of ships and their equipment. The international classification society is testing the new communication procedures in a pilot project with notable clients from Asia and Europe.

In view of an order level amounting to over 800 ships and increasingly-shorter production times at the yards, rapid plan approval is being more and more important. With the exchange of approved ship drawings via the Internet, all participants can be informed immediately about the current technical status. For each newbuilding, the experts at GL have to check up to 350 documents that until now had been sent back and forth by post between the yard or suppliers and the headquarters of the classification society in Hamburg. As a major bottleneck, this transmittal process had to be speeded up.

The new service consists of a special Internet portal, the "GL eRoom". The drawings of the ships, engines or components to be approved are exchanged in the PDF format between the yard or manufacturer and Germanischer Lloyd. What is more, the "GL eRoom" can be reached through a standard browser without the need for any additional software. The security of the digital interchange is safeguarded by the SSL method.

With this new electronic data exchange system, the approval procedures are accelerated and the administrative costs are reduced, both for the customers and for Germanischer Lloyd.

Thanks to the new approach, it is no longer necessary to photocopy drawings, transmit corrections or send entire drawings by "paper mail".

On successful completion of the pilot project, the digital data exchange will made available to all maritime customers, starting in the first quarter of 2005.

Improved Safety for Surveyors

Lloyd's Register, DNV and ABS have jointly announced an initiative to improve the safety of their surveyors on assignment. It will have an impact on shipyards, offshore platforms, manufacturers and other third-party sites. The three organisations stressed that they expect their clients to provide a safe place of work at all times for surveyors.

The initiative focuses on the principle that the working environment, including equipment, provided for a surveyor must be safe. It identifies five key safety concerns that surveyors face. In addition, it identifies a number of clear and simple expectations specific to each of these concerns that need to be in place if serious injuries and even fatalities are to be avoided. The five concerns are:

- entry into confined spaces;
- access to, from and within the workspace;
- safe plant and equipment;
- working at height; and
- transferring between vessels at sea.

Mark Pavey, Lloyd's Register Safety Manager, said "We only have to look at accident records to realise very quickly that the principal risk to the health and safety of our surveyors (who often have to work alone) occurs on third-party sites, and, as experienced as our surveyors are, they are heavily reliant on a ship's crew or the site controller for their safety. This joint initiative aims to highlight this situation, raise everyone's awareness and unite class societies in rectifying unsafe practices where the lives of our surveyors are put at risk."

Per Linden, DNV Safety Manager, added: "Even experienced surveyors can be put under pressure to carry out their work in a potentially-unsafe location, concerned that failing to do so may result in another class society being used. Under this initiative, a refusal to work from one of us due to an unsafe condition will represent a refusal from us all, and we value the strength of this collective approach".

Doug Ward, ABS Safety Manager, commented: "Although the vast majority of locations around the world have good safety arrangements in place, it remains the case that some locations and countries don't implement satisfactory safety procedures. Too frequently, a surveyor has to decide whether he or she should enter a confined space that may not have been adequately ventilated, climb scaffolding that appears flimsy or poorly erected, or step between vessels in pitching seas without a life preserver or adequate support crew. We have to encourage our clients to make the surveyor's decision to proceed the right one."

The organisations said that they will now inform their clients and those who control the work places of this initiative and work with them in a proactive and positive way to improve safety. "We can improve safety because the expectations are straightforward and based on common sense", said Pavey. "Class NK and Russian Maritime Register of Shipping (RS) have already signed up with us, (along with CRS) and it is our hope that this will act as a catalyst for the members of the International Association of Classification Societies (IACS), who are currently studying the issue, to join the initiative in the near future. We all face the same hazards in similar locations around the world and we can all benefit from being involved."

Lloyd's Register to Class World's First 10 000 TEU Container Ships

Lloyd's Register is to class the world's largest declared capacity container ships — four 10 000 TEU vessels, to be built in Korea at Hyundai Heavy Industries for China Ocean Shipping Corporation (Cosco). The vessels will be delivered between late 2007 and mid-2008.

Each of the ships will have a length overall of 349 m, a breadth of 45.6 m and a depth of 27.2 m. Each ship will be fitted with a 12 cylinder 70 000 kW engine to enable a trading speed of 25.8 kn.

"We are delighted to have won this significant classification contract," says John Stansfeld, Director of Lloyd's Register Asia. "We have made great strides in the container-ship sector over the past few years, especially in the post-panamax size bracket. We have gained significant expertise and knowledge of large container ships and look forward to working with HHI and Cosco on this exciting new construction project."

Lloyd's Register has an established track record of classing large container ships, including a series of 8 500 TEU ships recently completed by Samsung Heavy Industries (SHI) for Canadian, Chinese and Greek owners. Other orders for large container ships to Lloyd's Register class include 9 200 and 9 600 TEU ships at SHI, 8 400 TEU ships at Daewoo Shipbuilding and Marine Engineering, 7 030 TEU ships at Mitsubishi Heavy Industries and 6 400 TEU ships at Hanjin Heavy Industries.

"The 10,000 TEU container ships ordered by Cosco are the next step towards the 12 500 TEU limit," says David Tozer, Lloyd's Register's Business Manager — Container Ships. "Beyond 12 500 TEU we expect that container ship and container terminal design will have to undergo significant change. For container ships, this might include the addition of a second screw, with the added capital investment that this entails.

"Based on our findings, we firmly believe that the industry will see the first 12 500 TEU ship ordered before the end of this decade. With our standing as the classification society with the most new construction and in-service experience of large container ships, we believe we are the pre-eminent classification society for this ship type."

Naval Ship Safety and Classification Conference

How the Safety of Life at Sea (SOLAS) Convention can be implemented for naval vessels was examined on 15 and 16 March 2005 by more than twenty representatives of NATO and the Naval Ship Classification Association (NSCA) at the headquarters of Germanischer Lloyd in Hamburg. The members of the NSCA comprise the classification societies from the NATO countries and several

other states. The position of vice-president is currently held by Germanischer Lloyd.

Faced with sinking defence budgets, a lack of specialized personnel and the challenge of meeting international safety requirements, the military procurement agencies, both domestic and foreign, are increasingly looking for alternatives. Here they are orienting themselves towards the existing naval vessel standards of the classification societies. Safety regulations such as the SOLAS Convention are also to be applied to naval ships. In cooperation with the classification societies, NATO will be developing a naval interpretation of SOLAS.

For further details, contact Dr Olaf Mager by phone on +49 40 36149-634, fax +49 40 36149-250 or email pr@gl-group.com.

Germanischer Lloyd Engages in Fuel Cell Technology Research

Cruise ships tend to operate in sensitive ecological areas, and high environmental standards have to be met. Emissions are restricted by international as well as national and even local regulations.

The alternative power supply to diesel engines is the fuel cell technology. It promises a substantial reduction of air pollution. Compared to diesel engines, the efficiency of energy production is higher. To explore the advantages of this new technology with regards to cost efficiency, compliance with stricter environmental standards and technical safety for the maritime industry worldwide, Germanischer Lloyd engages in the research and development of fuel cell technology.

Fuel cells (FCs) convert chemical energy in a fuel (usually hydrogen gas) directly into electricity in an electrochemical process. The FCs are named after the type of electrolyte separating the anode from the cathode. The PEM fuel cell uses a polymer membrane, the AFC an alkaline (KOH) solution, the SOFC a solid oxide, the PAFC a phosphoric acid immobilised solution and the MCFC molten carbonate salt as electrolyte. This large variety of materials results in highly-different operation ranges and system components. The main benefit is the near emissions-free operation on board, because the by-product is water. The electricity is produced with higher efficiencies than normal diesel engines. The amount of energy to be produced is the main challenge in commercial application: Current power to be supplied by fuel cells ranges from several hundred kilowatts up to two or five megawatts. Since commercial seagoing ships require a propulsion power of from five to more than fifty megawatts, the first market applications in the maritime sector will be for auxiliary power supplies. Technical challenges on board a ship are the safe storage and handling of the yet unconventional fuels. Low volumetric density of hydrogen, for example, poses specific questions with regard to space saving storage.

Marine applications introduce a set of requirements for FC systems. These reflect the special conditions experienced at sea such as movement due to waves or saline air and the need to be compatible with the conventional power systems on board the vessel. The latter puts certain restraints ON the FC system with regard to power quality and dynamics. Further, any installation should be in compliance with current regulations.

Germanischer Lloyd participates in several research and demonstration projects. The classification society has developed “Guidelines for FC-Systems on board of ships and boats” which ensure technical safety of fuel cell application. With the introduction of the MARPOL Annex VI regulations and even-stricter emission controls, fuel cell technology will turn into a viable energy alternative for passenger ships and cruise vessels.

For further details, contact Dr Olaf Mager by phone on +49 40 36149-634, fax +49 40 36149-250 or email pr@gl-group.com.

EDUCATION NEWS

Australian Maritime College

AMC Graduation Ceremony

Mr Robin Gehling, President of the Australian Division of the Royal Institution of Naval Architects, spent two days at AMC in March to meet with local RINA Members, AMC research staff and to tour AMC facilities. Rob also represented RINA at the AMC Graduation and Prizegiving Ceremony which was held on Friday 18 March 2005. The following students received their Bachelor of Engineering degrees:

BE (Naval Architecture)

Nick Billett	
Kyle Dick	Honours, Class 2 Division 2
Noel Dunstan	
Peter Fanning	
Lee Fennell	
Alan Goddard	
Ben Healy	
Mark Hughes	First Class Honours
Colin Johnson	Honours, Class 2 Division 2
Sergy Kamkin	
Iain Lund	Honours, Class 2 Division 1
Jesse Millar	Honours, Class 2 Division 1
Oliver Mills	
Kay Myers	First Class Honours
Cameron Nilsson-Linne	Honours, Class 2 Division 2
Oscar Palos	
Luke Pretlove	Honours, Class 2 Division 1
Tom Ryan	Honours, Class 2 Division 2
Anton Schmieman	Honours, Class 2 Division 2
Emmanuel Solomon	

BE (Ocean Engineering)

Ben Gilkes	Honours, Class 2 Division 2
Suzanne Hayne	Honours, Class 2 Division 1
Holley Lees	Honours, Class 2 Division 2
Dane McNally	
Jonathon Schultz	Honours, Class 2 Division 2

BE (Marine & Offshore Systems)

William Edwards	First Class Honours
Ben Gilkes	
Mohamed Liraar	Honours, Class 2 Division 1
David McCausland	
Todd Tippett	First Class Honours
Jeremy White	Honours, Class 2 Division 2

Master of Philosophy

Alexander Robbins Thesis title: *A Tool for the Prediction of Wave Wake for High Speed Catamarans in Deep Water.*

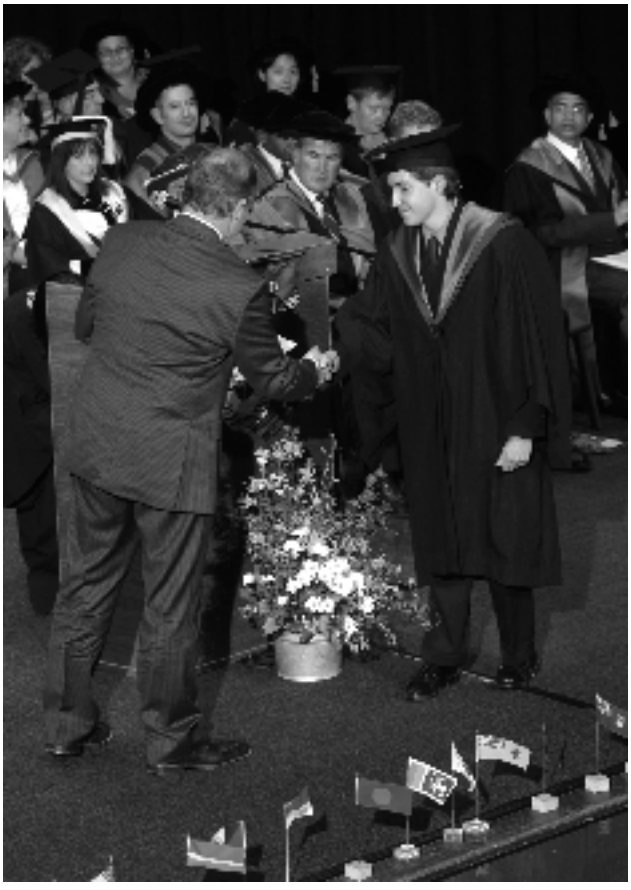
Prizes and Awards

The Connell Medal: Best Graduate (AMC wide) — Todd Tippett

Captain Thomas Swanson Prize: Best student over the duration of any engineering course in 2004 — Mark Hughes

Teekay Project and Technology Management Prize: Highest marks in technology and project management related subjects in any program in the Faculty of Maritime Transport and Engineering — Todd Tippett

Royal Institution of Naval Architects Prize: Best research project by a final year student in the Bachelor of Engineering (Naval Architecture) — Mark Hughes



Mark Hughes receiving the RINA prize from Australian Division President Rob Gehling
(Photo courtesy AMC)

RINA/Austal Ships Systems Prize: Best achievement in design related subjects (Year 2) — Tristan Andrewartha

Baird Publications Prize: Best Mark in Ocean Vehicle Design in the Bachelor of Engineering (Naval Architecture) course — Oliver Mills and Kay Myers

The Rob Lewis Prize: Excellence in Post-Graduate Research — David Clarke, *Viscous Flow about Underwater Bodies*

The motivation for this latter project relates to the hydrodynamic design of remotely-operated underwater vehicles (ROVs) currently used for mine disposal and being investigated for force multiplication with submarines. They are typically low-aspect-ratio bluff bodies operated at a range of Reynolds numbers and incidences for which a range of flow regimes are possible. These include attached and separated flows ranging from sub- to super-critical at low and high incidence. The objectives of this project are experimental investigation of the flows described as well as the gathering of experimental data sets for comparison with computational fluid dynamics (CFD) results. Two physical models, an ellipsoid and a spheroid, have been developed for sting mounting in the cavitation tunnel and include instrumentation for measurement of surface-flow properties. The models have also been developed for sting mounting on a 6-component force balance or for force measurement with an internal 6-component force balance. Studies of on- and off-body flow phenomena are being carried out using a range of physical probes and an automated 3-component traverse system.

AMC Council Award for High Achievement in Teaching: Dr Dev Ranmuthugala

Dr Dev Ranmuthugala is recognized as an outstanding and innovative teacher who carries out his responsibilities with energy and enthusiasm. He is committed to continuous improvement in pedagogy, care for his students and academic leadership.

With experience in teaching in both the Vocational Education and Training and Higher Education sectors, he adapts his delivery methods and strategies according to the course levels, student background and class size. He promotes student-centred learning, developing tasks and projects to motivate students to seek solutions to engineering problems while, at the same time, ensuring an understanding of the underlying theories and development of the required skills.

Dev was one of the pioneers of competency-based training at AMC, designing and implementing a number of courses to meet the requirements of specific client groups.

One of his achievements was the development of methods for assessing current competencies and prior learning to enable existing seafarers to upgrade their qualifications. He played a key role in the redevelopment of the suite of engineering degrees in line with industry and academic requirements and has been involved in a number of audits for the professional accreditation of a range of courses. His activity in research, dealing with topics such as vibration analysis, and underwater vehicles and cables, facilitates the incorporation of current knowledge into his teaching and validates his role in the supervision of a number of research students.

Dev consistently receives high scores in the student evaluation of teaching and learning. He is a mentor to both students and other academic staff and has facilitated the communication of feedback from students to the Course Committee.

AMC Council Award for High Achievement in Research: Dr Paul Brandner

Dr Paul Brandner has made a significant contribution to research activity at the Australian Maritime College, through his own research in the areas of hydrodynamics, cavitation, two-phase flows and viscous flows, extensive publications and the supervision of doctoral students and research projects conducted within the cavitation tunnel.

Paul has been instrumental in the development of AMC research collaborations with several organizations, including the University of Tasmania, the Defence Science and Technology Organisation (DSTO) and the University of Cambridge (UK).

Since 1996, Dr Brandner has been Manager of the Tom Fink Cavitation Tunnel. This position has entailed a key involvement in the development and commissioning of the cavitation tunnel facility, marketing and promotion of the facility, formulation of research effort, acquisition of grant funding and the development of collaborative postgraduate and commercial research and development programs. The current upgrade of the tunnel has necessitated the sourcing of expertise in hydraulic design and technology from Europe and the United States, facilitated by Paul's knowledge of the specialist expertise required.

Dr Brandner is a member of the Institution of Engineers (Australia) and the Royal Institution of Naval Architects, and has been the recipient of a number of prestigious research awards from these institutions and the Australian Maritime Hydrodynamics Research Centre.

Professor Tom Hardy joins AMC as New Vice-President

In mid-March 2005, Professor Tom Hardy joined AMC as its new Vice-President (Academic and Research). Professor Hardy joins AMC from James Cook University, where he held the positions of Associate Dean, School of Engineering, and Director of the Marine Modelling Unit. Professor Hardy is recognised as an international expert in tropical cyclone wind, wave and storm-tide modelling. He plans to remain active in this field of research, partly by relocating the Marine Modelling Unit to AMC in the coming months.

Prof. Hardy recently made a presentation at AMC on the generation of 100 000 years of winds and waves during tropical cyclones for the design of offshore oil production platforms. Also discussed in this presentation were other diverse Marine Modelling Unit activities, such as modelling currents and waves in shipping channels, modelling movements of dredge disposal, determining storm-tide water-level frequencies as well as simulating movements of coral trout larvae.

AMC/RINA Seminar Series — Semester 1 2005

The AMC/RINA Engineering Seminar Series provides a presentation every Thursday (between 12 noon and 1 pm) during academic semesters. Seminars delivered during the first semester of 2005 have included:

Martin Kopke, Intern student from University of Rostock, Germany, *Parametric Rolling in Head Seas*

Roberto Ojeda, PhD student, *Finite Element Analysis of Composite Structures*

Trevor Blakeley, CEO RINA, *The Royal Institution of Naval Architects*

James Clarkson, BE (Naval Architecture) student, *An Introduction to Automating Processes in Maxsurf*

Professor Tom Hardy, AMC Vice President (Academic and Research), *Generating 100 000 Years of Winds and Waves during Tropical Cyclones for Design of Offshore Oil Production Platforms, and other Marine Modelling Unit activities*

Dr Paul Brandner, Manager, Tom Fink Cavitation Tunnel, *Hydrodynamics of Surfboard Fins*

Tim Hopkins, Senior Engineer, Esso, *Design and Installation aspects of the Kazumba Project on the West African Coast*

Bryce Pearce, PhD student, *Numerical Analysis of 2D Super-cavitating Foils*

Dr Laurie Goldsworthy, Senior Lecturer and Research Leader (Marine Engines), *CFD Modelling of Heavy Fuel Oil Combustion*

Jonathan Duffy, AMC Research Engineer and PhD student, *Simulation of the Interaction Between a Ship and Lateral Banks*

Naval Architecture Degree — Industry Liaison Committee

The Bachelor of Engineering (Naval Architecture) degree course team held one of its regular Industry Liaison Committee (ILC) meetings at AMC on 28 and 29 April to conduct a thorough review of the course content. The industry representatives, all of whom provided excellent input throughout the meeting, included Mr Noel Riley (Commercial Marine Design, NSW), Mr Ray Duggan (Department of Defence, ACT), Mr Derek Gill (Austal Ships, WA), Dr Yuriy Drobyshevski (AMOG Consulting, WA), Mr Gordon MacDonald (BMT SeaTech Australia, Vic) and Mr Steve Quigley (North West Bay Ships, NSW/Tas). The AMC would like to express its appreciation to all ILC participants for their contributions, but to also make special mention of Noel Riley, who's "4-year" term on the Committee (which actually started in 1990 and has continued for some 15 years!) unfortunately came to an end at the conclusion of this meeting. AMC are very keen for Noel to continue to be involved in the naval architecture degree in the future in some capacity.

Vale Roy Horne

It is with sadness that the AMC records the passing of Mr Roy Horne on 24 February 2005, age 69. Roy commenced employment with the Australian Maritime College as a Technical Officer in October 1981, having recently arrived in Launceston from the United Kingdom, after a short stay in Sydney. In 1983, Roy was given the opportunity to assist Dr Martin Renilson with the commissioning of the AMC towing tank. For the next 12 years, Roy played a major part in the development of test rigs for almost every student and researcher using the facility between 1983 until his retirement in April 1996. Immediately following his retirement, Roy and his wife Pauline, returned to live in Kettering, Northants, in the United Kingdom to be closer to their family. Those who had any association with the AMC towing tank during these years are likely to have fond memories of Roy and his

great ability to keep the tank operating very smoothly. Right from the early years of the tank it was one of Roy's jobs to assign an identification number to all new ship models. These numbers became, and still are, affectionately known as the 'Roy Number' — a tradition that is sure to continue.

Gregor Macfarlane

National Maritime Safety Conference — Hobart 12 and 13 April

Organised by the National Marine Safety Committee (NMSC), the conference was themed *Safety is a State of Mind*. The conference was attended by representatives from all major maritime sectors, including naval architects, shipbuilders, ferry operators, recreational boating bodies, professional fishermen, port authorities, regulators and educational institutions

Some of the topics that were covered in the two-day conference included fast craft and their impact on safety standards, management of fatigue in smaller vessels, the impact of automation on safety at sea, effects of the megayacht industry on the Australian economy and port security. A number of delegates from AMC attended and presented papers at the conference.

Ship Hydrodynamics Centre (Towing Tank Upgrade)

With construction nearly complete, the staff at the Ship Hydrodynamic Centre are looking forward to taking possession of the 'new' towing tank as this edition of *The ANA* goes to press. The official handover date is set for 13 May 2005, with a commissioning and validation period of approximately three weeks to follow. After that, it should be business as usual with a heavy list of bookings over the following two to three months.

Apart from a six-week delay in the commencement of building works, the project should be completed on schedule and on budget. Building works will continue on the ground and first floor of the extension to the Swanson Building, with an expected completion of the entire project around August 2005.

The tank has been extended in length from 60 m to 100 m, doubling the effective test length. Major modifications have been made to the testing carriage including structural stiffening and vibration reduction. Along with the structural changes, there has been an upgrade to data acquisition system, dynamometry equipment, new workshops and offices. For photos showing the progress on the tank upgrade visit www.amc.edu.au/facilities/towing.tank/upgrade/ and for booking information contact Gregor Macfarlane on (03) 6335 4880 or at g.macfarlane@amc.edu.au.

Stuart McDonnell

RINA CEO Visit to AMC

As part of his Australian tour in March, Trevor Blakeley, Chief Executive of RINA, visited the Australian Maritime College. He met with the Tasmanian Section Committee to discuss a range of issues including membership, RINA's relationship with EA, course accreditation and the graduate mentoring system. Trevor also discussed issues of RINA accreditation with representatives of the Bachelor of Engineering program, along with Rob Gehling, President of the Australian Division of RINA. In addition, Trevor gave a presentation to BE students outlining what RINA does and what it can do for student members. The presentation was followed by a lunch attended by local members of the Tasmanian Section.

Martin Kopke Internship

Martin Koepke from the University of Rostock completed a 5-month internship at the Australian Maritime College from October 2004 to February 2005, under the supervision of Dr Giles Thomas. During his time at the college he worked on two main projects: a pilot study to optimise grillage structures of high-speed aluminium catamaran ferries using finite element analysis and an investigation into parametric roll in head seas for AMSA. In addition, he assisted with the upgrade of the AMC towing tank including investigating a new velocity-measurement system for the towing carriage.

Jon Binns Update

Jonathan Binns has submitted his PhD on the re-righting of yachts. He has recently taken up a position with BMW Oracle Racing in their design team.

Ocean Vehicle Design Projects 2005

The final year BE (Naval Architecture) subject Ocean Vehicle Design is again benefiting from the provision of design briefs from industry representatives. The briefs include a fast crew boat from Austal Ships, a Great Barrier Reef day-trip vessel from North West Bay Ships, a landing craft mechanised from the Department of Defence, and a 12.2 m racing yacht from Murray, Burns and Dovell. The industry "clients" have also provided significant and beneficial feedback on the students' designs as they progress.

In addition, external lecturers have presented students with valuable insights into the design process. These lectures have included:

- Robin Gehling (Principal Adviser — Technical, AMSA) on *Stability in Ship Design*.
- Alan Muir (Consultant Naval Architect) on *Hull Form Development*.
- Michael Seward (Chief Naval Architect, Seward Maritime) on *Design Processes*.

Giles Thomas

The University of New South Wales

Undergraduate News

Visit by RINA Chief Executive

The RINA Chief Executive, Trevor Blakeley, attended The University of New South Wales on Tuesday 14 March, and made a lunch-time presentation to the naval architecture students on the operations and functions of RINA, and the particular benefits of being a student member of RINA.

Student/Staff Get-together

The naval architecture students and staff held a get-together on Tuesday 14 March. This was to enable the students in early years to meet and get to know the students in later years and post-graduate students and the staff on a social level, and to discuss the naval architecture plan and matters

of mutual interest. The RINA Chief Executive, Trevor Blakeley, was also present to chat informally to the students. Pizza, chicken, beers and soft-drink were provided and, after a slow start, conversation was flowing pretty freely an hour later! This year we have fifty-two undergraduate students, more than ever before, and many of whom attended along with four staff and the Head of School, Professor Hartmut Kaebernick (who is an honorary naval architect). A broad mix, and some wide-ranging discussions ensued. The stayers were still avidly discussing two hours later, and putting the blackboard to good use.

Graduation

At the graduation ceremony on 29 April, the following graduated with degrees in naval architecture:

Sean Cribb	H1
Mervyn Lepper	H2/2
Felix Scott	H1

H1 = Honours Class 1
H2/2 = Honours Class 2, Division 1

At the prize-giving ceremony on the same day, the following prizes were awarded in naval architecture:

The Baird Publications Prize 1 for the best performance in Ship Hydromechanics A to Craig Singleton.

The Baird Publications Prize 2 for the best performance in Ship Structures 1 to Craig Singleton.

The Royal Institution of Naval Architects (Australian Division) Prize for the best ship design project by a student in the final year to Ruth Jago for her design of a high-speed monohull ferry carrying up to 286 passengers plus six (three marine and three cabin) crew on short international voyages of about 120 n miles.

The David Carment Memorial Prize and Medal for the best overall performance by a student in the final year of naval architecture to Felix Scott.

Congratulations to all on their fine performances.

Our 2005 graduates are now employed as follows:

Sean Cribb	ADI Limited, Garden Island, Sydney
Mervyn Lepper	Shipping company, Suva, Fiji
Felix Scott	Auckland, New Zealand

Post-graduate and Other News

Graduation

At the graduation ceremony on 29 April, there were two admissions to higher degrees in naval architecture:

Michael Andrewartha was awarded his Doctor of Philosophy (PhD) degree for his dissertation on *Application of Hydrofoils to Improve the Performance of High-speed Catamarans.*

Shinsuke Matsubara was awarded his Master of Engineering (ME) degree for his dissertation on *A Study of the Desingularised Boundary-element Method and Viscous Roll Damping.*

Congratulations Michael and Shinsuke.

Continuing Research in Ship Hydrodynamics at UNSW

Prof. Lawry Doctors officially retired from teaching Naval Architecture at UNSW in February 2005, but continues to be active in the field of ship hydrodynamics. He currently holds a Visiting Professorship at UNSW.

Ruth Jago collecting the RINA (Australian Division) Prize
(Photo courtesy Don Kelly)

Shinsuke Matsubara, Phil Helmore and Michael Andrewartha
UNSW Graduation Ceremony on 29 April
(Photo courtesy Catherine San)

He is implementing a number of changes to his computer software for the evaluation of the hydrodynamic behaviour of marine vessels, in the area of ship resistance, wave generation, and ship motions. Recent changes to his software include an improved modelling of the flow past the transom stern at low speeds when the transom is only partly ventilated. An additional major upgrade is the ability to include the influence of pressure patches on the water surface (as well as the usual demihulls of a catamaran). In this way, a very accurate modelling of the hydrodynamics of a surface-effect ship (SES) has been achieved. As a result, further light has now been shed on why the total drag of an SES can be considerably less than that of the equivalent catamaran. His software can also be employed to effect an optimization of an SES

design.

The results of this work are to be published in three papers to be presented at the Eighth International Conference on Fast Sea Transportation (FAST '05) in Saint Petersburg, Russia, during June 2005. A number of collaborators from Australia and overseas have participated with Lawry in this research.

During his recent trip overseas, Lawry gave extended presentations of his work on the Hydrodynamics of High-Speed Marine Vessels to the Department of Naval Architecture and Marine Engineering at the University of Michigan, in Ann Arbor, Michigan on 23 March, and to the Center for Innovation and Ship Design, Naval Surface Warfare Center, in Bethesda, Maryland on 28 March. In these two talks, he also discussed recent achievements of the

Australian high-speed ferry design and construction industry, which he illustrated with slides of these vessels.

Vice-Chancellor's Awards for Teaching Excellence

At the graduation ceremony on 29 April, A/Prof. Robin Ford and Dr Tracie Barber, of the School of Mechanical and Manufacturing Engineering, were presented with Vice-Chancellor's Awards for Teaching Excellence 2004, in recognition of their outstanding contribution to education.

Dedicated, effective and enthusiastic teachers, their influence has been acclaimed by both staff and students. Their inventive teamwork in contextual teaching (including Labweek for first-year students has enlivened and enlightened the education of students in the School, and demonstrated their commitment to improving the School's teaching and learning performance. Developed as a response to previously-unmet student expectations for practical experience, Labweek encourages students to gain an early grasp of engineering concepts and to inspire them to become self-reliant, knowledgeable and dedicated engineers. The team are enthusiastic and demonstrate great commitment to creating a practical, effective and enjoyable learning environment for students that is professional and effective, novel and fun.

Congratulations Tracie and Robin!

With Tracie having recently begun teaching hydrodynamics to the naval architecture students, and Robin Ford being an honorary naval architect (due to his commitment to sailing and naval architecture in general) three of the naval architecture staff now have Vice-Chancellor's Awards for Teaching Excellence; a standard for other programs to aim for.

Phil Helmore
Lawry Doctors

Robin Ford and Tracie Barber with their Vice-Chancellor's Awards for Teaching Excellence (Photo Phil Helmore)

THE INTERNET

Nabla

A naval architecture student recently queried the origin of the symbol nabla, ∇, which naval architects use universally for the immersed volume of a ship. This looks like an upside-down capital Greek letter delta, Δ. Mathematicians call this the Hamiltonian operator, "del" or, less commonly, "atled" ("delta" spelled backwards) and use it to express the gradient, divergence, or curl of a vector field, or as ∇^2 (the Laplacian operator).

A quick search of the web using Dogpile found a number of interesting possibilities, the same question having been asked by Arnold Neumaier on his website http://solon.cma.univie.ac.at/~neum. The most definitive answer seems to be that the term was introduced by William Rowan Hamilton (1805–1865) in 1853 in *Lectures on Quaternions*, according to Cajori, F., *A History of Mathematical Notations*, vol. 2, page 135. It is likely that the name derives from the Aramaic and Greek words "nabla" for a harp, the symbol having that shape.

For further details of the discussion, visit www.csc.fi/math_topics/mail/nanet98-1/msg00048.html.

Phil Helmore

Conversion Factors

If you want to convert measurements in one set of units to measurements in another set of units then AS 1376 *Conversion Factors* is a handy reference. However, if you don't like having to do the sums yourself, then there is a shareware program which can take a lot of the pain out of the conversion process.

Master Converter is a program for conversion of measurements, going either way. The types of units include length, pressure, kinematic viscosity, specific heat, temperature, speed, etc. (there are thirty-four in total). For length the choices include metres, feet, angstroms, poles, points, perches, fathoms, etc. (there are forty-three in total) which can be converted either way — at the click of a mouse button. For example, typing in 23.7 km gives the result 12.79697624 nautical miles (clearly indicating International nautical miles of 1852 metres rather than Imperial nautical miles of 6080 feet). If you want the conversion factor between the two units, then simply type in 1.

You can download a thirty-day trial copy of the shareware program from the website www.savardsoftware.com/masterconverter/download.asp.

Graham Taylor

New Germanischer Lloyd Rules via the Internet

Offering comprehensive information and communication solutions has become indispensable: "use it or lose it". For the shipping companies who also provide their products and services through the Internet or make use of such offers themselves, significant potentials for savings have been opened up. According to experts, the transaction costs alone can be reduced by 50 to 70 percent. And so to say that e-business is currently an important topic for international shipping would be an understatement. It is *the* topic. Although Internet-based services were only offered by a few trailblazers for many years, the number of providers of maritime e-commerce services has practically exploded in the last few years.

In ship classification too, the Internet and modern communication techniques are now playing a significant role. With an eye to the future, Germanischer Lloyd is extending its package of electronic services round the world and offers also all new and updated Rules via the Internet. New GL rules came into force on 1 October 2003 and can be seen and downloaded via www.gl-group.com/.

Georgios Spiliotis

THE PROFESSION

New Safety Standards for Australian Marine Industry

Major new standards for Australian recreational and commercial vessels have been adopted by the National Marine Safety Committee, with many of the new standards set to be enshrined in law.

The new standards follow a significant consultative period with stakeholders, ranging from boat and ship designers and builders to operators and industries associated with the Australian marine sector. They were launched at the National Marine Safety 2005 Conference in Hobart in April.

The new commercial vessel standards cover:

- Fire safety
- Onboard safety equipment
- Medical equipment required to be carried on board
- Operational practices such as navigation and training for emergencies at sea

In addition, the recreational standards include an agreed NMSC requirement for the Australian Builders Plate, which all new boats will soon be required to carry.

"The standards mark a major advancement in saving lives and reducing injuries around the Australian coast, in an industry where many accidents occur weekly," said Maurene Horder, Chief Executive of the NMSC. "The new standards will in some cases become law, and in other cases will represent the expert opinion of the NMSC as voluntary guidelines for the industry to follow." She said that the standards were an evolving process which were designed to meet the changes occurring in the Australian maritime industry. "This is a dynamic industry where technology and design are playing a major part in the development of the industry, so that standards must be under continual review to ensure that we meet best practice and the safest outcomes for people in the industry."The standards have been produced in CD form, one for the recreational industry and the other for the commercial industry. They are available through the NMSC for $14 each.

For further information please contact: Maurene Horder (CEO, NMSC) on (0418) 655 203; Stuart Bridges on (0416) 122 098; or Ursula Bishop on (0412) 813 056.

Ursula Bishop

Standard Values of Passenger Mass

The standard values of passenger mass used in the USL Code are 65 kg for sheltered-water operations, or 75 kg for any offshore operations, and in the HSC Code is 75 kg.

However, *Safety Recommendation M-04-04* was published by the US National Transportation Safety Board on 4 December 2004 following the capsize of the 11.0 m enclosed pontoon water taxi, *Lady D*, in Maryland. This cast doubt on the validity of 1960s mass data for passengers. The investigation following the capsize found that the vessel had been certificated for 25 persons at 140 lbs (63.5 kg) each (the requirement when the rule was written in 1960), for a total of 3500 lbs (1588 kg). However, the actual mass of the 25 passengers on board was calculated to be 4200 lbs (1905 kg), or an average of 168.4 lbs (76.4 kg). The vessel was therefore overloaded by 700 lbs (317.5 kg).

Further investigations showed that average US adult weights have increased by nearly 25 lbs (11.3 kg) in the last 40 years. The US Federal Aviation Authority, as a result of an air disaster in 2004, updated its operator weight and balance guidance by increasing the average adult passenger weight from 160 lbs (72.6 kg) to 174 lbs (78.9 kg), based on summer clothing and the assumption that 50 percent of passengers are male and 50 percent female.

The full NTSB Safety Recommendation is available on their website, www.ntsb.gov/surface/marine/marine.htm.

The latest figures on masses of Australian adults appear to be those given in the Australian Bureau of Statistics' Publication 4359.0, *How Australians Measure Up*, Canberra (1995). Measured masses are given for people aged 18 and over, and the overall averages are 82 kg for males and 67 kg for females, with separate breakdowns by age groups. No figures are given for children. The report is available for download from www.abs.gov.au/ausstats/abs@.nsf/9cfdfe271b7930bbca25688b5007b8618/7bb16992d6427c93ca256889001f4a36!opendocument, or in hard copy at your handy UNSW Library.

The masses of Australian adults and children may not have increased as much as those of their USA counterparts. However, with the USL Code being updated into the National Standard for Commercial Vessels, this may be a good time to update the standard values of passenger mass.

Phil Helmore

INDUSTRY NEWS

Wärtsilä Dual-fuel Engines for LNG carriers

In April Wärtsilä received a major order to supply twenty-four Wärtsilä 50DF dual-fuel engines to Samsung Heavy Industries Co Ltd of Korea. These engines will power a series of six 155 000 m^3 dual-fuel-electric LNG carriers. Four of these ships were ordered by A.P. Møller of Denmark, while Kawasaki Kisen Kaisha Ltd ("K" Line) of Japan ordered the other two. The delivery of the first ship of this series is scheduled for early 2008. Each ship will be equipped with three twelve-cylinder and one six-cylinder Wärtsilä 50DF dual-fuel engines, delivering a total power of 39.9 MW. The delivery of these engines from Wärtsilä's engine factory in Trieste, Italy, will commence in January 2007.

The dual-fuel-electric machinery concept for LNG carriers combines multiple dual-fuel generating sets with electric propulsion and offers a significant improvement compared to the traditional steam turbine installation in terms of operating economy, exhaust gas emissions and redundancy. At the same time, it keeps aspects like safety, reliability and maintainability at an appropriate level. Crewing of dual-fuel-

electric LNG carriers is not problematic either.

Fifty-two Wärtsilä 50DF dual-fuel engines have so far been ordered for application in thirteen dual-fuel-electric LNG carriers. In December last year, Wärtsilä received an order from Alstom Chantiers de l'Atlantique of France to supply three twelve-cylinder and one six-cylinder Wärtsilä 50DF dual-fuel engines for the 154 000 m^3 dual-fuel-electric LNG carrier *Gaselys*, which was ordered earlier that year by Nippon Yusen Kaisha (NYK Line) of Japan and Gaz de France. Wärtsilä received an order from Hyundai Heavy Industries Co Ltd of Korea in November last year to supply eight twelve-cylinder and eight nine-cylinder Wärtsilä 50DF dual-fuel engines for a series of four 155 000 m^3 dual-fuel-electric LNG carriers. These ships were ordered earlier that year by BP Shipping of the UK.

In December 2003, Wärtsilä received an order from Alstom Chantiers de l'Atlantique to supply three twelve-cylinder and one six-cylinder Wärtsilä 50DF dual-fuel engines for the 154 000 m^3 dual-fuel-electric LNG carrier *Provalys*, which was ordered earlier that year by Gaz de France. In April 2002, Wärtsilä received an order from Alstom Chantiers de l'Atlantique to supply four six-cylinder Wärtsilä 50DF dual-fuel engines for the 75 000 m^3 dual-fuel-electric LNG carrier *Gaz de France Energy*.

In addition to these thirteen dual-fuel-electric LNG carriers, Wärtsilä dual-fuel engines have been selected for FPSOs, dual-fuel-electric offshore supply vessels, as well as a large number of onshore power plants.

Wärtsilä Propulsion Package for Ulstein AHTS

In March Wärtsilä Corporation received a major contract from Ulstein Verft AS in Norway for a package of generating sets, thrusters, control system and seals for an anchor-handling towing supply (AHTS) vessel ordered by Bourbon Offshore Norway AS, a subsidiary of the French marine service company Groupe Bourbon.

Due for delivery in May 2006, the new AHTS vessel is of the distinctive Ulstein AX104 design from Ulstein Design AS, with an inverted bow intended to eliminate slamming and allow higher speeds in all sea conditions.

The vessel will be one of the world's first AHTS vessels with diesel-electric propulsion. It also has innovation in safety, being equipped with a newly-developed system for safer anchor handling. It has a DP2 dynamic positioning system. Measuring 83.6 m long by 18.5 m beam, the vessel is capable of a speed of 17.5 kn. The vessel's minimum bollard pull is 180 t.

It will be equipped with six Wärtsilä generating sets having a combined electrical output of 14 850 kWe. Four of the generating sets are driven by six-cylinder Wärtsilä 32 engines and two by nine-cylinder Wärtsilä 20 engines. These will supply a propulsion and manoeuvring system comprising two Lips CS3500/3500WN main steerable thrusters, a Lips CS250-250/MNR retractable bow steerable thruster and a Lips CT250M-D bow tunnel thruster. The main steerable thrusters, each with a power of 5 000 kW, will have controllable-pitch (CP) propellers of 3.6 m diameter running in Lips HR nozzles. The 1800 kW bow steerable thruster will be equipped with a 2.4 m-diameter CP propeller, while the 1200 kW bow tunnel thruster will have a 2.5 m-diameter CP propeller. The four thrusters will be fitted with JMT MkII Unnet shaft seals. The thrusters will all be controlled through a Lipstronic/T control system which provides both joystick control for manoeuvring and full dynamic positioning.

Bourbon Offshore Norway is a fully-integrated offshore supply company and is located in Fosnavaag on Norway's west coast. The company currently operates a fleet of 16 vessels, including six anchor handling towing supply vessels, seven platform supply vessels , two multi-purpose supply vessels and a cable-laying vessel. When the new Ulstein AX104 anchor handling towing supply vessel joins the fleet, it will operate in the North Sea.

This new anchor-handling tug supply vessel of Ulstein AX104 design will be equipped with generating sets, tunnel thruster, steerable thrusters, control system and seals from Wärtsilä Corporation
(Image courtesy Wärtsilä)

Wärtsilä Power for Yacht-Carrying Pioneer

Wärtsilä Corporation has been awarded an order to supply the 19.7 MW power plant for a yacht carrier contracted by the heavy transport specialist Dockwise Shipping BV, based in Breda in the Netherlands.

The yacht carrier has been ordered from Yantai Raffles Shipyard in China with delivery due in autumn 2006. Its dimensions are: 205.34 m length overall, 32.2 m beam and operational draught of 5.80 m. The cargoes of yachts will be loaded by floating them over the deck, which measures 165 m long by 31 m wide, while the vessel is ballasted down. To protect the yachts, the cargo deck is equipped with high side walls.

This vessel is the first to be designed and built for carrying luxury yachts. Dockwise has built up the yacht transport business since 1987 and owns four converted semi-submersible vessels dedicated to this business. The new vessel will be employed in carrying yachts primarily across the North Atlantic with monthly sailings between Florida/ Caribbean and the Mediterranean. The vessel will have a service speed of 18 kn. This will reduce the current transatlantic transit time of fifteen days to eight days.

The new yacht carrier will be equipped with a 19 680 kW diesel-electric plant for propulsion, ancillary electrical power, and all shipboard electrical services. The plant will be powered by two Wärtsilä 12V38B main diesel generating sets, two Wärtsilä 6L20 auxiliary generating sets, and a 300 kWe emergency/harbour generating set. The generating sets will supply twin Lips CS3500 pull thrusters for propulsion.

Manoeuvrability will be enhanced by a 1.64 MW Lips CT225 transverse bow thruster. The two 5.1 MW azimuthing pull thrusters will each be equipped with a 4.0 m diameter Lips skewed, pulling, controllable-pitch propeller and Sternguard MK2M shaft seals.

This is one of the first vessels to be equipped with Lips pull thrusters. The propeller is arranged ahead of the pod to achieve the best overall hydrodynamic efficiency and steering at high ship speeds.

The Wärtsilä main and auxiliary engines will incorporate common-rail fuel injection. This has the primary benefit of no visible smoke emissions under any operating conditions. Common rail, with its integrated electronic control, allows the fuel injection pressure to be maintained high at all engine loads and speeds thereby ensuring efficient, clean combustion right across the engine's operating range.

The complete power plant will be delivered by a consortium formed by Wärtsilä and the Dutch company Imtech NV, a specialist in electrical installations and integrated bridge systems. The consortium is responsible for the initial design of the power plant: the supply of the complete generating sets, thrusters, all ancillary systems, electrical switchboards, and the integrated bridge system, including controls for the whole power plant. Furthermore, Imtech delivers the components and controls for the ballast system.

The choice and design of the power plant has certain beneficial features that well suit the ship's trade. For example, the choice of a diesel-electric plant gives flexibility in matching engines in operation to the service speed for good operating economy, while also providing for the high ballast-pumping capacity required when loading and unloading the ship. In addition, the combination of a diesel-electric plant, azimuthing main thrusters and the transverse bow thruster provides good manoeuvrability when approaching and leaving the yacht loading and unloading points. Additionally the common-rail engines reduce smoke to zero. This is a mandatory requirement for transporting luxury yachts.

The yacht-carrying dock ship of Dockwise Shipping BV will be equipped with a Wärtsilä diesel-electric power plant
(Image courtesy Wärtsilä)

Seastate — Looking to the Future

Seastate is a renowned supplier of complete motion-control solutions to luxury yachts, high-speed ferries, military and para-military markets. When it comes to motion control, Seastate offers operators and shipyards operability and simulation studies, product supply, installation, commissioning and after-sales operational and maintenance support. This makes Seastate a one-stop shop for all your motion control requirements.

Now, as a wholly-owned subsidiary of Austal, Seastate will join with the Austal team to form a resource with a vast knowledge of vessel design and operation that will push the boundaries of motion-control development into the future.

For new ships, Seastate offers operability studies and simulations enabling operators to access the suitability of the vessel with or without motion control on a particular route. Where vessels are currently in operation, and passengers and crew comfort levels are unsatisfactory, studies can be undertaken to estimate the amount of improvement that can be obtained by using different types of motion-control systems. This ensures that the installation of a motion-control system will meet the operators' requirements and, most importantly, the passengers' expectations.

Once a motion-control system has been selected for a particular vessel, Seastate is able to provide all the components direct to the shipyard for them to install, or Seastate can be contracted to complete this work. Following installation, Seastate can conduct suitable harbour trials and then sea trials to ensure that the system is operating at its optimal performance. Finally, Seastate can provide all the operational and maintenance support through the life of the system.

MEMBERSHIP NOTES

Australian Division Council Meeting

The Australian Division Council met on 8 March, with teleconference links to all members and the President, Robin Gehling, in the chair. Matters, other than routine, which were discussed included:

- The Walter Atkinson Award: Council is presently conducting a review of the conditions and the future of the award, and should finalise their deliberations at the next meeting of Council.
- Course in Offshore Engineering and Naval Architecture: The University of Western Australia has recently introduced this course and the President has been in contact with the university concerning the matter of accreditation and offering the assistance of the Institution should it be required. This matter will continue to be monitored by Council. Mr Hutchison, a member of Council, has collated information on courses in naval architecture available in Australia and this information will be made available to those members of Council appointed by Sections of the Division for the information of members of Sections.
- Membership of the Division: Council was informed the membership stood at about 590, including some 125 student members at the Australian Maritime College.
- RINA Council Meeting in London: RINA Council met in London on 19 January 2005. The meeting was informed by the Chief Executive that a Joint Branch was proposed in Poland and discussions were taking place with Indian naval architects on the possible formation of a Division of the Institution in India.
- Retiring Members of the Australian Division Council: The President expressed his thanks to those members making their final contribution, at least for the present, on Council. He thanked Mr Warren especially for his role with the Division's website, and Mr Seward for his work with the Safety Committee.

The next meeting of the Australian Division Council is scheduled for June 2005.

Australian Division Annual General Meeting

The Australian Division of RINA held its AGM on the evening of 8 March in the Harricks Auditorium at Engineers Australia, Milsons Point, attended by thirteen with the President, Rob Gehling, in the chair.

Rob, in his President's Report, touched on some of the highlights of 2004, which were enumerated in his President's column in the February issue of *The ANA*.

Allan Soars, in his Treasurer's Report, outlined the main areas of expenditure and highlighted the fact that the Division's finances were healthy and that we had operated within the black for 2004.

The Secretary, Keith Adams, announced that this is an election year and that the following members had recently been elected to the Australian Division Council: Messrs J.M. Black, Mr W. Bundschuh, Mr P.R. Crosby, Mr J.C. Jeremy, Mr M.B. Smallwood and Mr G.R. Taylor. These members will serve for a two-year term from the conclusion of the AGM.

As a result, the composition of the Australian Division Council is now as follows:

President:	Mr R.C. Gehling
Immediate Past President	Mr B.V. Chapman
Vice-President	Dr S. Cannon
Elected Members of Council	
	Mr J.M. Black
	Mr W. Bundschuh
	Mr P.R. Crosby
	Mr J.C. Jeremy
	Mr M.B. Smallwood
	Mr G.R. Taylor
Members Appointed by Sections	
	Dr S. Cannon (Vic.)
	Mr M.J. Williams (NSW)
	Mr B.R.G. Hutchison (Qld)
	Mr G. MacFarlane (Tas.)
	Mr S. Ritson (WA)
	Mr N.P.Whyatt (ACT)
Secretary	Mr K.M. Adams
Treasurer	Mr A.J. Soars

Keith Adams
Secretary

NAVAL ARCHITECTS ON THE MOVE

The recent moves of which we are aware are as follows:

Michael Andrewartha has graduated from The University of New South Wales with his PhD degree for his dissertation on *Application of Hydrofoils to Improve the Performance of High-speed Catamarans*. He continues in his position as a naval architect with North West Bay Ships in Sydney, and has also taken over the teaching of the hydrodynamics component of the course in Design of High-speed Craft at UNSW.

Jonathan Binns has submitted his PhD dissertation on *The Self-righting Capability of Yachts* to the Australian Maritime College, and has taken up a position with Larry Ellison's *Oracle* America's Cup team in Annapolis, Maryland, USA.

Richard Caldwell has retired from the Directorate of Navy Platform Systems in Canberra, after a lifetime of service to the Department of Defence. His farewell barbecue was held in August last year, and he has been burning up accumulated leave since then and retired officially in March. Richard will be content to improve his golf handicap, and get better at lawn bowls, something he took up in more recent times. In the longer term, he and his wife may also do some travelling.

Matthew Cleary submitted the dissertation for his PhD degree

at the University of Sydney in December 2004 on *CMC Modelling of Enclosure Fires*. CMC is the acronym for Conditional Moment Closure, which is a method for modelling turbulent flames and his research looked at the production of carbon monoxide in enclosure fires. He and his wife headed off to London in March, where Matthew has now taken up a post-doctoral position at Imperial College and will be researching in the field of turbulent combustion. He says that they are looking forward to the change of scenery, but not to the weather!

Sean Cribb, a recent graduate of The University of New South Wales, has taken up a position as a naval architect with ADI Limited at Garden Island, Sydney, working on the FFG upgrade project.

Glen Green moved on from his posting as Marine Engineer on HMAS *Arunta* in January 2004, and spent the next year completing the Australian Command and Staff Course in Canberra. He was then selected for a two-year exchange position at HMS *Sultan*, the Royal Navy's School of Marine Engineering in Gosport, UK, and has moved there for the duration with his wife. Glenn says that it will be a challenging job as, early next year, the RN is transitioning its technical training to a technician-based approach in lieu of the current apprenticeship/trade-based scheme that has served the RN well for many years. Things are also starting to ramp up in preparation for commencing training of the technical sailors for the RN's new Type 45 air-warfare destroyer.

Peter Holmes, having returned to Australia from the UK where jobs in naval architecture are pretty thin on the ground at the moment, has taken up a position as the naval architect for Perry Catamarans at Coomera, Qld. This is a relatively small company, but has recently hired more technical staff with the intention of expanding production over the next few years.

Mervyn Lepper, a recent graduate of The University of New South Wales, has taken up a position in Suilven Shipping Ltd which is owned and run by his father, in Suva, Fiji. He is also teaching part-time at the Fiji Maritime School in Suva.

Kate Linley has been promoted within the Australian Maritime Safety Authority in Canberra, and has taken up the position of Principal Adviser — Cargoes, within the Marine Standards team. She continues in her role of Secretary of the ACT Section of RINA.

Gordon MacDonald has moved on from Australian Marine and Offshore Group and has taken up a position as Director Technical and Operations at BMT Defence Services (Australia) Pty Ltd in Melbourne.

Bruce McNeice has moved on from the Navy Systems Branch of the Department of Defence in Canberra and has taken up a position as the Australian Navy Liaison Officer with the Ministry of Defence in Bristol, UK.

Shinsuke Matsubara has graduated from The University of New South Wales with his ME degree for his dissertation on *A Study of the Desingularised Boundary-element Method and Viscous Roll Damping*.

Cengizhan Uluduz has moved on from R&R Watercraft and has taken up a position as a naval architect with Diab Australia in Sydney.

Ramesh Watson, a student in naval architecture at The University of New South Wales, has taken up a part-time position as a naval architect with Diab Australia at Seven Hills, Sydney, while he completes his degree.

This column is intended to keep everyone (and, in particular, the friends you only see occasionally) updated on where you have moved to. It consequently relies on input from everyone. Please advise the editors when you up-anchor and move on to bigger, better or brighter things, or if you know of a move anyone else has made in the last three months. It would also help if you would advise Keith Adams when your mailing address changes to reduce the number of copies of *The Australian Naval Architect* emulating boomerangs (see *Missing in Action)*.

Phil Helmore

JAMES CRAIG IN HOBART

The Sydney Heritage Fleet's magnificent *James Craig* returned to Tasmania in February for the first time since she was salvaged there 32 years ago. Now beautifully restored she was a popular attraction at the Australian Wooden Boat Festival. The photograph shows *James Craig* in the Derwent River on her arrival on 11 February 2005 (Photo by Judy Stannard courtesy Sydney Heritage Fleet)

FROM THE ARCHIVES

THE PHOTO CHALLENGE

In the February Edition of *The ANA* we published this beautiful photograph of Campbell's Cove in Sydney and invited readers to identify the ships and date the photograph
(Photo courtesy David Gosling)

Whilst we had hoped for a flood of informative letters in response, we were delighted to receive this contribution from Neil Cormack in South Australia.

"Again an excellent issue of *The ANA*, and being a square-rigged ship fanatic, I was quite fascinated by the historic photograph on page 47.

"First the brigantine — as far as is known there were only two white-painted brigantines ever on the Australian coast. There were one or two others but they were painted either black or grey.

"The two white ones I mention were *Rachel Cohen* and *Wollomai. Rachel Cohen* did not cross a royal yard on her foremast and could be considered as a 'bald-headed brigantine', whereas *Wollomai* did cross a fore-royal yard. Both had double topsail yards. "My guess is that the one in the photograph is *Rachel Cohen*, built on the banks of the Manning River in Northern NSW by a man named Newton in 1871. She was 107 tons and 105.5 feet (32.15 m) LOA. *Wollomai* was built by R. Kennedy in Williamstown, Victoria in 1876. She was 143 tons and 107.6 feet (32.79 m) LOA. Both were registered in Port Adelaide at one time.

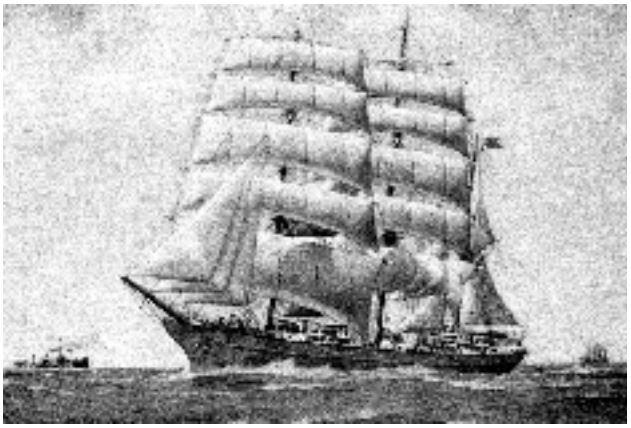
To identify the full-rigger is another question. It will be noted that the vessel is showing a portion of her boot-topping which is light in colour, and the upper strake of the poop is returned inboard. I have been right through my photographs of square-riggers (over 3 000) and, rightly or wrongly, have narrowed it down to one or possibly two, the British full-riggers *Samuel Plimsoll* and *Shandon.*

"The former vessel was built of iron by Hood in Aberdeen for G. Thompson & Co. (White Star Line) in 1873,and was an out-and-out clipper in the Australian/UK passenger and wool trade. On the other hand, *Shandon* was much fuller lined and had been built by Robert Duncan & Co. in Glasgow in 1883. After working under the Red Duster for 30 years or so, she was sold to the Norwegians, then almost immediately she was sold to the Sydney firm, J. Patterson & Co., and hulked in Melbourne. With the shortage of shipping during the First World War she was re-rigged as a barque with main double t'gallants and a royal, but the foremast was 'bald-headed', i.e. no royal yard. As such she traded mainly across the Pacific to America.

"After the war she was returned to Melbourne again as a hulk, although I believe she was temporarily re-rigged for the Melbourne Centenary in 1934. The photograph shows a vessel rather full on the waterline aft, so for that reason I will suggest, again rightly or wrongly, that the vessel is *Shandon*, bearing in mind that during this period there were many similarly-rigged ships, i.e. crossing double t'gallant

yards and royals on fore and main, and a single t'gallant yard and royal on the mizzen, in service all over the world. "*Samuel Plimsoll* was also rigged down to serve as a coal hulk in Australia, serving as such in Albany in Western Australia."

Rachel Cohen
(Photo courtesy Neil Cormack)

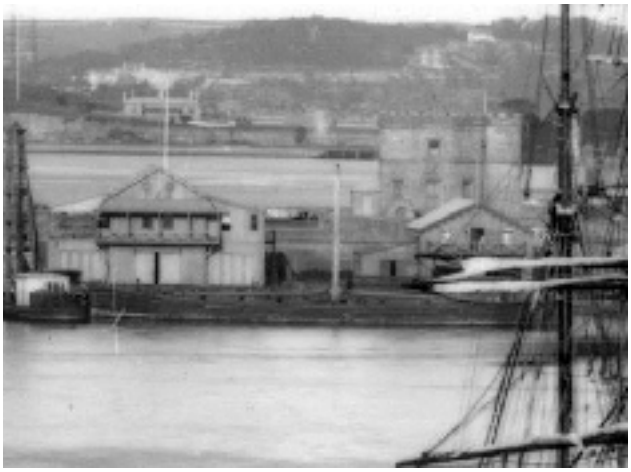


Shandon
(Image courtesy Neil Cormack)

The background is also interesting, and provides some clues to the date of the photograph.

It must have been taken after 1883. The boatshed on the eastern shore of Sydney Cove in front of the tower of Fort Macquarie (see the enlargement below) was completed on 21 April 1883 as the headquarters of the Sydney Amateur Sailing Club — described in The Sydney Morning Herald of 31 March 1883 as 'a commodious 60 ft x 45 ft building, certainly the best boatshed in Sydney'. Unfortunately, the property was resumed by the Colonial Secretary on 13 July 1883 with the offer of £650 for the boatshed. The boatshed was to be used by the NSW Naval Corps.

As the building cost the Club over £1059, the Club was left with a considerable debt of £200 after donations. Interestingly, the Club did not have another Clubhouse until the purchase of its present property in Mosman Bay in 1962. The larger boatshed immediately to the north of the SASC building was the Sydney Rowing Club. [1]



Detail showing the Sydney Rowing Club and the ex-Sydney Amateur Sailing Club boatshed

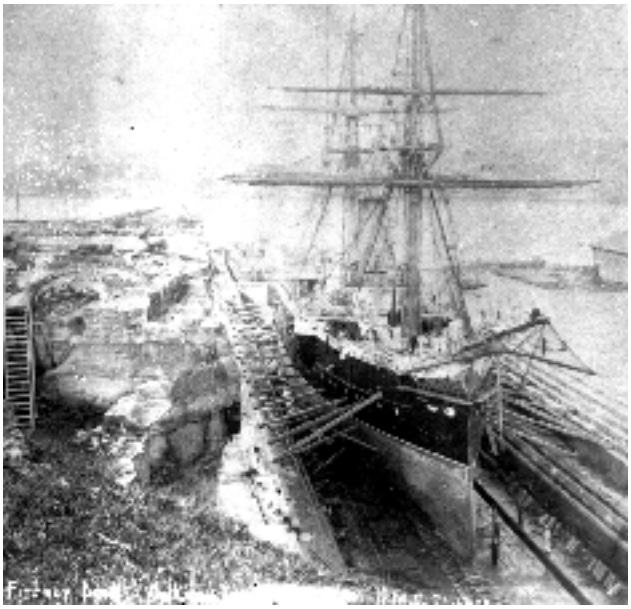
The warship on the left in the background (enlarged below) looks like and might be HMS *Calliope*. She was on the Australia Station from 15 November 1887 (when she arrived in Sydney) until she returned to England in October 1889.

The warship moored in Farm Cove is possibly the famous HMS *Calliope*

In March 1889 *Calliope* responded to a crisis in Samoa which threatened the trading interests of Britain, Germany and the United States. Germany sent *Adler*, *Eber* and *Olga*, and the US sent USS *Nipsic*, *Trenton* and *Vandalia* to Apia to exercise some gunboat diplomacy. They were all at anchor with some merchant ships in the small harbour at Apia on 15 March 1889 when the weather began to deteriorate. By the morning of 16 march a full hurricane had developed and all ships were dragging their anchors. *Calliope*, with three anchors down, steamed into the wind to take the load off her anchors, but two of the cables parted. Finally her commander, Captain Kane RN, decided to try to escape to the open sea. She slipped her last anchor and with engines at full power she edged forward at about half a knot. Despite almost hitting the reef, she gradually made headway towards the entrance. USS *Trenton* was out of control and almost blocking the gap in the reef, but *Calliope* just managed to get through and make the open sea.

By midday the following day the wind had moderated to gale force, but *Calliope* was unable to return to Apia for two days. She found utter devastation. The town was destroyed and she and a small schooner were the only survivors of the

seven warships and fifteen merchant ships that had been in the harbour on the fateful day. *Calliope* received only minor damage and the seamanship of Captain Kane and his crew has become legendary. She returned to Sydney on 4 April for repair. After leaving the Australia Station on 2 October 1899, she paid off in 1904 and, in 1907, became the RNVR drill ship in Newcastle-upon-Tyne. Named *Helicon* between 1915 and 1931, *Calliope* was finally sold and broken up in 1951. [2]



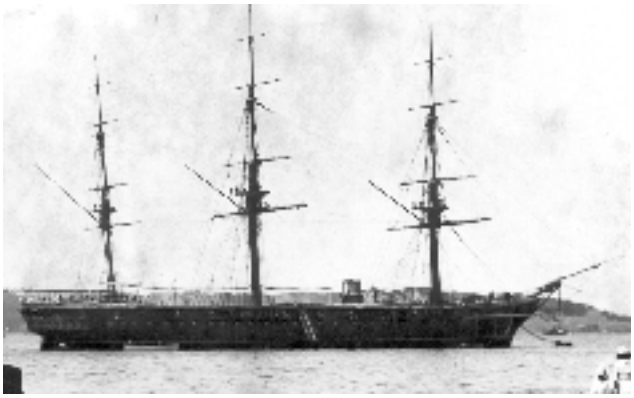
HMS *Calliope* in the Fitzroy Dock at Cockatoo Island
(Photo John Jeremy Collection)

The warship on the right in the background has distinctive boat davits on each quarter which suggest she might be HMS *Wolverine*. Built in 1864, she arrived on the Australia Station on 7 September 1885, relieving HMS *Pearl* as flagship. She was replaced by HMS *Nelson* in January 1882, and was presented to the government of NSW for use in the training of the local Naval Brigade and Naval Artillery Volunteers. She finally paid off in December 1892, and was sold in 1893.

Setting aside the dredger and drill barge in the foreground, the other interesting challenge is the identity of the passenger ship on the eastern shore of Sydney Cove.

Detail of the passenger ship in Sydney Cove

She looks rather like the Orient Line's *Garonne*. *Garonne* was built in 1871, was 3876 grt with a length between perpendiculars of 382.1 feet (115.79 m). Her first voyage from London to Melbourne and Sydney was in 1878, and her last voyage to Australia was in June 1889. Whilst that choice would neatly close the matter, it is probably not *Garonne* because the same ship appears in another photograph taken in Sydney in 1903 (below). *Garonne* had



HMS *Wolverine* in Farm Cove
(Photo John Jeremy Collection)

been sold to Frank Waterhouse Ltd in 1898, and was used in the Alaskan gold rush and as a troopship between San Francisco and the Phillipines during the Spanish-American War. She was registered in the US in 1900. She was broken up in 1905. [3]

The mystery ship at anchor off Balmain, south of Cockatoo Island in 1903
(Photo John Jeremy Collection)

With such a good image we are optimistic that there will be a member who can finally identify this ship. Meanwhile, we think we can say with reasonable confidence that the photo of Campbell's Cove was taken in 1889.

1. *The Amateurs*, Sydney Amateur Sailing Club, Sydney, 1972.

2. Bastock, John, *Ships on the Australia Station*, Child & Associates, Sydney, 1988.

3. Newall, Peter, *Orient Line: a Fleet History*, Ships in Focus Publications, Preston, 2004.

John Jeremy

MISSING IN ACTION

Only one member is Missing in Action:

Mr K. Glensor, former address Southbank Blvd, Southbank, Victoria.

If anyone knows his present location, then please let Keith Adams know on (02) 9876 4140, fax (02) 9876 5421 or email kadams@zeta.org.au.

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