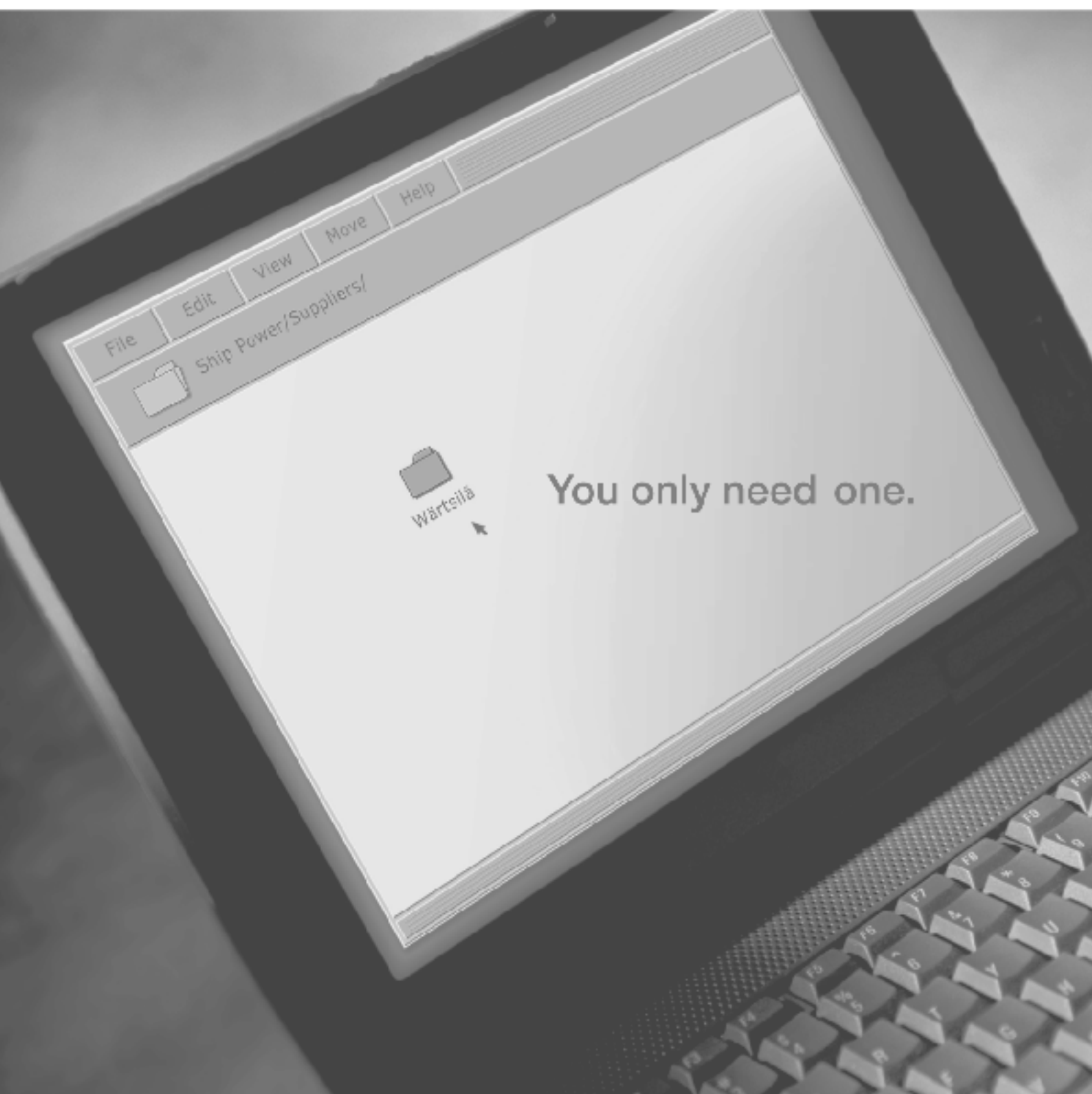


THE AUSTRALIAN NAVAL ARCHITECT



Volume 9 Number 1
February 2005



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Journal of
The Royal Institution of Naval Architects
(Australian Division)

Volume 9 Number 1
February 2005

Cover Photo:

Ten 37.5 m patrol boats built by Austal Ships leaving Fremantle as deck cargo for Yemen on board the heavy-lift ship *Maria* (Photo courtesy Austal Ships)

The Australian Naval Architect is published four times per year. All correspondence and advertising should be sent to:

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The deadline for the next edition of *The Australian Naval Architect* (Vol. 9 No. 2, May 2005) is Friday 29 April 2005.

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The Australian Naval Architect

ISSN 1441-0125

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Editor in Chief: John Jeremy
Technical Editor: Phil Helmore

Print Post Approved PP 606811/00009
Printed by B E E Printmail
Telephone (02) 9437 6917

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on the

World Wide Web

www.rina.org.uk/aust

From the Division President

To ensure its circulation to all members, I have decided to use this column as my report on the calendar year 2004 to the Annual General Meeting scheduled for 8 March 2005.

The year was an historic one, marking the 50th anniversary of the formation of the Australian Branch and the 25th anniversary of the elevation of the Branch to Division status.

This year has been one of significant progress in the Division's relationship with Engineers Australia through our Heads of Agreement. By year's end, and after a couple of false starts, agreement on a set of competencies defining our profession was well within sight, enabling establishment of an area of practice in naval architecture on the National Professional Engineers Register and indirectly assisting those members registering as Chartered Professional Engineers (CPEng). I would like to record my thanks to Jim Black and his group who have been responsible for developing these competencies.

As the Heads of Agreement was due to expire at the end of the year, Council requested the extension of this agreement for up to two years during which Council intends to thoroughly reconsider the structure and details of these cooperative arrangements. For the year in review, Bryan Chapman and I have been RINA's representatives on the Joint Board that administers the Heads of Agreement.

Division Council and Headquarters (London) during the year were unsuccessful in negotiating suitable arrangements with Engineers Australia whereby members could gain chartered (CPEng) status without needing to become members of Engineers Australia. Despite the fact that entry on the CPEng register was more appropriate for Australian RINA members, the hiatus in these discussions was recognised by Headquarters' confirmation of arrangements for Division members to achieve chartered status through the United Kingdom (CEng) register. A number of applications taking advantage of this option were being processed by year's end.

In mid-year the Division co-sponsored with Engineers Australia a highly successful lecture tour by Prof. Peter Jackson, a New Zealand expert on the design of high-performance yachts and adviser to New Zealand syndicates in a number of America's Cup campaigns.

The Division's representation on the National Marine Safety Committee's (NMSC's) Industry Advisory Committee continued during the year. A significant aspect of the cooperation with the NMSC during the year was the contribution made by the Division to the NMSC consultative process which will lead to the proposed replacement for the construction requirements of the Uniform Shipping Laws Code. Following on from a submission developed by the Division's safety group in response to the public-comment round, those consolidated comments were further elaborated through forums conducted in Sydney and Fremantle and the developments reported to a workshop conducted by NMSC.

It has been an interesting and challenging year for the RINA (London) Council on which I as your President sit as an ex-officio member. During the year I attended three of the quarterly Council meetings, two by teleconference and in

person at the meeting that marked the 50th anniversary of the formation of the Australian Branch in 1954. As elected members, Noel Riley and Bryan Chapman have joined me in ensuring that Australian members' interests are well represented on Council. We bring to the Council a perhaps unique view of the Institution, being from a cohesive and well-established Division located far from headquarters. Our views have generally been directed towards ensuring that the Institution's governance and procedures reflect the Chief Executive's oft-stated view that the Institution is an international organisation that happens to be headquartered in London. I look forward to continuing this role in working towards what I term the 'visible internationalisation' of the Institution.

The commencement of the working year was highlighted by the successful conduct of the Pacific 2004 International Maritime Congress, the third in the series following the 2000 and 2002 events. Once again, the joint organising committee chaired by John Jeremy and including Keith Adams, Bob Campbell, IMarEST and IEAust representatives did a sterling job in pulling together this conference. While attendance numbers were down a little on previous years, the high standard of papers was maintained, making this biennial event together with the associated exposition a "must" for keeping up-to-date in what's happening in the maritime industry. Planning has now commenced for the next conference to be held in Sydney in February 2006. Apart from the retirement of Bob Campbell, the RINA representation on the Organising Committee is unchanged. I look forward to another outstanding program, covering a broad selection of topics featuring top national and international speakers in accordance with the high standards and reputation achieved by the previous conferences.

A feature of the activities of the various Sections of the Division was the formation by Council of a Sub-Committee in South Australia. Council looks forward to the establishment by Peter Crosby and his group of an active presence by the Institution in South Australia.

All Sections have active and enthusiastic committees and I thank the people who make up these committees and contribute their time to the operation of the Division. Sections now have their own pages on the RINA web-site, with the ability to publicise their activities and conduct forums. I encourage them to take full advantage of this facility and to ensure that all information provided is kept up-dated.

The Australian Naval Architect continued to be an important and effective part of the Division's activities. It continues to develop as a journal of high standard of which the Division is rightly proud and is well supported by the Division membership and a respectable international readership. Achievement of this support has been largely due to the efforts of the Editor in Chief, John Jeremy, and the Technical Editor, Phil Helmore. I also want to acknowledge the continuing and generous financial support given to the journal by Wärtsilä and other advertisers, which is very much appreciated. Thanks to this support the journal continues to be produced at minimal net cost to the Division.

The Division has continued to provide prizes for students in naval architecture at both The University of New South Wales

and the Australian Maritime College. We are particularly indebted to Austal Ships for their continued support of the joint RINA/Austal prizes at both of these institutions.

The year closed on a sad note with the passing of incumbent Divisional Council member, Andy Tait, after bravely continuing "in harness" through a long illness. Andy has been a Council member on a number of occasions during his membership of over forty years. Our condolences extend to his wife and family.

Finally, I would like to express my thanks to members for their continued support. I would particularly like to thank those members of Council who are retiring this year and look forward to the participation of the new Council members. Particular thanks are due to our Treasurer, Alan Soars, for securing our financial stability and Secretary, Keith Adams, who is continually prompting me as necessary to ensure the continued smooth running of the Division.

Rob Gehling

Editorial

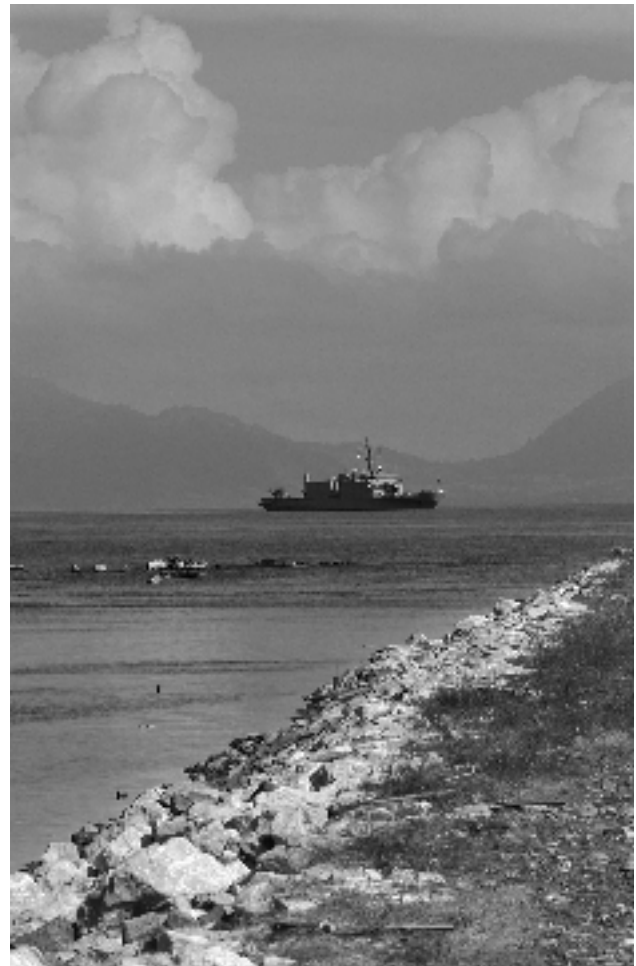
The purchase by the RAN of the LSTs USS *Saginaw* and USS *Fairfax County* in 1994 caused eyebrows to be raised in some quarters in view of the age and utilitarian nature of these ships. Commissioned into the RAN as HMAS *Kanimbla* and HMAS *Manoora*, they were converted for their new role as amphibious ships (LPA) in the RAN at considerable cost, with further questions raised about the wisdom of spending so much money on these old ships.

Subsequent events have shown that both ships are very flexible and useful assets. As a command ship in the Gulf, HMAS *Kanimbla* was able to operate in waters too confined and shallow for the much-larger US Navy ships of similar role. In the Solomon Islands, HMAS *Manoora* not only provided the stabilising influence of a grey ship off the coast, but was also a base, communications centre and support for ADF personnel during the operation. Her hospital also provided services to the local population.

As I write this, HMAS *Kanimbla* remains off the coast of Aceh in Indonesia, providing much-needed support for relief efforts following the devastating Boxing Day tsunami. Both ships have already given great service to Australia in a variety of roles, clearly proving the concept of operations of this type of amphibious support ship. However, as useful as they are, they are both now 34 years old and will become more difficult to support as each year passes.

Defence project JP2048 aims to replace HMAS *Tobruk* with a larger amphibious vessel (LHD) by 2012, and either *Kanimbla* or *Manoora* with a second ship by 2014. Designs by Izar and DCN are currently being assessed. Finally, a sea-lift ship will replace the last LPA by 2018, by which time that LPA will be 47 years old.

Project JP2048 may be less glamorous than that to acquire three air-warfare destroyers for the RAN, but it is clearly no less important. It will be a considerable task to build the ships in Australia now that we have so little steel shipbuilding capability but there is surely plenty of justification to do so. Despite the sizeable workload for Defence to manage in



HMAS *Kanimbla* at anchor off the coastline of Banda Aceh, Indonesia. The amphibious transport ship HMAS *Kanimbla* is part of the Indonesian-led operation to help rebuild Banda Aceh, which was one of the areas worse hit by the Boxing Day tsunamis
(RAN photograph)

coming years, it would seem essential that momentum be maintained so that ships that will be such useful assets for Australia can enter service at the earliest practicable date.

John Jeremy

Naval Architect

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Letters to the Editor

Dear Sir,

I would like to draw attention to an idea that has interested me since I first read an article about it in 1996. The article described the advantages of having toed-in, twin lifting daggerboards on 6–7.5 m trailer-sailer yachts.

These asymmetrical daggerboards have their leading edges angled in by a few degrees towards the centerline. When sailing upwind with the leeward board down and windward board raised, the boat is lifted to weather since there is a lift component at right angles to the boat's heading. As the boards are toed-in anyway, the boat itself has little or no yaw angle. This also happens on a conventional yacht, but the angle of attack on the symmetrical-section keel is induced by yawing the hull, not the foils. The result of this is reduced overall drag, and allows the sail plan to be sailed freer without losing pace to windward.

Despite these advantages, I have yet to see or hear about a boat produced which uses this concept. Further searching led me to realise that strict racing rules would not permit such changes, as such a boat would gain an unfair advantage.

I believe that this example also relates to many innovative ideas in the yachting world that have been outlawed by racing committees. A lot of thought and discussion should be undertaken before disregarding or outlawing new ideas, as I think technological advances in the yachting world are slowed as a result.

Recent vessels launched lead me to believe that naval architecture is heading into a new age of development, especially in the area of yacht design.

Craig Birdsall
UNSW Student

Dear Sir,

As a relatively new member of RINA and recipient of *The Australian Naval Architect*, I would like to commend you on the quality of the publication. Many publications of a similar nature seem to get too involved with technical information and this often involves a lot of heavy reading. Although the technical information is an important addition to *The Australian Naval Architect*, I believe your publication contains just the right mixture of information to keep the reader interested, and this makes it far more enjoyable to read.

As a student, *The Australian Naval Architect* helps create awareness of what is going on within the industry, not only throughout the world but, more importantly, here in Australia. This information will prove to be very helpful to myself and my fellow students when we enter the industry, as we will be aware of what options are available.

Overall, I believe the total package contains something interesting for all readers and the historical stories add a nice touch to show the younger generation how the present industry has evolved.

Keep up the good work.

Aaron Carle
UNSW Student

The Australian Naval Architect

Dear Sir,

I have been around boats all my life, but it wasn't until I went to the 2001 International University's expo in Hong Kong that I realised the opportunity of studying naval architecture. I first applied to study naval architecture in the UK, where they offered me a place at Glasgow University, but I soon found out that Australia also had a naval architecture program on offer at the Australian Maritime College in Launceston. It wasn't until I came to Sydney for my gap year that I found out that The University of New South Wales also has the naval architecture degree on offer.

I weighed up the options between Sydney and Glasgow and, after a couple of long nights, I decided to take a chance and head off to Sydney in pursuit of my degree. In the beginning I was busy trying to settle into a new environment and make new friends but, after a while, I noticed a very disturbing fact. I found out that I would not start to learn anything about naval architecture until half way through my degree in Year 3.

This made my first two years in Australia very difficult, since I was going through university learning topics that seemed to have very little connection with naval architecture and, at times, I found it hard to keep motivated. I know that everyone needs to know the basics about engineering, but wouldn't it be more interesting if certain naval architecture courses, such as ship practice or ship construction were taught during the first two years of the course?

I believe that this would help the naval architecture students feel more involved in the naval architecture plan and make the first two years of the course more enjoyable.

Michael Halkes
UNSW Student

Dear Sir,

When planning, with my wife Roz, a recent short holiday to Hong Kong, a culture and place for which we have great feeling, I thought it would be a great opportunity to catch up with naval architecture and related activities. Contact with Keith Adams, Secretary of the Australian Division and then Trevor Blakeley, Chief Executive of the RINA put me in touch with Michael Lee who is Secretary of the Joint Branch of RINA and IMarEST in Hong Kong.

Michael arranged for me to participate in seminar on 6 November 2004 organised by the Joint Branch together with The Hong Kong Institution of Engineers and The Hong Kong Institute of Marine Technology.

Two papers were presented. The first paper *Ice-class Tankers* was a culture shock for a Queenslander, but was very interesting and well presented by David Power from Lloyds' Register of Shipping. The second paper was also very interesting. *Anti-corrosion System using Nano-technology* was presented by P.S. Kwan from Ocean Man Limited and Tru-seal International (Hong Kong) Limited. Judging from the number of questions, both papers provoked in-depth interest amongst the approximately 40 participants. A very professional operation, and at the end of proceedings each participant was provided with a Certificate of Participation.

Many thanks to Michael Lee, Hou Kin Leung, Chair of the

Joint Branch, and Francis Law from the Engineers Registration Board for arranging for me to join in the seminar but also for their very kind hospitality. Roz and I were very appreciative of the banquet we shared with them and look forward to reciprocating.

As visitors to Hong Kong on many occasions, Roz and I can assure RINA that its people, activity, technology, culture and cuisine are as interesting as ever.

Brian Hutchison
Queensland

Roz and Brian Hutchison (right) on board *James Craig* for SMIX Bash 2004 with John Jeremy and Keith Adams
(Photo courtesy Paul O'Connor)



NEWS FROM THE SECTIONS

New South Wales Section

Committee Meeting

The NSW Section Committee met on 9 November and, other than routine matters, discussed:

- SMIX Bash 2004: Members of the Australian Society of Defence Engineers had been invited to attend, but not all members of Engineers Australia. Bill Bollard had completed the model of *William the Fourth* for raffling. Ben Hercus had received the DVD of the documentary on the Japanese submarine attack on Sydney Harbour to use as second prize, and Andy Tait had allowed a print to be taken of a painting of *James Craig* to be used as third prize. Ben Hercus had printed the raffle tickets for 2004, and the first batch of tickets were ready for sale. Details of the raffle-selling requirements of the NSW Department of Racing and Gaming Seminar were discussed. Bookings for SMIX Bash reached 200 that evening, and would be closed off at 215. IMarEST's Harry Lees Award, and RINA's Walter Atkinson Award, would be presented at SMIX Bash.
- TM Program for 2005: The proposed program was discussed, and the draft program decided (see *Coming Events* in this issue). Proposals for a visit to a cruise ship were discussed, and narrowed down to a possible three to be pursued.
- Visit of RINA Chief Executive in March 2005: The RINA CE would be visiting Sydney from pm Saturday 12 March to pm Wednesday 16 March. A visit to ADI had been arranged. Our AGM would probably be held on Wednesday 8 March; we could hold a NSW Section Committee meeting on Monday 14 or Tuesday 15 March, followed by dinner.
- Finance: We currently have about \$8000 at the bank, being the combined NSW Section and Social accounts, with the Section account \$486 in the black, and the remainder being Social account and SMIX Bash money.
- Budget for 2005: The draft budget for 2005 looks the similar to that for 2004, subject to securing the Harricks Auditorium venue for the same cost.

SMIX Bash 2004

The fifth SMIX (Sydney Marine Industry Christmas) Bash was held on Thursday 2 December aboard the beautifully-restored *James Craig* alongside Wharf 7, Darling Harbour, from 1730 to 2130. The Bash was organised jointly by the IMarEST (Sydney Branch) and RINA (NSW Section). This year the invitation was also extended to the Australian Society of Defence Engineers to join us.

About 220 guests came from the full spectrum of the marine industry, including naval architects, marine engineers, drafters, boatbuilders, machinery and equipment suppliers, regulators, classifiers, surveyors, operators, managers, pilots, navigators, researchers, and educators. Equally importantly, the full spectrum of age groups was represented, from present students to the elders of the marine community.

It was also great to see intrastate and interstate visitors in the throng, including Rob Gehling, President of the Australian Division from Canberra, Martin Williams from Newcastle, Gregor Macfarlane, Giles Thomas and Stuart McDonnell from the AMC in Launceston, Brian and Roz Hutchison from Queensland, Howard and Frances Peachey from South Australia, and Jim Black from Western Australia.

Sydney turned on a cool evening and many partners in attendance enjoyed the view from the decks of *James Craig*. Drinks (beer, champagne, wine and soft drinks) were provided, and a delicious buffet dinner was served in the 'tween decks.



Some of the crowd enjoying drinks on board *James Craig*
(Photo courtesy Paul O'Connor)

This year we introduced “early bird” pricing and credit-card facilities for “early bird” payments, and this turned out to be almost too successful, as all tickets were sold before the event. Last year we had a tropical downpour at 4 pm, and the year before that we had the bushfires, keeping some people at home. However, this year it all came together in a big way, and, for the first time, we had to turn people away, with no tickets available at the gangway.

Formalities were limited to a short speech by the Chair of the NSW Section, Phil Helmore, who welcomed the guests and thanked the organising committee and the industry sponsors.

The SMIX Bash Raffle was back, bigger and better than ever this year, with three prizes. Bill Bollard had built a magnificent half-block waterline model of the paddle steamer *William the Fourth*. Our thanks to Bill for his expertise in building and generosity in donating this model. Andy Tait had allowed a print to be taken and framed of a painting of *James Craig* under full sail, and Incat Designs — Sydney and Claude Gonzales (director of the documentary) had jointly donated two DVD documentaries of the Japanese submarine attack on Sydney Harbour during World War II. The raffle was drawn on the evening of SMIX Bash by Mrs Ann O'Connor. Third prizes of the DVDs went to Mike Farrell and Jeremy Spear, second prize of the framed print went to Kieran Helmore, and the first prize of the model went to Rob Gehling.



Bill Bollard's Model of PS *William the Fourth*
(Photo courtesy Bill Bollard)

The IMarEST's Harry Lees Award for the best presentation to the IMarEST in 2004 was announced by Don Gillies, and went to Prof. Hugh Durrant-Whyte for his presentation on *Automation in Container-handling Operations* in August 2004.

RINA's Walter Atkinson Award for the best maritime paper published in Australia in 2003 was presented by the President of the Australian Division, Rob Gehling, and went to Michael Andrewartha, Lawrence Doctors, Kishore Kantimahanthi and Paul Brandner for their paper *Application of Hydrofoils to Improve Performance of High-speed Catamarans*, published in *The ANA* in November 2003. The award was presented to Michael Andrewartha and Lawry Doctors. Congratulations!

RINA NSW would like to thank all our wonderful sponsors, without whom SMIX Bash could not happen:

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Our thanks to them for their generosity and support of SMIX Bash 2004.

Phil Helmore



James Craig in the evening light at Wharf 7, Darling Harbour Sydney during SMIX Bash 2004
(Photo courtesy Paul O'Connor)

Correction

The November 2004 issue of *The ANA* carried a write-up of the October joint technical meeting held by the NSW Section of RINA and Sydney Branch of IMarEST. The article stated that the author, Peter Lucey, did not show up.

This was incorrect. Mr Lucey did show up and, in fact, spent considerable time in trying to locate IMarEST and RINA members, and the venue which had not been clearly defined.

The ANA was unaware of the circumstances, and apologises unreservedly to Mr Lucey for any embarrassment caused.

ACT Section

On the evening of 26 October 2004, Ian Williams spoke to the ACT sections of RINA and IMarEST on *Regulations for African Inland-waterways Vessels*. He described his experience in developing a set of regulations for African inland-waterways vessels — the task of developing such regulations had been commissioned by IMO.

Ian said that, although international conventions are not normally applicable to inland vessels or voyages, a need had been identified by IMO to assist in development of standard regulations that could be adopted by African nations, particularly for application to inland waterways. This need was identified following the loss of over 500 lives when the passenger ship *Bukoba* sank on Lake Victoria in 1996. Ian observed that the African inland waters are not necessarily benign — he had been told that waves of 2–3 m could develop on Lake Malawi. The lake is about 500 km long and is approximately aligned with the prevailing wind in autumn, resulting in a long fetch.

The existing regulations used by many of the countries in the region date back to the colonial regimes of the 1900s. While some of the larger ships are built to class rules, it is unusual for them to remain in class. This is not normally a problem, given the fresh water in the lakes.

Ian used the 1982 European Community (EC) Inland Waterways rules as the basis for the proposed new rules for Africa and, where necessary, supplemented them using provisions of the IMO regulations developed for Asian, Pacific and Caribbean nations, the later EC Inland Waterways regulations, the USL Code including more recent NSCV rule developments, and USCG regulations. IMO and the African countries had agreed that prescriptive rather than performance-based rules were preferable at this time.

Following initial feedback on the first draft of the new rules by maritime authorities in the nations concerned, a workshop was arranged between representatives of the administrations and industry to ensure that they fully met the requirements of the countries. The final model regulations were then completed ready for adoption by those nations. Although standardised regulations are considered to have a number of advantages, the nations remain free to adapt them to suit their needs.

The model rules, which apply to new vessels of 4 m and above, have been available for about three years. Ian has not had feedback on how they are being implemented and used. He noted that with poverty, starvation and health issues being priorities in many of the countries concerned, it is not surprising that maritime affairs tend to attract less attention from governments. A follow-up workshop concerning the regulations is proposed for 2005 as part of the ongoing IMO Technical Cooperation Program.

Kate Linley

Queensland

The final technical meeting of the Queensland Section for 2004 took place on 2 November at the Gateway Campus, Brisbane North Institute of TAFE. At this meeting a workshop was held on the proposed NSCV Stability Standard. The facilitators for this workshop were Mark Devereaux and James Stephen.

Werner Bundschuh, in introducing the facilitators and the topic, stated that it was not intended to deliver a theory paper but to address in a practical way an issue for naval architects. Werner traced through the development of the standards. He said that the review of the standards had been commenced in the 1990s by the NMSC and that the document in draft form had not yet been approved for release and general industry comment. He outlined the role of Mark Devereaux in the review process and explained that Mark would draw on his experience and James Stephen as a consulting naval architect would provide input from an industry perspective.

Using a PowerPoint presentation, overhead transparencies and whiteboard graphics, Mark Devereaux outlined work undertaken to date on the standard while James Stephen related the proposed changes with previous/existing rules, regulations and standards and possible implications.

On the social front, the Broadwater Tavern on the Gold Coast played host to the Queensland Section Christmas Party. Held on the night of 14 December the party was well attended by members and their partners as well as distinguished friends. A good night was had by all and was complemented with good food, cold drinks and interesting conversation. Thanks are extended to our Deputy Chairman Dion Alston for organising the night and ensuring its success.

Brian Robson

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.

COMING EVENTS

Australian Division AGM

The Annual General Meeting of the Australian Division of RINA will be held on Wednesday 8 March immediately following the scheduled technical meeting of RINA (NSW Section) and IMarEST (Sydney Branch) at 5:30 for 6:00 pm in the Harricks Auditorium at Engineers Australia, 118 Alfred St, North Sydney; see separate notice mailed to members.

NSW Section AGM and Technical Meetings

The Annual General Meeting of the NSW Section of RINA will be held on Tuesday 8 March immediately following the AGM of the Australian Division of RINA which, in turn, follows the scheduled technical meeting of RINA (NSW Section) and IMarEST (Sydney Branch) at 5:30 for 6:00 pm in the Harricks Auditorium at Engineers Australia, 118 Alfred St, North Sydney; see separate notice mailed to NSW members.

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 for 2005 (with exceptions noted) is as follows:

8 February	Alan Budd, Mercy Ships <i>Conversion of a Train Ferry to a Hospital Ship</i>
8 March	RINA AD AGM and RINA NSW AGM Magnus Lindgren, Det Norske Veritas <i>Wave Loads on Ships</i>
12 April *	Chris Field, Wartsila Australia <i>Stern Tube Seals in the Collins-class Submarines</i>
10 May	Tony Armstrong, Austal Ships <i>Design and Construction of Benchijigua Express</i>
14 June *	David Meiers, David Meiers and Associates John Dransfield, H.I. Fraser <i>Replenishment at Sea and Conversion of HMAS Sirius</i>
12 July	Gregor Macfarlane and Alex Robbins, AMC <i>Low-wash Hullforms and the AMC Towing Tank Upgrade</i>
9 August *	Paul Elischer, Defence Science and Technical Organisation <i>Sea Trials of the Collins-class Submarines</i>
13 Sept*	Clive King, AWD Project <i>Design of the RAN's New Air Warfare Destroyer</i>
11 October	IMarEST AGM Rob Madders, Rolls Royce Australia <i>Zebra Batteries for Submarines</i>
1 Dec	SMIX Bash 2005

* Denotes joint meeting with the Australian Society of Defence Engineering.

Marine Safety 2005

The National Marine Safety Committee (NMSC) will host Australia's premier marine safety event, the Marine Safety 2005 conference, at Wrest Point, Hobart, on 12–13 April 2005.

Marine Safety 2005 is the third national forum of its type conducted by NMSC, which comprises representatives of all government marine authorities and is committed to improving marine safety in Australia.

This conference will bring together a wide range of expert and interesting presentations around the theme *Safety is a State of Mind*. The two-day program includes over 50 speakers. The program has been organised into several plenary sessions and two concurrent streams, one focussing on recreational boating and training, and the other on commercial vessels and operators and including port and security matters.

Speakers at the conference are drawn from around Australia and the USA, UK and NZ, and the program will include interesting debates, panel discussion and an open forum. Set on the Derwent River at Wrest Point, Hobart, this event promises to be a major highlight for the maritime industry in 2005. The program provides for a number of marine-related activities including on-water displays of new safety products and a choice of site visits to some of Tasmania's leading boatbuilders and marine suppliers.

The conference has been planned to inform those employed across the marine industry sectors. It will be of value to all involved in Australian domestic-fleet operations, whether commercial or recreational. It will be of interest to government regulators, boating educators, surveyors, engineers and masters, as well as the many suppliers of marine services and, especially, boat designers and builders. This will provide a great networking opportunity for those wanting to expand their knowledge and contacts.

This conference follows the successes of the Marine Safety conferences in Brisbane in 2002 and Sydney in 2003. As with past conferences, NMSC is inviting all sectors of Australia's marine industries to participate.

For further information, contact NMSC on (02) 9247 2124, email secretariat@nmsc.gov.au, or visit the website www.nmsc.gov.au.

Queensland Section

The next meeting of the Queensland Section will be its 2005 AGM and will be held from 6.30 pm to 8.00 pm on Tuesday 1 March 2005.

Pacific 2006 International Maritime Conference

The Pacific 2006 International Maritime Conference (organized by the Royal Institution of Naval Architects, the Institute of Marine Engineering, Science and Technology and Engineers Australia) will be held at the Darling Harbour Convention and Exhibition Centre in Sydney from 31 January to 3 February 2006.

THE INTERNATIONAL MARITIME EXPOSITION & CONGRESS

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31 JANUARY - 3 FEBRUARY 2006 SYDNEY AUSTRALIA



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

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.

GENERAL NEWS

Bids to Build Air-warfare Destroyers Announced

Defence Minister Robert Hill announced on 23 December 2004 that the Department of Defence had received three proposals from Australian industry for the role of shipbuilder in the \$4.5 to \$6 billion air-warfare destroyer project. Proposals were received from ASC Shipbuilding, Northrop Grumman Ship Systems and Tenix Defence.

Defence is currently evaluating the three ship designer proposals from Blohm+Voss, Gibbs & Cox and Izar which closed on 24 November 2004. The Department is also evaluating responses from BAE Systems, Raytheon Australia and Saab Systems for the Combat System — System Engineer, which closed on 10 December 2004.

“The construction of the air-warfare destroyers will be one of the most significant shipbuilding projects undertaken in Australia to date, and will provide an enormous challenge for Australian industry,” Senator Hill said.

“The destroyers will have the US-sourced Aegis air-warfare system as the core of their combat system, and will provide sustained maritime-area air defence for deployed forces. The ships are expected to be highly interoperable with the US and other coalition partners.”

The proposals will now be the subject of rigorous and detailed analysis. Selection of the shipbuilder will be based on a number of key criteria including:

- commitment to the principles of a long-term risk sharing arrangement with the Commonwealth and other industry partners for the construction of the AWDs;
- a cost, overhead and pricing structure that will enable the cost effective delivery of the AWDs, including the ability to build designs considering ‘whole of life’ costs;
- a sound record of past performance in building naval vessels;
- commercial viability and financial backing;
- access to the skilled workforce required to produce ships to the Commonwealth’s requirements;
- willingness to provide open financial accounting data — including visibility through to the sub-contractor level — to the Commonwealth;
- capacity to provide the Commonwealth with transparency and contractual influence over major sub-contractors; and
- capacity to access sensitive technology required for the AWD project.

“Companies bidding for the AWDs were required to include Australian skills and training programs in their tenders, with Defence to fund companies for extra skills generation and training benefits in the programs,” Senator Hill said.

“The AWD project provides a massive opportunity for Australian industry to participate at both the prime and sub-contractor level. The project will also create new Australian jobs and skills and strengthen Australia’s strategic industrial base.”

Agreement with the US for Collins-class Submarines

A new era of cooperation has been reached between Australia and the United States in the further development and improvement of the new combat system being provided for Australia’s Collins-class submarines.

The system, the AN/BYG-1 Combat Control System, will be installed in both US Navy and Royal Australian Navy submarines under an Armaments Cooperation Project.

A Memorandum of Understanding was signed by Australia and the United States in November 2004 for future joint development, production and support of the combat system.

Defence Minister Robert Hill said this latest decision follows the Government’s approval of the \$455 million Collins Replacement Combat System Project in September 2002 and will lead to significant upgrades to the capability of the Collins-class submarines commencing with the first installation in 2006.

“Cooperating with the US Navy means we have the opportunity to influence the design and development of the systems and to participate in a continuous upgrade process that will provide the latest advances while continuing to meet our particular requirements,” Senator Hill said.

“The cooperative approach also provides opportunities for Australian industry to inject Australian innovative technology into the joint program and to participate in supporting the systems while in service.

“The MOU specifically provides for industry from both countries to bid for work on equal terms and to be selected competitively.”

The new combat systems will complement the new advanced capability torpedoes for the Collins-class submarines, also approved by the Government late 2002, and also being developed and produced under an Armaments Cooperation Project with the US Navy.

THE SECOND HIGH PERFORMANCE YACHT DESIGN CONFERENCE

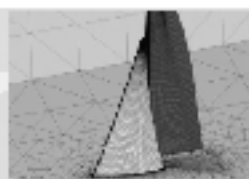
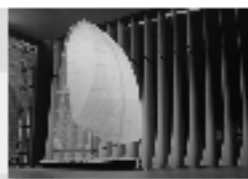
www.hpyd.org.nz

14 to 16 February 2006 Auckland, New Zealand

First Notice and Call for Papers
ABSTRACTS DUE 30 APRIL 2005

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 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 new hullforms, moving keels and masts and new approaches to sails and propulsion systems require innovative approaches to analysis, design and experimental verification.



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" *Merlyn 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

Ophelia Delivered by NQEA

Designed by NQEA and G.A. Glanville and built by NQEA in Cairns, the motor yacht *Ophelia* was delivered recently.

The vessel was originally ordered as a high-speed expedition yacht but, during the construction period, the vessel was extensively modified both internally and externally to upgrade to a very high-quality luxury high-speed motor yacht. She is powered by two MTU Detroit 12V 4000 M90 diesels driving Stone Marine 1525 mm five-blade propellers via ZF 7550A – 8° down-angle gearboxes.

On trials *Ophelia* achieved a loaded speed of 22 kn and a light condition speed of 23.5 kn. The main engines feature NQEA-designed underwater exhausts with low-speed by-passes via external boxes exiting at the transom. This system has proved to be extremely quiet with low back pressures. Three MTU Sabre Perkins diesel-generator sets producing 83.5, 61.7 and 35.6 kWe allow a mixture of electrical loads to accommodate the varied operating conditions of the vessel, with the 35.6 kWe set used primarily as a harbour set.

Both the Naiad 508 mm hydraulic bow thruster and 305 mm hydraulic stern thruster as well as the 1.1 m² stabiliser fins were provided by Seairland. The gearbox PTO hydraulic pumps and manifolding was provided by Bosch Rexroth.

MTU Detroit provided the four-station propulsion controls which also integrated the trolling system to allow slow speed manoeuvring primarily in marina berths. External comms were provided by Electrotech and included a GMDSS A3 suite, Fleet 77 and satellite television. Nav aids were provided by Electrotech and Taylor Marine, including two Decca-IMO Radars, Furuno look-ahead sonar and C Plath gyro and autopilot system.

Internal comms were provided by DeltaCom including 13 CCTV units. An extensive audio-visual system was provided by Automation Dynamics and integrated by an AMX control system. Internal lighting and 27 motorised blinds were controlled by C-Bus. Air conditioning was provided by Seairland which consisted of 27 air-handling units and a packaged marine-air systems SCW 360 reverse cycle liquid chiller unit. Two 8 000 L Dolphin reverse-osmosis watermakers were provided by Sharplift.

The black and grey water systems are by EVAC with Jets vacuum pumps and a Hamann Wassertechnik sewage-treatment plant. The oil-water separator is a 1 m³ RWO unit. Two Steelhead Marine 2 500 kg low-profile deck cranes with a maximum boom length of 6.2 m were provided with one meeting MCA requirements as a rescue boat crane.

Two semi-rigid inflatables are provided on the upper deck; a Rayglass-Protector 750 RIB fitted with two 112 kW Yamaha outboards and a Rayglass-Protector 650 RIB fitted with one 112 kW Yamaha outboard. The Protector 650 RIB is configured as a rescue boat. The two RIBs are fitted on cradles mounted on recessed tracks, allowing the tenders to be moved aft to provide more deck space for guests.

The vessel is also designed to operate and fuel a Eurocopter EC145 helicopter during daylight hours. The helicopter has a maximum weight of 3 585 kg and has a capacity for a pilot and nine passengers. The helicopter landing area has two



Ophelia on trials
(Photo courtesy NQEA)

flush-rubber deck inserts with anti-skid facings to land the helicopter skids on. Tie downs for the helicopter are also provided.

The five-star interior of the vessel was designed by FMCA in conjunction with NQEA, and the internal fit-out was achieved by NQEA installing all the grounds throughout the vessel and FMCA manufacturing and fitting the final furnishings and finishes. The interior finishes were to the highest quality with high-gloss facings, selected fabrics, leathers and stone used extensively throughout the vessel.

The vessel interior was built to primarily meet MCA requirements and all internal structural bulkheads were B-15 fire rated and supplied by IMAC. NQEA utilised extensive noise and vibration reduction techniques throughout the vessel, including floating floors which allowed the vessel to meet the contractual noise requirements.

Principal Particulars

Length OA	36.2 m
Beam (moulded)	8.10 m
Hull draft (maximum)	2.7 m
Crew	5
Guests	20
Fuel	42 000 L
Freshwater	6 000 L
Range (with 10% reserve)	2 800 nm at 12 kn
Propulsion	2 x MTU Detroit 12V 4000 M90 each 2 040 kW at 2 100 rpm
Propellers	Stone Marine 5 blade
Speed	22 kn at loaded displacement 23.5 kn at light displacement
Classification	Lloyds Register of Shipping +100A1 SSC, Yacht Mono, LMC, HSC, G6
Gross tonnage	322 grt
Flag	Australian
Survey	USL Class 1B for 20 passengers USL Class 1D for 80 passengers

Gary Mears

Defence Tests New Underwater-vehicle Technology in Portland

On 20 November the Defence Science and Technology Organisation (DSTO) demonstrated its latest technology for undersea navigation and surveillance capability by taking an unmanned underwater vehicle (UUV) through its paces in Portland, Victoria.

The trial involved Navy Reserve divers placing dummy sea mines at known positions in the Portland Port area to enable the DSTO-developed UUV *Wayamba* to hunt these objects. The locations of the mines were then confirmed using underwater navigation and communications technology.

Ms Janis Cocking, Research Leader in DSTO's Platforms Sciences Laboratory, said *Wayamba* was a research vehicle to test concepts of operations and technologies for future defence applications of autonomous underwater vehicles.

"UUVs are poised to play a major role in support of defence because they enable Defence personnel to be separated from areas of extreme danger. In the future, UUVs could be used to support amphibious operations by undertaking rapid environmental assessments, detect underwater mines and other maritime hazards, and conduct hydrographic surveys," Ms Cocking said.

"Given their potential to operate undetected, UUVs may join our submarines in the longer term as part of Australia's 'silent service'," Ms Cocking said.



The new underwater vehicle during trials at Portland
(Photo courtesy DSTO)

DSTO has made a significant commitment to the development of a UUV-related research and development infrastructure, of which the *Wayamba* test-bed is an important part. *Wayamba* is an aboriginal word for sea turtle.

Ms Cocking said *Wayamba* was designed to be both powerful and highly manoeuvrable. "It enables us to study precision control of UUVs in operationally-demanding environments, such as may occur if the vehicles were required to work in ports or near other man-made maritime structures."

The vehicle is equipped with a comprehensive range of on-

board navigation, communications and surveillance sensors, with the capacity to carry quite large additional payloads. One of the key features of the *Wayamba* underwater-vehicle technology is the ability to navigate and communicate with the outside world without the need to surface. This is being achieved through a collaborative research project between DSTO and WA company Nautronix Ltd.

The Portland trial involved staff from DSTO, Nautronix Ltd, Swinburne University of Technology, Victoria University and the Australian Maritime College. They will be undertaking various scientific activities associated with autonomous underwater vehicles.

First of the Armidale-class Patrol Boats Launched

On 22 January 2005, Minister for Environment and Heritage, Senator Ian Campbell, attended the naming ceremony of *Armidale*, the first of the RAN's new Armidale-class patrol boats, at the Austal Ships construction facility, Western Australia. Senator Campbell represented the Minister for Defence Senator Robert Hill at the ceremony.

"This ceremony commemorates the successful launch of the vessel on 5 January 2005, following the design and construction over the past year," Senator Hill said.

"This achievement is testament to Austal's and Defence Materiel Organisation's ability to deliver on time and on budget.

"I am sure that the ship trials over the next two months will also see the vessel's ability to meet the required performance."



Armidale alongside at Austal Ships
(Photo courtesy Austal Ships)

The vessel was named by Ms Jana Stone, the eldest daughter of Ordinary Seaman Donald Raymond Lawson who served in the original HMAS *Armidale*, a Bathurst-class minesweeper, during World War II.

This launch of the first vessel is a key milestone under Project Sea 1444 following the signing of a \$553 million contract on 17 December 2003 with Defence Maritime Services (DMS) for the supply and long-term support of a new patrol-boat fleet of twelve Armidale-class boats.

"I congratulate DMS, the principal contractor, and Austal

Ships, responsible for the design and construction of the vessels, for their work on this project,” Senator Hill said.

“The delivery of the first patrol boat on schedule has reaffirmed the Government’s commitment that the contracted delivery schedule for the remainder of Armidale-class patrol boats will be met.

“The Armidale-class vessels will substantially improve the Royal Australian Navy’s capability to intercept and apprehend vessels suspected of illegal fishing and quarantine, customs or immigration offences. The patrol boats in this regard play a major role in patrolling and protecting Australia’s coastline.”

Following the sea trials, *Armidale* is scheduled for acceptance in May 2005.

US Navy Awards Contract Option for First Littoral Combat Ship

In December 2004 the US Navy awarded Lockheed Martin Corp., Maritime Systems and Sensors, Moorestown, N.J., a \$US188.2 million contract option for detail design and construction of the first Flight 0 Littoral Combat Ship (LCS).

LCS is an innovative combatant designed to counter challenging shallow-water threats in coastal regions, specifically mines, diesel submarines and fast surface craft. A fast, agile, and networked surface combatant, LCS will utilize focussed-mission packages that deploy manned and unmanned vehicles to execute a variety of missions.

“Today, we take the next step toward delivering this needed capability to the fleet,” said Assistant Secretary of the Navy for Research, Development and Acquisition, John J. Young Jr. “Just two years after we awarded the first contracts, we’re signing a contract to build the first LCS. This was made possible by great support from Congress and industry, which both teamed with the Navy so we can provide the fleet with greater capability and flexibility to meet mission requirements.”

This detail design and construction contract option award is a critical step in getting the first LCS in the water in 2006. Lockheed Martin’s team-mates include Gibbs & Cox, Arlington, VA., Marinette Marine, Marinette, WS. and Bollinger Shipyards, Lockport, LA. Marinette Marine will begin construction early next year after a production readiness review with the Navy.

“LCS takes the operational Navy into a higher tactical speed regime and is a net-centric focal point,” said Rear Adm. Charlie Hamilton, program executive officer for ships. “It will also fundamentally alter the ship/mission system integration paradigm, through extensive use of modularity. The acquisition of LCS sets a new standard for rapid procurement in support of the war-fighter.”

On 27 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 Flight 0 LCS.

The US Navy plans to build a total of four Flight 0 LCS.



An impression of the Lockheed Martin LCS
(US Navy image)

Queensland Industry News

The holiday break saw most of the Gold Coast boatbuilders shutting their doors for a well-deserved break — all accounts indicate a busy year ahead. Of particular note is the seemingly endless stream of motor yachts calling in to the Gold Coast City Marina for refits or repairs.

Local design office Sea Transport Solutions seem to have a busy year ahead with numerous design and consultancy jobs. Current jobs include design of a 47 m aluminium ro-ro ferry for Sea Stradbroke that is to be built by FBMA in the Philippines. Other design and engineering projects in hand by Sea Transport Solutions include a 12.5 m pilot boat for LITA Ocean of Singapore, the preliminary design for a 30 m high-speed landing craft for Thailand, the design of a 62 m oil tanker for Speke Shipping, and the preliminary design of a 42 m sail training vessel — currently tendering to yards. Also recently completed is the redesign, conversion and supervision of a 35 m ro-ro catamaran to a scientific research vessel for Steam Ships New Guinea. The 12-week conversion took place at Harwood Slipway in Northern NSW and included accommodation for scientists, laboratory, work shop, galley, rec room, cool room, laundry, crew’s quarters, air conditioning, office, crane, OWS, sewage plant, electronics upgrade, upgrade of gensets and electrics, and shafting conversion to oil lubricated with MB seals. The vessel was flagged with PNG.

In the Brisbane region, Aluminium Marine is constructing a 34 m catamaran passenger ferry for operation in the Whitsundays. Designed by Crowther Design, this vessel is a single-deck design, capable of accommodating 300 passengers.

In our northern region, on 9 January 2005 NQEA launched the 63 m passenger ship *Oceanic Princess* which has been constructed for Coral Princess Cruises Pty Ltd. The outfit of this vessel is being completed before it undertakes a program of sea trials in February with the aim of entering service on 8 May. The second 22 m catamaran ferry, *Private Anderson* was handed over to Kwajalein Range Services and delivered in December. NQEA is currently lengthening the catamaran ferry MV *Quicksilver III*, which was built by NQEA in October 1986. The vessel has been cut in half and a 4.8 m long pre-fabricated section inserted. The vessel will

resume operations under its existing name *Big Cat* for the local operator Big Cat Cruises. NQEA is also currently constructing an 18 m steel-hull aluminium-superstructure semi-submersible coral-viewing vessel for Great Adventures.

Brian Robson

True North Launched

Last November, Australian shipbuilder Austal launched a live-aboard adventure cruise vessel, the 50 m, thirty-six passenger *True North*. Construction of this vessel has proceeded rapidly since the contract, Austal's second with fellow Western Australian company North Star Cruises, was announced 12 months ago. The magnificent new vessel will begin cruising in the new year, once fitout and sea trials have been completed.

The winner of multiple tourism awards, North Star Cruises is the longest-established charter cruise-operator to cover the vast wilderness of the far north of Western Australia. The company specialises in cruises along the spectacular Kimberley coastline and at the Rowley Shoals — three atolls on the edge of Australia's continental shelf, 300 kilometres west of Broome.

Mr Rothwell said it was particularly satisfying that the vessel was not only designed and built in Western Australia, but would continue to operate locally with one of the state's leading tourism operators.

"That means that, in addition to the immediate economic contribution generated by building the vessel here, North Star's operations will provide an ongoing boost to the economy, particularly in regional areas. It is great to be playing a part in further developing our tourism industry in this manner," he said.

North Star's existing vessel, delivered by Austal in 1999 and also named *True North*, has been instrumental in developing the company's reputation for offering the ultimate in style and comfort. The new, larger vessel will take the cruising experience to a level previously unheard of while maintaining the appeal of highly personalised onboard service and the ability to visit areas that are inaccessible to larger vessels without sacrificing onboard amenities.

The 36-berth aluminium monohull has four more cabins than the current vessel and greater space throughout. The mix of cabin types has also been changed in response to passenger demands for the higher-end luxury provided by staterooms. Intending passengers will be able to select from three options on the new vessel: four premium staterooms on the upper deck, six staterooms on the main deck and eight large double cabins on the lower deck. Each cabin has its own en suite.

Whereas the current vessel has a combined lounge and dining area, the increased common area on the new *True North* is split over two decks. Dining takes place on the main deck and the lounge-bar is located on the upper deck and opens onto an outdoor area, providing guests with a spectacular viewing platform.

Another obvious and attractive feature of the new vessel is the range of equipment which will be carried to enable passengers to explore the most remote and spectacular

highlights of the cruising grounds. With a seven-seat helicopter carried on the top deck and six tenders on board, guests can undertake a range of different activities simultaneously — from scenic flights over waterfalls, rivers and gorges through to fishing, diving and exploring ashore.

The arrival of the new vessel will also see North Star Cruises expanding its sphere of operations with a 7-night, 8-day cruise in the waters of Papua New Guinea and 14 day "Over the Top" cruises linking Cairns and Darwin being added to the existing favourites in the Kimberley and Rowley Shoals.



True North ready for the sea
(Photo courtesy Austal Ships)

Canadian Submarine HMCS *Chicoutimi* Returns Home

In December 2004 a \$C2.7 million contract was awarded by the Canadian Defence Department to Eide Marine of Norway to carry the submarine HMCS *Chicoutimi* (damaged by fire in the Atlantic in October) back to Canada, where repair work can be combined with a scheduled update programme.

She left Faslane, Scotland, on Thursday January 13 on MV *Eide Transporter*, a semi-submersible self-propelled transport vessel, which is now a standard method of transporting disabled warships and submarines.

The trip to Halifax was expected to take between 12 and 14 days, depending on weather conditions in the North Atlantic.

A Board of Enquiry was convened in Helensburgh, near the Clyde Naval Base, shortly after the incident, and the Board subsequently completed their deliberations in Halifax, Nova Scotia, and Ottawa, Ontario, with a final report going to Vice Admiral Bruce MacLean, Commander of the Canadian Navy, on 17 December 2004.

During the investigation, 78 witnesses submitted reports and 142 exhibits were presented, and the written report makes findings in 38 areas and makes 23 recommendations.

The Board recommended that the report be made public as soon as the review process is complete, subject to limitations imposed by the Canadian Privacy and Access to Information Acts.

Vice Admiral MacLean said: "A great deal of effort has gone into this important investigation."

It was originally scheduled to finish by the end of November, but the complexity and scope of the inquiry meant they had to request an extension into December.

“The decision to transfer HMCS *Chicoutimi* by heavy sealift back to Canada was taken after careful consideration of the cost and the imperative to get HMCS *Chicoutimi* back to her operational schedule as soon as possible,” said Vice Admiral MacLean.

“By conducting the repairs in Canada, the Navy can combine the repair work with previously-scheduled maintenance and upgrade work so that we can get *Chicoutimi* back to sea where she is needed.”

Repair work to the submarine will take around 12 months to complete.

Chicoutimi was the last of the four Upholder-class submarines to have been ‘regenerated’ — brought back to life and converted — for the Royal Canadian Navy by BAE Systems, who originally built her as VSEL at Barrow-in-Furness.

Formerly HMS *Upholder*, she was the first of the four boats launched between 1986 and 1991, but by 1994 they had been laid up, with no role to play, as the Cold War was over.

She and her sisters, HM Ships *Unseen*, *Ursula* and *Unicorn*, were sold to Canada in 1998, and underwent extensive modification work to incorporate a new torpedo and weapons fire-control system.

The other boats are now known as HMCS *Victoria* (ex-*Unseen*), HMCS *Windsor* (ex-*Unicorn*) and HMCS *Cornerbrook* (ex-*Ursula*).

The Victoria-class submarines displace almost 2 500 t when submerged, have a diving depth of around 200 m and a speed of about 20 kn when dived.



HMCS *Windsor* setting out on her delivery voyage to Canada
(Canadian Defence Department photograph)

Start of French Carrier Project

On 25 January the French Defence minister, Michèle Alliot-Marie, announced the launch of the design phase for France's second aircraft carrier (PA2).

This important step marks the end of the preparatory study phase, in which DCN and Thales have been closely involved.

The current studies, which began in June 2004 and will be completed in mid-2005, include risk-reduction studies and an evaluation of opportunities for cooperation between the British and French aircraft-carrier programmes. Once these

studies have been completed, the final design-definition phase will begin.

In June 2004, DCN and Thales announced their decision to combine their strengths and set up an integrated Prime Contract Office to jointly lead the future French aircraft-carrier programme. A jointly-owned company will assume the role of prime contractor. This company will have a four-member board of directors, with equal representation by DCN and Thales, chaired by a DCN nominee.

This company, which is currently being set up, will lead the PA2 programme from conception to completion and support implementation of cooperation with the United Kingdom's future aircraft carrier programme.

The new joint company will be 65% owned by DCN and 35% owned by Thales Naval France.

World's Largest Orders in 2004

Shipbuilders in South Korea enjoyed another bumper year in 2004 by winning the largest amount of orders in the world. The shipbuilders clinched combined orders of 17.3 million compensated gross tons (CGT) last year, and which is higher than the second ranker — Japan's 12.2 million CGT.

COSCO Orders the Largest Container Ships

Hyundai Heavy Industries Co. Ltd. (HHI) has won an order from COSCO for what will be the largest containerships — four 10 000 teu vessels due for delivery in 2008. Each will be 349 m in length, 45.6 m in beam and 27.2 m in depth. The ship will have a diesel of 70 000 kW brake power for a service speed of 25.8 kn. HHI says it has completed the design development of a 12 000 teu containership.

HHI's backlog for super-large containerships with a capacity of over 8 000 teu totals 35 units, giving it a 35 percent share of the global market. HHI's total shipbuilding division order backlog now stands at 230 ships, which is equivalent to \$US16 billion. For 2005, HHI set an order target of \$US5.5 billion and plans production of 70 ships totaling 5.1 million CGT.

RAN Support the Focus at DSTO Stirling

A \$3 million extension to the Defence Science and Technology Organisation's Stirling research facility will ensure continued leading-edge support to the Royal Australian Navy in specialised submarine research.

Australia's Chief Defence Scientist, Dr Roger Lough, officially opened the newly extended building — including four new research laboratories — at DSTO's WA research facility, located at HMAS *Stirling* in Rockingham, south of Perth on 12 November.

The newly-expanded structure can now accommodate up to 70 staff and boasts specialised new research laboratories that will support the Royal Australian Navy's submarine and surface combatants at HMAS *Stirling*.

‘We have added four new laboratories to our Stirling facility, focusing on materials investigation, noise and vibration, combat systems and sonar processing,’ Dr Lough said.

‘This will enable DSTO researchers to better support the RAN by enhancing a variety of core research programs — including submarine hull and towed-sonar data replay and analysis, which is critical to evaluating submarine hull sonar performance and investigating advanced-processing concepts.’

The extensions also provide DSTO researchers with:

- a replica of a Collins-class submarine control room, which will allow the study of the interaction between systems and operators;
- improved computer-based facilities for modelling studies and submarine tactical war games;
- an expanded trials-support capability; and
- a better ability to undertake materials-failure analysis and data-mining activities.

‘The improved facilities at DSTO Stirling will ensure we continue to provide high-level support to the RAN,’ Dr Lough said.

‘The new labs will provide DSTO scientists and RAN personnel with access to more-realistic representations of improved submarine combat system and sonar options, as well as better facilities for investigating ship and submarine noise, vibration and materials issues.’



Could this be the RAN's smallest survey ship? Navy Hydrographers, Lieutenant Commander Darryn Mullins, Petty Officer Hydrographic Systems Manager Darryl Harper, and Able Seaman Hydrographic Systems Operator Adam Henry, survey the channel in Banjir Kanal Krueng Aceh (river), to guide landing craft from HMAS *Kanimbla*, during Operation Sumatra Assist (RAN photograph)

Incat-built *Normandie Express* Delivers Aid to Indonesia

Normandie Express, Brittany Ferries' high-speed catamaran, built by Incat in Tasmania, took a detour with aid for Indonesia on her delivery voyage from Hobart to France.

The Incat-built vessel left Tasmania on Saturday 22 January 2005, for France under the control of her new operator Brittany Ferries. The ship was ferrying aid items donated for the victims of the Asian tsunami disaster and unloaded the much-needed supplies in Jakarta before continuing on to France in readiness for a cross-channel fast-ferry service between France and the UK.

The aid project was a joint effort by Brittany Ferries, Incat, the Tasmanian Government and AusAID, with the donations of aid items coming from the State Government, companies and individuals. Included in the aid were 80 pallets of bottled drinking water, 320 large (including multi-roomed) tents accommodating up to 2 500 people, several donated 4WD vehicles including a fire truck, 40 sewage treatment systems which will cater for many thousands of people, medical supplies, bedding items, baby food and other non-perishable food items.



Normandie Express on trials before leaving Tasmania for service with her new operators (Photo courtesy Incat)

Brittany Ferries' *Normandie Express*, a 98 m Incat catamaran, will be the largest to operate on the English Channel, accommodating up to 900 passengers on a single level and 280 cars on the vehicle deck.

The ship will operate from mid-March until mid-November with crossing times of only 180 minutes to Cherbourg and 225 minutes to Caen, running up to two return trips a day to Cherbourg and a daily service to Caen every Friday, Saturday and Sunday, supplementing the three return crossings a day by conventional cruise-ferry.

The fast catamaran is powered with a propulsion system of four engines each providing 7080 kW to drive a system of waterjets, enabling the vessel to reach a service speed of 42 kn.

The high-speed catamaran is also returning to France the stricken yacht *Sill et Voilia* which, in December last year, was forced to withdraw from the Vendee Globe solo round-the-world race after suffering keel damage. Solo sailor Roland Jourdain was third in the race when forced to withdraw and, although still disappointed at not completing the race, said ‘I am most grateful to Incat and Brittany Ferries

for arranging this rescue of a sailor in distress by returning my damaged yacht to France”.

Mr Gilles Norgeot, Brittany Ferries’ Technical Director, said: “We are excited at taking delivery of this Incat-built fast catamaran in Tasmania. The *Normandie Express* new high-speed service from Portsmouth will complement our existing 135 minute express service from Poole to Cherbourg to give customers even more choice on how they cross the channel”.

Mr Cyril Fabry, Maritime and Ports Operations Manager for Brittany Ferries, travelling on delivery voyage, said “We are accustomed to taking ferries for a couple of hours across the English Channel; this trip will take us halfway around the world so the delivery crew is excited about taking the ship to France and being able to make the stop in Indonesia.

Managing Director of Incat Chartering, Craig Clifford said “We are pleased to welcome Brittany Ferries, one of Europe’s leading transport operators, to the Incat family and congratulate them on their support of the tsunami relief program. I am sure the aid being delivered on board the vessel will greatly assist those in need. In the meantime we wish Brittany Ferries every success in their new operation with our Incat vessel”.

New South Wales Industry News

NWBS Catamarans for Quicksilver

North West Bay Ships has signed a contract for two 28 m dive catamarans for Quicksilver Dive in Queensland, and construction commenced in January 2005.

These two vessels are specifically designed to cater for small groups of divers and snorkellers to visit a number of dive sites during the day. Main features of the vessel include full-width transom access to the water, creating an 8 m “beachfront” onto the coral reef, lots of external deck space for sun worshipping, and galley facilities to serve a full buffet lunch for up to 150 guests.

Principal particulars of the vessels are:

Length OA	29.45 m
Length WL	27.10 m
Beam OA	7.80 m
Passengers	100 divers 150 persons max.
Main engines	2 × Deutz TBD 616V16 each 936 kW at 2100 rpm
Gearboxes	2 × ZF 2550 reversing
Propellers	2 × fixed pitch 5 blade
Generators	2 × Deutz BW 1555 I each 52 kVA 50Hz at 1500 rpm
Speed	31 kn cruising
Survey	USL Code Class 1C

NWBS Trimaran for Japan

North West Bay Ships has signed a contract for a 45 m trimaran for Japan, and construction is due to start as we go to press.

This vessel is based on the NWBS foil-assisted 55 m passenger trimaran, but is propeller driven with a service speed of 31 knots at 90% MCR. She is designed to run on

The Australian Naval Architect

an exceptionally-rough route and, hence, is quite a large vessel at 45 m for the modest 200 passenger capacity. Built to Japanese JG standards, she will be able to maintain the full service speed of 31 knots in a 2 m significant sea state.

Principal particulars of the vessel are:

Length OA	46.50 m
Length WL	44.03 m
Beam OA	14.40 m
Passengers	200
Main engines	2 × MTU 12V4000 each 1740 kW at 2000 rpm
Props	2 × fixed pitch 5 blade
Speed	31 kn at 90% MCR
Survey	JG Limited Coastal

Rob Tulk

Visiting Cruise Vessels

As usual, business for the cruise vessel season picked up during December and January, and saw Princess Cruises’ brand-new vessel *Sapphire Princess* (completed May 2004), visiting Sydney for the first time on 23 December 2004. Others included *Pacific Princess*, *Pacific Sun*, *Silver Cloud*, and *The Topaz*.

Phil Helmore



Sapphire Princess in Sydney Cove
(Photo John Jeremy)

US Navy Launches X-craft

The US Navy officially christened its new Littoral Surface Craft — Experimental, commonly referred to as “X-Craft,” on 5 February 2005. Developed by the Office of Naval Research (ONR), this high-speed, aluminium catamaran is designed to test a variety of technologies that could allow the Navy to operate more effectively in littoral or shallow waters.

The ship has been named *Sea Fighter* and has been assigned hull number FSF 1, which stands for fast sea frame.

“The United States Navy has been at the forefront of employing catamaran technology for advanced naval vehicles,” said *Sea Fighter*’s designer, Nigel Gee. “The difference here is that ONR came out with some very challenging new requirements which required some new technology in order to address that.

“We’ve been working with ONR and The Titan Corporation to produce something that would satisfy those demands,” he said. “They include achieving speeds of more than 50 kn



The Littoral Surface Craft — Experimental (X-Craft), christened *Sea Fighter* (FSF 1), at Nichols Bros Boat Builders in Freeland, Whidbey Island, Wash., will be used to evaluate the hydrodynamic performance, structural behaviour, mission flexibility, and propulsion system of high-speed vessels.
(US Navy photograph)

with a full payload; being able to travel 4 000 n miles across the ocean without being refuelled; being able to land helicopters in sea states four or five; being able to recover watercraft in sea state four at reasonable speeds over the stern ramp; and ensuring that the vessel be habitable at sea states four and five for long periods.”

Sea Fighter is powered by a combined diesel or gas turbine (CODOG) engine plant outfitted with two MTU 595 diesel engines and two General Electric LM2500 gas turbines. The diesels will primarily power the ship during long-range cruising speeds, while the gas turbines will enable the sea fighter to travel at least 50 kn in calm seas and more than 40 kn in sea state four.

“There is a tremendous capability in this vessel to move people, equipment and mission modules, and she can help with humanitarian assistance,” said Capt. David Comis, initial X-craft project manager from February 2002 to July 2004. “I think this vessel would have been perfect for the recent Indonesian mission. It can get to its destination very quickly and has the capability to take part in a large variety of missions.”

Thanks to its large mission bay, which can hold up to a dozen 20-foot mission modules, *Sea Fighter* remains mission flexible. It can take part in various undertakings, including battle-force protection, mine countermeasures, anti-submarine warfare, amphibious-assault support, and assistance with humanitarian aid.

A multipurpose stern ramp, with direct access to the mission bay, allows *Sea Fighter* to launch and recover manned and unmanned surface and sub-surface vehicles while underway. Its flight deck has dual landing spots that can fit two H-60 helicopters or unmanned aerial vehicles (UAV).

The 79.3 m catamaran has a crew of 26, of whom 16 are US Navy while the other 10 are US Coast Guard. *Sea Fighter* is designed with three-man staterooms for its crew, a decidedly more-personal setting than the vast berthing compartments of most naval ships.

Sea Fighter, which took 20 months to build, was launched on 9 February. Nichols Bros will officially hand the ship over to the US Navy on 30 April and in July, the ship will head south to its home port of San Diego.

February 2005

Progress with Civil War Submarine Conservation

Scientists, under the supervision of the Naval Historical Centre (NHC) began work in February on the removal of the wooden bench on which the crew of the Civil War Confederate submarine *H. L. Hunley* sat on to crank and propel it into world history.

Archaeologists and conservators are hopeful that, once the bench is removed, they will discover new *Hunley* artifacts.

“I am pleased to see the project move into this phase of partial disassembly, both for what we may learn about the construction and operation of the submarine, but also because it allows for the conservation of the iron hull to move forward,” said Dr Robert Neyland, Underwater Archaeology Branch, NHC. Dr Neyland has supervised the recovery and conservation of the historic submarine since 1998.

Storage space for the crew’s personal belongings was extremely limited within the tight confines of the submarine. When the *Hunley* crew was preparing for their mission, the most logical place to store personal belongings while not interfering with the operation of the submarine was directly beneath the bench.

“Up until now, the area beneath the bench was almost inaccessible. This area is also heavily concreted, which masks any artifacts that may have been stored there and makes them very difficult to remove,” said Senator Glenn McConnell, chairman of the *Hunley* Commission. “This is potentially a relic-rich region. I can’t help but wonder what other items the crew may have decided to take with them on a mission which they knew to be dangerous and life threatening. The possibilities are limitless on what other fascinating artifacts from the 19th century *Hunley* has yet to reveal.”

At this time, scientists have already identified two canteens located under the first section of the bench, and one canteen under the second section.



Civil War Confederate submarine *Hunley* conservators Philippe de Vivies, left, and Paul Mardikian remove the first section of the crew’s bench at the Warren Lash Conservation Laboratory in the former Charleston Navy Shipyard, S.C.
(Photo courtesy of US Naval Historical Centre)

The bench removal was expected to be difficult and take several weeks to complete. After being submerged in salt water for more than 140 years, the bench is waterlogged and extraordinarily fragile. Additionally, approximately 50

percent of the bench is still covered with a clear lead-based paint.

“You are looking at the original paint from 1864,” explained Paul Mardikian, senior conservator to the *Hunley* project. “The binder (oil) has disintegrated over the years, leaving the white pigments behind. The paint can literally just slide off, which makes this bench even more fragile to handle and conserve.”

Still, conservators are hopeful of maintaining the bench’s original features as much as possible during excavation.

Removing the bench is the beginning of the final steps needed to prepare the world’s first successful combat submarine for conservation. Before conservators can begin a treatment to eliminate salts threatening the stability of the vessel, the bench and other artifacts must be removed from the submarine, so they are protected from the effects of the chemicals used in the conservation process.

The bench is almost 5.45 m long, about 25 mm thick, and is made of three distinct panels of wood bound together. In order to remove the bench from the submarine, scientists are excavating the iron concretion that, over time, has built up around the various metal brackets holding the bench in place.

The front bench panel, approximately 2 m in length, is in the forward section of the submarine and was the first to be excavated. Archaeologists anticipated this section of the bench would be the least complicated to remove due to ease of access. They have also completed removal of the second bench panel. The third section of the bench will likely prove to be the most difficult to excavate since it is extremely difficult to access and, in some places, is mounted within the submarine’s aft pump mechanisms. Once the bench and other artifacts are removed, they will be analysed and stabilised.

On the evening of 17 February 1864, *H.L. Hunley* became the world’s first successful combat submarine by sinking USS *Housatonic*. After signalling to shore that the mission had been accomplished, the submarine and its crew of eight vanished.

Lost at sea for more than a century, *Hunley* was located in

1995. The hand-cranked vessel was raised in 2000 and delivered to the Warren Lasch Conservation Centre, located on the former Charleston Navy Yard, S.C., where an international team of scientists is at work conserving the vessel and piecing together clues to solve the mystery of its disappearance.

Kellen Correia

Naval Historical Center Public Affairs

French Navy’s *Mistral* Launched

On 6 October 2004 a ceremony was held at DCN’s Brest shipyard to launch *Mistral*, the first of two BPC force projection and command vessels for the French Navy.

The event is a major milestone in the BPC shipbuilding programme. The ship will now move to the final fitting-out stage before proceeding, ahead of schedule, to trials and testing with delivery in 2005. In parallel with these activities, the construction of *Tonnerre*, the second of the class, is progressing rapidly towards its scheduled delivery in 2006.

The contract for the design and construction of the two ships was awarded to prime contractor DCN, in partnership with Alstom Marine-Chantiers de l’Atlantique and Thales, for a total cost of •570 million. Design/need optimization and innovative engineering solutions cut construction times and reduced costs by some 30% compared with the earlier *Foudre* and *Sirocco* designs.

The contracting arrangements have enabled each main contractor to contribute its key shipbuilding strengths. As a result, the aft sections, which are more military, are the responsibility of DCN’s Brest shipyard, whereas the forward sections, more like commercial ships, are the responsibility of Alstom Marine-Chantiers de l’Atlantique’s Saint Nazaire shipyard.

Mistral and *Tonnerre* are all-electric ships with a length overall of 199 m and a displacement of 21 300 t. The BPC concept combines a landing helicopter dock, a floating hospital, an amphibious assault ship, a troop transport and a command vessel — all in a single hull.

A stretched version of *Mistral* is one of two designs (the other is by Izar of Spain) under consideration for the RAN’s LHD project.



USS *Swift* (HSV 2) prepares to dock at the pier in Belawan, Indonesia on 3 February 2005. The Australian-built USS *Swift* transferred water purification chemicals, medical supplies, and rice donated from the Mexican people to the victims of tsunami (US Navy photograph)

Integrated Naval Architecture & Ship Construction Software

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DESIGN

Trimmed NURB Surfaces,
fairness indicators, developable
surfaces, parametric variation
& high accuracy

ANALYSIS

Hydrostatic analysis, longitudinal
strength, damaged stability,
resistance prediction, VPP, seakeeping

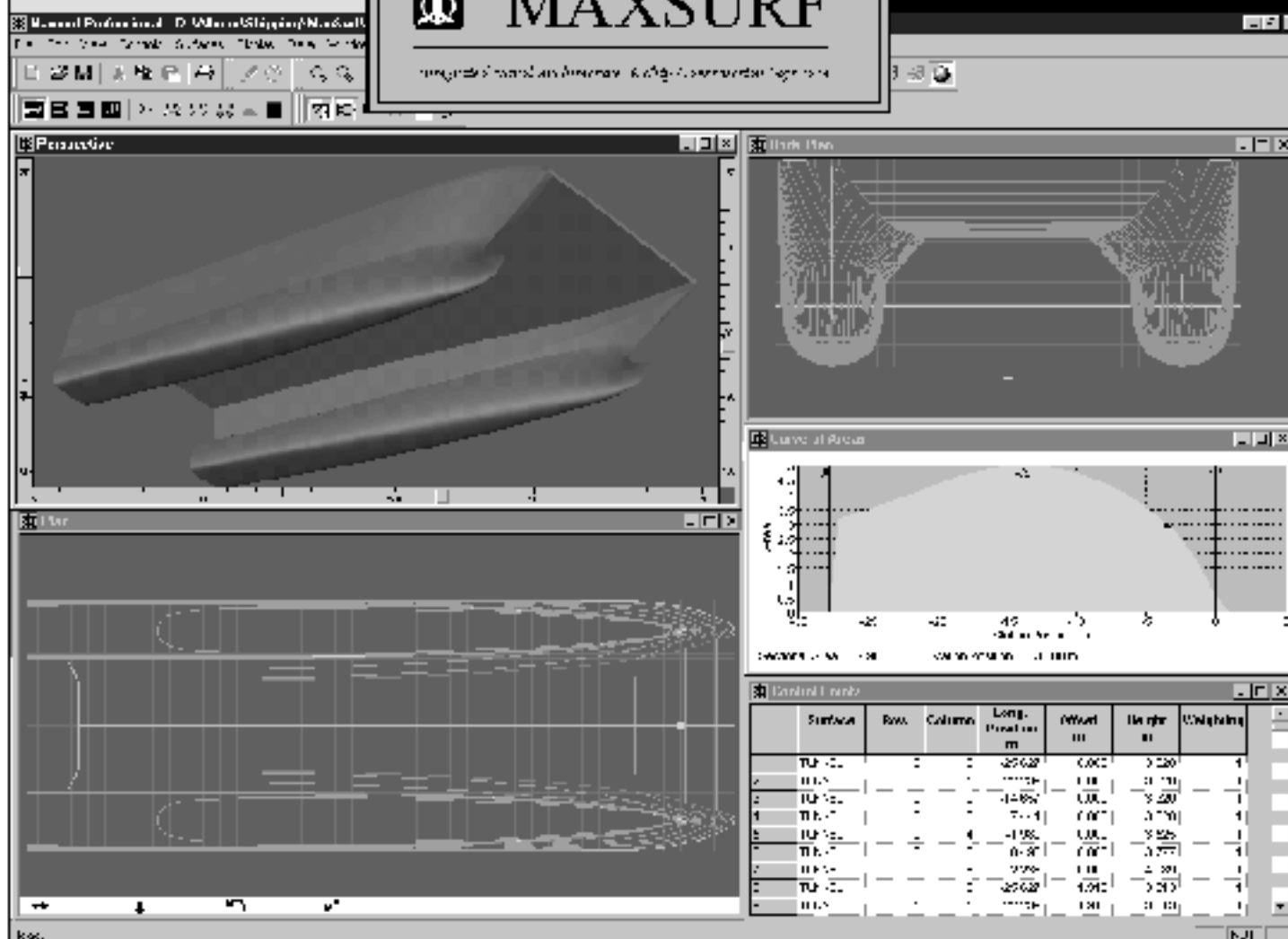
CONSTRUCTION

Stiffener paths, frame generation,
plate development & parts database



MAXSURF

Integrated Naval Architecture & Ship Construction Software



Patrol Boats for Yemen Completed

Austal has launched the final fast naval patrol boat of the ten ordered by the Republic of Yemen in June 2003.

They have been designed to meet a variety of operational requirements including general police missions in coastal waters, customs control and anti-terrorist operations at sea, offshore protection and tracking, surveillance of the Exclusive Economic Zone, defence and protection of national sea areas and operations within integrated task forces.

The patrol-boat capabilities of Austal were first highlighted to the Yemen Ministry of Defence as part of an extensive requirement and worldwide market analysis carried out by an international strategic consultancy firm. Some 24 shipyards, including builders from Asia and eastern and western Europe were studied as part of this process. Impressed by Austal's naval-design capability, value for money and short delivery times the consultants identified the Australian builder as the preferred supplier.

Austal's Sales and Product Development Manager, Mr. Glenn Williams, says Yemen is receiving a well-built, well-engineered and well-supported patrol-boat fleet.

"Based on the eight Bay-class patrol boats Austal delivered to the Australian Customs Service in 1999/2000, these 37.5 m deep-V monohull patrol boats offer exceptional value for money by combining world's best shipbuilding techniques and commercial-off-the-shelf (COTS) equipment," he said.

"The aluminium construction contributes to both excellent high-speed performance and through-life economies due to reduced propulsive power and maintenance requirements."

The moderate power of two Caterpillar 3512 diesel engines driving fixed-pitch propellers through Reintjes gearboxes ensured the contract speed of 29 kn was achieved on trials. This twin-screw propulsion system blends mechanical reliability and simple, efficient operation with ease of maintenance and is backed by the suppliers' own well-established service and spares networks.

Twin rudders, fabricated from stainless steel, ensure maximum manoeuvrability and are offset from the screws to facilitate easy shaft removal.

The excellent seakeeping of the deep-V, single-chine, semi-displacement hullform has already been proven through extensive tank testing and subsequent operational experience with the Australian Customs Service. This will facilitate operations well out into the nation's territorial waters. Operating range is in excess of 1000 nautical miles.

In order to enforce local and international laws within Yemen's territorial waters, each patrol boat is fitted with a 25 mm twin-barreled naval gun and two 12.7 mm heavy machine guns. Weapons lockers for the machine guns and small arms are fitted and ready-use ammunition lockers are located adjacent to each gun mounting.

To facilitate all possible combinations of functions that the vessel will be expected to perform with emphasis on safety and efficiency, the deck layout has been designed with an absolute minimum of trip points. Bulwarks are provided to the weather deck forward and port and starboard walkways are provided around the superstructure. The weather deck is raised forward to improve the vessel's operating capability.

Aft on the Main Deck a crane is fitted allowing transfer of



Six of the patrol boats for Yemen in line abreast
(Photo courtesy Austal Ships)



The bridge of one of the patrol boats
(Photo courtesy Austal Ships)

general cargo from the vessel to a sea boat or from ship to shore. A RIB sea boat with a 30 kW outboard engine is also provided.

Each patrol boat operates with a complement of 19, comprising three officers and 16 sailors.

The interior fitout has been completed to a comfortable and easy-to-maintain commercial standard. Layout is arranged for maximum habitability taking into account vessel movement, noise, vibration and the flow of personnel when carrying out their shipboard duties.

The spacious wheelhouse is arranged for three-man operations and located for around-the horizon visibility and minimal motion, thus reducing crew fatigue. The emphasis on using COTS equipment from reputable suppliers is clearly evident in the navigation, communication and control systems, not only on the bridge but also in the dedicated operations room.

Sleeping accommodation comprises the captain's and officers' cabins on the main deck and two six-berth and two two-berth crew cabins in the hull, all provided with ample storage space. There is also a ship's office and separate mess areas for officers and crew. In the mess rooms, TV, video and audio entertainment system are fitted with a booster to enhance reception in marginal areas. A well-appointed galley and adjacent food storage allows the vessels to spend at least 14 days at sea on patrol without replenishment. A fresh water maker is fitted to supplement potable water supplies.

The onboard air conditioning provides a comfortable working environment and has been designed taking the local climatic conditions, including extremely high air and sea temperatures, fully into account.

Training Programme

In addition to designing and building the ten modern patrol boats, Austal has provided a substantial package of training for some 70 personnel, the aim of which is to ensure that crews can make the best use of the vessels' capabilities both when they enter service and for many years to come.

The training programme at the shipyard involved key members of each vessel's crew undertaking a combination of tuition and practical training. This included familiarisation with the vessels while they were under construction so that

crews are conversant with structural, engineering and systems considerations, as well as at-sea instruction covering the capabilities and operating procedures for the new patrol boats.

Importantly, personnel are also being given instruction and practical training in aluminium welding techniques so that they will be better equipped to undertake or supervise vessel repair and maintenance tasks at local facilities.



The engine room
(Photo courtesy Austal Ships)

Principal Particulars

Length overall	37.5 m
Length waterline	32.4 m
Beam moulded	7.2 m
Hull depth (moulded)	5.0 m
Hull draft (maximum)	2.2 m
Crew	3 officers 16 sailors
Armament	1 x 25 mm twin-barrelled naval gun 2 x 12.7 mm heavy machine guns

Propulsion

Engines	2 x Caterpillar 3512; each 1305 kW at 1800 rpm
Gearboxes	2 x Reintjes WVS 730
Propulsion	2 x fixed pitch propellers
Generators	2 x Perkins Sabre 6TWGM, each 83 kW.
Maximum speed	29 kn
Range (20% reserve)	1000 n miles

Tankage

Diesel fuel	27 000 L
Fresh water	10 000 L
Sewage	2 000 L
Sludge	500 L
Lube oil	500 L

Survey

Classification	Germanischer Lloyd
Survey Authority	Government of Western Australia, USL Code Class 2B

Developable Surfaces in Maxsurf

In the write-up of a recent technical presentation on Design for Production (see The ANA, August 2004, p. 10) it was stated that:

“Developable surfaces are popular for small vessels, and AutoShip (for example) has an option for converting surfaces to be developable automatically.”

Here Andrew Mason, Technical Director of Formation Design Systems, discusses developable surfaces in general, and how they are handled in the FDS program Maxsurf.

The perfectly-developable surface is not necessarily (or even usually) the surface that is most desirable from the point of view of the designer and/or builder. Typically on a powerboat hull, with twist in the bottom panel forward, truly-developable panels have too much convex curvature to be ideal.

However, by modifying the sections toward a more ideal shape, it is often possible to come up with a surface that is just as buildable as the truly-developable surface. The reason for this is that we are not dealing with inelastic materials, as even steel plate has some elasticity which allows it to be persuaded into a slightly non-developable shape.

This is one reason why we take the approach that we have in Maxsurf. We show, using marker points, where the truly-developable surface will lie, and the designer then chooses whether to have his surface conform to those points or whether to deviate from them.

This approach also allows another important design function — the ability to intentionally make a portion of a surface non-developable. For example, on the topsides of a typical powerboat hull, the aftmost two-thirds of the surface may be perfectly developable. Up forward, however, the designer may choose to sacrifice developability to create a significant amount of topside flare. Maxsurf allows the designer to do this within a single surface, and to measure the amount of

strain (i.e. compound curvature) in the resulting plates. Apart from small boats, this is a typical requirement of steel and aluminium workboats — to make as much of the boat as developable as possible, but sacrifice developability in those areas which have a critical influence on seaworthiness and performance.

Remarkably, the use of Maxsurf to design surfaces that are practically developable has resulted in examples that were easier to build than truly developable designs. One example that I can give is of a builder in the north-west USA who was building a workboat with a deep forefoot at the bow. This is a hard shape to make developable but it can be done with fairly full sections. One plate in the bow, although developable, needed to be formed around a radius of curvature of about one metre. When the design was modified to give straighter sections and less-developable plates, the minimum radius of curvature increased to around two metres, resulting in less force being required during the plating process.

We recommend with Maxsurf and Workshop that, if a plate is developed and has a maximum internal strain of less than 0.25%, then the plate can be considered to be practically developable. We have had builders who have relaxed this recommendation to 0.4% with good results. As a result of our experience, I have concluded that the enforcement of



HMAS *Parramatta* at sea off the New South Wales coast during Exercise Ocean Protector in February demonstrating that she is a ship and not just a platform
(RAN photograph)

true developability by many programs is an artificially-strict requirement which results in the unnecessary compromise of seakeeping and resistance characteristics for many designs.

As an additional point, there are some low-cost hull-design programs which do surface developments. However, some of these actually only cater for straight-section designs. This is fine for untwisted panels, but results in large discrepancies from the developable surface when a panel is twisted. Ironically, I think that the reason that these programs have produced many reasonable boats is for exactly the reason described above — the inherent elasticity of plywood allows a panel to be tortured into a shape that is not developable, allowing the straight-section designed to be panelled

effectively while retaining straight sections.

In summary, most designers compromise on developability by allowing some double curvature in their designs (i.e. making them not truly developable) to get a more seaworthy or better design. The method Maxsurf uses for generating developable surfaces allows the user to decide how much strain they are willing to allow in the plates of their vessels.

If a user has the Prefit module from the Maxsurf suite, then a truly-developable surface can be generated by generating a set of Markers from the ruling lines and using the Fit to Markers command to automatically fit a surface to these markers. This will ensure that the entire surface is 100% developable.

FROM THE CROW'S NEST

Changes at Lloyd's Register

The Lloyd's Register Asia General Manager for Australasia, Alan Williams, has moved to Shanghai, China to take up the position of Marine Manager for China.

The position of General Manager for Australasia was taken over by Glenn Cobb on 1 February 2005. Glenn was previously the Operations Manager for the Great Lakes and Atlantic Canada area for Lloyd's Register North America and, prior to that, spent over 20 years in LR's Vancouver office. Glenn is a naval architect, originally from the UK, a Member of RINA, SNAME and IMarEST, and is the first naval architect in many memories to hold the GMA position.

Adrian Broadbent

WWSR

Ken Warby's challenge to his own World Water Speed Record is warming up. Sterling Estates joined the team as major sponsor last year, and the new boat was unveiled at the Australian National Maritime Museum on 8 October last year, 25 years to the day since Ken broke the world record in 1978.



Aussie Spirit at speed on the Manning River in January
(Photo Daniel Leonard)

The new boat was launched at Taree and trialled on the Manning River in December, and "went like a scalded cat", according to Ken. Further trials were conducted in January, with acceleration and speed being slightly increased on the previous test, and building up what Ken calls "seat time". The handling characteristics continue to be as planned. The

February 2005

next tests are scheduled for Easter 2005, with more of the same; increasing acceleration, speed and seat time. For further details of the challenge, visit www.kenwarby.com.

The schedule for the record runs will be highly dependent on the water level in Blowering Dam, which is currently at about 21%. Blowering is now controlled by the Department of Infrastructure, Planning and Natural Resources and releases water into the Murrumbidgee River for irrigation. Water levels for the Tumut River at Blowering Dam for the past month can be found at <http://waterinfo.dlwc.nsw.gov.au/index.epl?site=410102&ref=> (you need the equals sign at the end). The fourth graph down gives the percentage full.

If you want longer-term trends on the water level, then you have to go to the Murrumbidgee Irrigation website at www.mirrigration.com.au/ and click on "history" above the table for Burrinjuck and Blowering to find tabular data for the previous six months.

You should keep the prayer mat out for good autumn rains, as in the Australian board game *Squatter*!

Maxsurf Upgrade

Maxsurf, the well-established suite of hull-design software from Formation Design Systems, has recently been upgraded to Version 11.01. The upgrade adds a number of enhancements, including user interface improvements, more heeling-arm parent criteria, improved stringer fitting in Workshop, higher-order conformal mapping in Seakeeper, and an updated slender-body method for resistance prediction.

Many dialogue boxes have been made resizable in Maxsurf, Hydromax and Workshop, and this can be useful in a number of situations. The default size can be easily restored at any time. The PDF manual for each module is now easily accessed through the Help menu and is automatically opened on clicking, for example, "Hydromax Help" in Hydromax.

Maxsurf now enables the trimming menu to be accessed by right-clicking of the mouse button on a contour or surface, and the trimming procedure remains the same.

Hydromax now includes new items in the Analysis menu to allow recalculation at any time. The new items are Update Loadcase, Recalculate Tanks and Compartments, Recalculate Hull Sections, and Snap Margin Line to Hull. There is a

new item in the Display menu to enable the individual review of hull sections calculated by Hydromax, and the floodable length criteria have been expanded to allow immersion to a specified freeboard from either margin line or deckline. There are new parent criteria for heeling-arm values, and updated heeling-arm criteria.

Workshop now includes significant improvements to the stringer-fitting algorithm to ensure that the stringer passes exactly through each stringer point, and four new stringer types replace the “fitted” and “B-spline” stringers. The stringer toe direction and the associated cutout may now be flipped, and the frame and deck opening definitions have been enhanced to allow easy generation of a variety of opening shapes. Mouse holes can now be inserted automatically at the intersections of plate edges with frames. Lines can now be exported optionally as a series of polylines, or a series of polylines and arcs to suit the particular cutting-machine controller.

The conformal mapping capability in Seakeeper has been improved by allowing conformal mappings of up to fifteen terms, in order to better match the actual hull sections.

The existing slender-body analytical method in Hullspeed has been revised in accordance with the work of Tuck, Lazauskas and Scullen, gives more reliable answers for a wider range of hull shapes, and is significantly faster. It is now possible to plot the individual resistance coefficients.

For further information, contact Formation Design Systems on (08) 9335 1522 or email info@formsys.com.

Multiframe Upgrade

Multiframe, the well-established suite of structural software from Formation Design Systems, has recently been upgraded to Version 9.0. The upgrade adds a number of enhancements, including drawing and dragging in three dimensions, snapping and drawing options, semi-rigid connections, resizable dialogues, and improvement of column restraints in Steel Designer and improvements to groupings and dynamic reloading of the section library in Section Maker.

In Multiframe, arbitrary drawing in three dimensions can now be performed, and dragging of joints and members may

also be done in 3D, and this can be constrained to a particular direction with dynamic line constraints. A number of options have been introduced to give the user greater control over drawing and snapping, by the use of toggling particular snaps. A new geometry toolbar has been added to allow graphical modification of the structure using the commands available via the Geometry menu. Semi-rigid connections can now be modelled using member end springs. New sections can now be added to the sections library or frame group by specifying the shape and dimensions of the section, and the properties associated with the shape will be calculated by Multiframe and inserted into the library. Axial end releases can now be defined at the ends of members. A new option has been added so that global loads can have either a global or a local distribution along the member. The drawing of distributed loads has been improved, and they are now represented by a shaded polygon containing arrows showing the direction of the load. A new field has been added to the Symbols dialogue to allow the user to display properties of a joint which are not available as separate symbols. The format of real numbers is now associated with the units of the number, and the Units dialogue has been redesigned as a table containing options to set the real number format for each type of unit.

In Steel Designer, the definition of effective lengths for column buckling in AS4100 has been improved to allow the user to specify a number of column-buckling segments along the member. A new field has been added to the Symbols dialogue which, when selected, allows the user to choose a design parameter to be displayed with each member.

In Section Maker, the Group Window has been replaced by a new Groups Window which lists all of the groups, and some of the properties of the groups, in the current sections library. The table in the Group Information dialogue has been modified so that the field associated with a section property can be selected by name. Section Maker checks for changes to the current section library each time it is selected and prompts the user to reload the sections library if a modification is detected.

For further information, contact Formation Design Systems on (08) 9335 1522 or email info@formsys.com.

Phil Helmore



The International 5.5 m World Championships were conducted on Sydney Harbour during January 2005. Twenty-seven boats from eight countries competed in the series which was won by *Artemis XII* (SUI 210) sailed by Ronald Pieper and Jochen Schuehmann (Photo John Jeremy)

EDUCATION NEWS

The University of New South Wales

Undergraduate News

Graduation

At the graduation ceremony on 10 December, Mark Williamson graduated with his degree in naval architecture with Honours Class 2, Division 2. Congratulations, Mark! Mark has been running his own consultancy, Mark Williamson Design, in Brisbane for some time.

Prof. Lawry Doctors Retires from Teaching

Prof. Lawry Doctors retired from The University of New South Wales in February, after thirty-four years of teaching, and twenty years as coordinator of the Naval Architecture plan. He became coordinator after the departure of Prof. Owen Hughes for Virginia Polytechnic Institute and State University in the USA. Lawry thus becomes the longest-serving of all the lecturers who have taught naval architecture at UNSW.

Lawry completed his BE and MEngSc in mechanical engineering at the University of Sydney under Prof. Tom Fink, and then travelled to Ann Arbor, Michigan, to do his PhD at the University of Michigan on *The Wave Resistance of an Air-cushion Vehicle*. On completion, he returned to Sydney in November 1970 to take up a lecturing position in the (then) School of Mechanical and Industrial Engineering at The University of New South Wales, where Prof. Fink had been appointed as Dean of Engineering.

In addition to lecturing in undergraduate naval architecture, fluid mechanics and numerical methods, Lawry soon established new courses in ship hydrodynamics. Over the years, he has established a world-wide reputation for his research in the field of numerical prediction of resistance, wave generation and motions of ships. He is particularly proud of the many achievements of his UNSW graduates, who have excelled themselves in all facets of naval architecture. This is particularly true in the area of high-speed ships, in which Australia is the world leader.

One of his early practical tasks was testing a model of Ken Warby's *Spirit of Australia* in the wind tunnel at UNSW and giving advice on the proper sizing of the proposed added tailplane. *Spirit* took the world water-speed record in 1978 and still holds it today. He has appeared as an expert witness in court cases and has consulted on the design of high-speed craft both in Australia and overseas. Lawry was promoted to Associate Professor in 1984 and, in 2002, to Professor.

For the immediate future, he has secured a position as Visiting Professor at UNSW, which will provide an umbrella for his continuing collaborative research in hydrodynamics both in Australia and other countries.

In order to mark Lawry's retirement and long-term teaching at UNSW, some of the naval architecture staff (Mac Chowdhury, Graham Taylor, Tracie Barber, Gangadhra Prusty and Phil Helmore) and their partners took Lawry and Helen out to dinner in late January. There, they reminisced, dreamed, and philosophised about a wide range of topics.

February 2005

Naval Architecture Staff Changes

As a result of the retirements of Lawry Doctors and Noel Riley, a number of staff changes have occurred.

Phil Helmore has taken over as Coordinator of the Naval Architecture plan in addition to his position as Director of Undergraduate Teaching in the School of Mechanical and Manufacturing Engineering.

Phil Helmore has taken over teaching the hydrostatics component and Tracie Barber has taken over teaching the hydrodynamics component of the Ship Hydromechanics course.

Graham Taylor has taken over from Noel Riley in teaching of the Ship Standards course. Graham brings with him a wealth of design, supervision of construction and operational experience from the consultancy world, and will inject a highly practical flavour to this course as well as to the design projects.

Michael Andrewartha has taken over teaching the hydrodynamics component of Design of High-speed Craft. Michael is currently working for North West Bay Ships, and has recently submitted his PhD dissertation on foil assistance for catamarans.

Other Staff Changes

Dr Ian MacLaine-cross retired from UNSW in February, after thirty-one years of teaching. He will be remembered by many for his teaching of computing in Year 1, fluid mechanics in Year 2, and numerical methods in Year 3. He also contributed significantly with his research in refrigeration and air conditioning, and is a long-time champion of hydrocarbon refrigerants.

Phil Helmore

Post-graduate and Other News

RINA Conference on High-Speed Craft: Design and Operation

This conference was organized by RINA and took place in London at the RINA headquarters on 17 and 18 November 2004. As with all previous such conferences attended by this writer, the event was very well attended with designers and researchers travelling from a number of countries to listen and to contribute. Also, following the format of previous RINA conferences, there was ample time for presentations of the papers, namely 35 minutes. This included ten minutes of discussion time. The result was an unrushed atmosphere which was much appreciated.

A total of nineteen papers was presented at the conference. The bulk of these papers was of a design nature. This characteristic is typical of the London RINA meetings. It certainly demonstrated the spread of ideas for increasing the speed of marine vessels.

Particular topics included catamarans, trimarans, hydrofoils, surface-effect ships, hovercraft, and air-supported vessels. In the latter regard, a heated debate ensued with regard to the desirable level of pressure in an air-supported marine

vehicle: should it be low or high for maximal efficiency? Since the wave drag is proportional to the square of the pressure and the cushion support is only proportional to the pressure, the answer is almost certainly that the pressure must be low, commensurate with other constraints, such as the permitted length and beam of the vessel.

Two Australian papers were delivered. *The Evolution of the 112 m Wave Piercing Catamaran Design*, by Mr Gary Davidson and Mr Tim Roberts of Revolution Designs, Tasmania, was well received and elicited many questions. The paper concentrated on structural aspects, but also delved into matters of the vessel's response in waves.

Professor Lawry Doctors of UNSW in Sydney, in typical style, extended the theoretical analysis of seakeeping theory. In this case, the true unsteady effect of stabilisers was accounted for, in terms of their influence on the damping of the vessel in waves. This effect is well known in the aerodynamic field, where it is probably more widely appreciated that it takes a certain time for a wing or foil to develop the full lift force, once a particular angle of attack relative to the onset flow is achieved. The effect of this time delay is that the lift generated is essentially less, perhaps down to 50% of the steady-state value, in many cases of practical interest to naval architects.

The total number of attendees was seventy-six, not including the RINA conference-organising staff. The biggest contingent was from England with thirty-five registrants, followed by the USA with eleven. On this occasion, there were only two representatives from Australia.

Lawry Doctors

Australian Maritime College

Research into Asymmetric and Nonlinear Unsteady Loads on High-speed Catamarans

The University of Tasmania and the Australian Maritime College have been awarded an Australian Research Council (ARC) Linkage Grant in conjunction with industry partners Incat Tasmania and Revolution Design Pty Ltd. The project will investigate asymmetric and nonlinear unsteady loads on high speed catamarans. A combination of theoretical and experimental work will be undertaken in order to improve the prediction of wave loads, particularly slamming impacts and bow-quartering loads. The experimental facilities of the Australian Maritime College (the towing tank and model test basin) will be utilised to measure loads on model catamarans and validate computational techniques. The grant includes funding for APA (I) scholarships at both UTas and the AMC. Details on the available scholarships may be found at www.amc.edu.au/students/scholarship/unsteady.loads.

For further details on the project, or information on available postgraduate opportunities, please contact either Professor Michael Davis at the University of Tasmania or Dr Giles Thomas at the Australian Maritime College.

AMC Hosts the Annual General Assembly of the International Association of Maritime Universities

The 5th Annual General Assembly of the International Association of Maritime Universities (IAMU) met at AMC from 8 to 11 November 2004. The conference theme **The Australian Naval Architect**

Advances in International Maritime Research addressed IAMU's goal as an international organisation on the cutting edge of research into maritime safety, education, engineering, management and operations. The Lieutenant Governor of Tasmania, Justice Cox, opened the event and a presentation by AMC Council Chair, David Sterrett, followed. David gave an interesting talk on the current issues facing the international maritime industry.

The IAMU Assembly brought together around 100 delegates from all over the world (from 21 countries) and included 20 student delegates. Senior people attended the conference, including the presidents of at least ten major maritime universities. In addition to the Nippon Foundation, which is the major IAMU sponsor, the assembly attracted sponsorship from AMSA and Rheinmetall Defence Electronics. Many AMC staff members were involved — as speakers, as session chairs, as delegates, as technical support and as administrative support.

As part of the assembly, AMC ran a student debating competition focussing on current maritime issues. This was organised by AMC PhD student Vinh Thai and, given that English was not the native language for many of the students, the level of cooperation and presentation was very good.

Visitor from Bureau Veritas

The head of hydrodynamics at Bureau Veritas in France, Dr Chen, who led the development of the advanced hydrodynamics software package *Hydrostar*, spent some time at AMC in late 2004 to discuss research collaboration with Dr Jinzhu Xia and other AMC researchers. The French classification society recently provided AMC with a copy of this software package, which handles linear and non-linear wave effects and motions of ships and offshore platforms. Following Dr Chen's visit to AMC, both he and Dr Xia traveled to Perth to attend and present research work at the Sixth International Conference on Hydrodynamics (ICHD 2004).

Towing Tank Upgrade Update

The AMC Towing Tank was de-commissioned on Christmas Eve 2004 in order to commence work associated with a major upgrade of the facility. It is expected that the re-vamped and lengthened facility should be re-commissioned in late May 2005.

Anyone interested in seeing more photographs showing various stages of the AMC Towing Tank upgrade can view them at www.amc.edu.au/facilities/towing.tank/upgrade/ (the link to the photos is at the bottom of this web page). Further photographs will be periodically added.

The upgrade of the towing tank is just part of a \$3 million project expanding the AMC's Swanson Building. The project involves extending all three floors of this building, the establishment of a postgraduate centre and an upgrade of all computer laboratories. The extension will also provide an additional fourteen offices, two staff rooms, two meeting rooms and seven classrooms accommodating fifty students each.



Progress on the towing tank upgrade in late January 2005. The northern end wall of the tank and Swanson building have been removed and the foundations for the walls of the new section of tank are in place. The first pre-cast concrete panel for the tank wall can be seen being lowered into position
(Photo courtesy AMC)

Busy Times for the Ship Hydrodynamics Centre

In addition to the numerous tasks associated with the upgrade of the towing tank, the Ship Hydrodynamics Centre staff members are being kept very busy on a number of other projects. The Model Test Basin is fully booked until May 2005, at which time it is expected that there will be a number of final year students ready to conduct experiments as part of their research theses. The team also have a few active projects in the fields of vessel-generated waves and ship interaction in port environments. To keep up with the workload, the Centre has increased its staff by employing PhD student, Tim Lilienthal, and final year naval architecture student, Peter Henry. Ex-AMC lecturer Dr Tim Gourlay has also lent a hand on a casual basis while on leave in Tasmania.

Gregor Macfarlane

THE INTERNET

Copernic Desktop Search

Are you sure that you have a file saved on your computer, but can't find it for love or money? Fear not, for now you can find it for free: Copernic Desktop Search has the answer.

Copernic builds up a database of everything on your computer, and then you can search based on any criteria. It will search any file types (e.g. Word, PDF, JPG — you choose), and can also search emails, picture and media files, or the web. A search locates all references to a search string in the text of files, in file names, etc. within a few seconds, listing them all with file properties, their folder location and opens a preview of the file — all listed in groups, first from the last day, then last week, last month and last year!

When you first load the software it takes a long time to build the initial database if you have a lot on your hard drive, like I did. I left it overnight to build the database and thereafter, whenever the program is activated, it sits in the background and updates the database while the computer is inactive. This can cause the computer to be a little slow when you initiate another activity on the computer, as Copernic stops and lets you do whatever you want to do, so a periodic update when you are not using your computer may be the way to go.

Copernic is downloadable for free from www.copernic.com.

Graham Taylor

Wordsmithing

If you enjoy working with words, or you are regularly asked the meaning of words and phrases, then your *Macquarie Dictionary* is no doubt your first port of call. The *Macquarie Dictionary* is not available freely online, but is available by subscription at www.macquariedictionary.com.au. However, the grandfather of them all, the *Oxford English Dictionary*, is available freely at www.oed.com. There you may search for a word, and find out about its pronunciation, etymology, dates of first usage, and quotes using the word.

A cracking good read is Simon Winchester's recent *The Surgeon of Crowthorne*, the story of how the *Oxford English Dictionary* was compiled over a period of forty-four years and the circumstances of William Chester Minor, one of the principal contributors.

Wordplay

To find out more about correct use of the English language, or to simply play with words, you could try some of the following sites.

World Wide Words at www.quinion.com/words has many words and phrases, what they mean, where they came from, how they evolved, and ways in which they are misused.

Richard Lederer's Verbivore site at <http://pwl.netcom.com/~rlederer> is an excellent collection of word and language sites. A verbivore, by the way, is someone who devours words!

Judi Wolinski's Word Play site at www.wolinskiweb.net/wor.htm is for those who enjoy playing with language.

The Phrase Finder at <http://phrases.shu.ac.uk> is a searchable list of the meanings and origins of common words, sayings, quotes and clichés.

Word Spy at www.worspy.com/index.asp is a good place to find the meaning of newly-coined words and phrases. Many are American in origin but, with globalisation, they spread quickly.

Fun with Words: the Word Play Website at www.fun-with-words.com is the place to go to sharpen up your word skills and have fun at the same time, with word puzzles, games, lists and facts.

Many sites deal with correct spoken and written English. An extensive collection is garbl's Writing Resources Online at <http://garbl.home.comcast.net/writing>, with links covering grammar, style and usage, fat-free writing, plain language, word play, creativity and reference sources.

If you are not familiar with the Aussie vernacular, then you can find many terms in the ABC's Australian Word Map at www.abc.net.au/wordmap. Also worth checking is the Macquarie Book of Slang at www.macquariedictionary.com.au/slang.html (unlike the dictionary, the book of slang is free).

For a more detailed explanation of the origins and meanings of selected Australian words and phrases, visit the Australian National Dictionary Centre's Australian Words site at www.anu.edu.au/andc/austwords.

Coastal Data

The Bureau of Meteorology's marine website is a mine of information on coastal data. From the marine home page you can access current marine warnings, weather forecasts for local waters or the high seas, predictions of surface wind speed, surface water temperature, wave height, and tides. Visit www.bom.gov.au/marine.

Ellen MacArthur Takes World Record

Ellen MacArthur on her 23 m trimaran, *B&Q*, which was built by Boatspeed at Gosford, NSW, has just taken the Jules Verne trophy for the solo around-the-world sailing record, which she completed non-stop. The record was previously held by Francis Joyon on board the 27 m trimaran *IDEC*, who finished on 3 February 2004 in 72 d 22 h 54 min 22 s. Ellen crossed the finish line between The Lizard, UK, and Ushant, France, on Monday 7 February 2005 in an elapsed time of 71 d 14 h 18 min and 33 s, taking more than 1 d 8 h off Joyon's record.

This record is exceptional. More than 1 800 people have reached the summit of Mt Everest, more than 450 people have been in space, twelve astronauts have stepped on the moon, but only five solo sailors have attempted to race around the globe on multihulls and only one, Joyon, had previously gone the distance non-stop. Ellen now holds the outright record.

Check out the details of Ellen's feat at www.teamellen.com.
Phil Helmore

THE PROFESSION

NMSC Releases Documents for Public Comment

The National Marine Safety Committee (NMSC) has released for public comment two documents that should be of interest to anyone involved in the marine industry or recreational boating.

The first document is the *Service Specification for the National Marine Distress and Safety Communications System*. Released in mid December, the specification defines the minimum performance requirements for a nationally-consistent infrastructure to provide safety and distress communications for domestic non-SOLAS vessels operating in coastal waters, and to provide the radio communications interface between vessels at sea and the relevant search-and-rescue body.

While the specification addresses both the land-based communications monitoring and information component, and the vessel-based distress and safety communications component, the specification deals more thoroughly with the land-based component.

The development of the specification recognises the need to update and replace the land-based marine safety and distress infrastructure, and that the existing arrangements were put in place back in July 2002 as an "interim measure" following the cessation of the previous national Telstra system.

The second document is a revised version of *NSCV Part C*

Subsection 5B — Electrical. NMSC reviewed the electrical requirements for commercial vessels back in 2001 and then published the first edition of *NSCV Part C Subsection 5B — Electrical*. However, due to a number of submissions regarding the differences between the NMSC standard and AS/NZS3000, NMSC has now revised the standard to require new vessels to comply with AS/NZS3000 in addition to a number of special requirements in *NSCV Part C Subsection 5B* which meet the special conditions found in the marine environment.

Both documents can be downloaded from the NMSC website at www.nmsc.gov.au, or can be obtained in hard copy by phoning the NMSC Secretariat on (02) 9247 2124. The period for public comment runs for three months, with the deadline for submissions being mid-March 2005.

Maurene Horder

WORKSHOP REPORT

NATIONAL STANDARD FOR COMMERCIAL VESSELS PART C SECTION 3 — CONSTRUCTION

Introduction

An issues paper for the National Standard for Commercial Vessels (NSCV) Part C Section 3 — Construction was released for public comment on 25 June 2004. Final date for submissions was 31 August 2004. Twenty-three submissions were received in response to the issues paper. The comments indicated there was a range of opinion on the direction the construction section should take and which rules should be used.

To help initiate the drafting of the construction section, a workshop was organised in Brisbane on 30 November 2004 to focus the diverse opinions on the main issues affecting the commercial marine industry with regard to design and construction, and to identify the best rules/standards to use for the section.

Representatives from the Australian commercial marine industry were invited to participate in the workshop. The workshop consisted of two parts; a series of presentations in the morning and then the workshop itself in the afternoon.

Selected workshop participants, known for their profile and experience in the commercial marine industry, were invited to give presentations covering their areas of expertise in the industry. Those presenters who were designers, builders, or owners were asked to give details on what rules/standards they currently work with and to inform workshop participants what they like and dislike about these rules. These presenters were also asked to outline their preference for the rules/standards for use in the construction section of the NSCV.

Other presentations included an overview of the comments received in response to the issues paper, the Royal Institution of Naval Architects response to the issues paper, a report from a working group set up to gauge classification society interest in the construction section, and a state regulator's view on the proposed construction section.

In the workshop, participants were divided into five groups and asked to discuss, and then nominate, their preferred option for the construction section. The groups were then to consider, and inform the workshop, what they perceived were the costs and benefits of their preferred option.

The workshop participants ultimately resolved to approach the six AMSA-recognised classification societies to invite tenders for both reviewing the USL Code and adopting existing rules as the basis of Part C Section 3 — Construction of the NSCV.

Presenters

Presentations were made by Mark Devereaux (*Overview of Responses to the Issues Paper*), Andrew Tuite and Bryan Chapman (*Designer's Perspective*), Mike Hollis and Bill Wright (*Builder's Perspective*), Bill Edwards (*Owner/operator's Perspective*), Rob Gehling (*RINA Response to the Issues paper*), Adrian Mnew (*Regulator's Perspective*) and Peter Walsh (*Classification Society Working Group Report*).

The Workshop

The participants were divided into five groups, with each being asked:

- What is your preferred option for the construction section of the NCSV?
- What do you see as being the costs and benefits associated with your preferred option?

The responses of each group are set out below.

Group 1

Preferred Option

Vessel size	Standard
<24 m	ISO 12215 (adjusted) or EC or classification society rules
24 m – 35 m	(a) Hull — plan approval and construction survey by a classification society (b) Machinery — State or territory Authority (c) Safety equipment — State or territory Authority
>35 m	Full class

Costs

- Increase in costs for vessels in 24 m to 35 m range

Benefits

- Available now
- International (good for export and import)

- Mutual recognition between states
- Duty of care to operators and designers
- Quality insurance for builders
- Rules upgraded automatically (amended).

Group 2

Preferred Option

Vessel size	Standard
<6 m	Recreational standard (comply with Australian Builders Plate)
6 m – 35 m	USL Code/AS 4132 (develop formula based on L, Ä, and passenger numbers say, to cater for all vessels, e.g. workboats, charter boats, light and low-passenger-density vessels, etc.)
>35 m	Full class

General comments

- “Novel” boats referred to recognised international standard
- Design loadings to be based on current recognised class society standards. Revised standard should be benchmarked against ISO and classification society rules
- Improvement and updates by national committee
- Develop software for universal use

Costs

- Initial review cost
- Ongoing review costs

Benefits

- Minimal retraining for users and approvers
- Familiarity with USL Code/AS 4132
- Australian based
- ‘Live’ document
- Central review board can be set up

Group 3

Preferred Option

Vessel Size	Standard
<7.5 m	Recreational standard
7.5 m – 35 m	USL Code/AS 4132. This revision should be undertaken by an entity, chosen by tender. This entity might include an organisation that is not a classification society.
>35 M	Full class

Costs

- Sign-off is regional (not class nor international recognition)
- Cost and effort required to develop revision with attendant risk (exposure)
- Maintenance costs of rules
- Quality control; possible differences in interpretations.

Benefits

- Australian ownership and control
- Capitalise on wide acceptance of USL Code for regional exports
- Quick plan approval
- Regional areas catered for
- Holistic — design, build, survey
- Funded by government

Group 4

Preferred Option

Vessel size	Standard
6 m – 12 m	Recreational standard
12 m – 35 m	Contract with a single classification society to provide rules/support/training
>35 m	Class rules + class plan approval + initial survey

Costs

Agree with issues-paper summary for these options

Benefits

Agree with issues-paper summary for these options

Group 5

Preferred Option

All sizes

- A contractor to be selected to draft requirements for standards/rules to meet needs and options of NSCV. Once requirements are documented, tenders to be called to draft NSCV Construction rules based on these requirements.
- Tenders to also include:
 - Requirements for ongoing support
 - Training and updates
- Tenders to be based on selecting the best rule appropriate for each type of vessel

Costs

- Cost of buying intellectual property rights for existing rules
- Cost of ongoing support and updates
- Cost of promotion and re-training of users
- Time taken for development and agreement

Benefits

- Fixed time line given to write standard
- Will provide an independent view
- Tenderer made accountable
- Single set of standards
- Uniformity
- Provides for ongoing development (intellectual property)
- Feedback mechanism can be incorporated
- Opportunity to achieve national agreement

Summary

In general, participants were satisfied that recreational vessel design rules could be used for vessels in the up-to-6 m or possibly up-to-7.5 m range (either AS 1799 or ISO 12215).

There was also solid, though not unanimous, support for using ISO 12215 for certain lighter duty commercial vessels up to 24 m in length. Modifications such as the application of service or safety factors may still need to be introduced for the perceived higher loadings encountered during commercial service.

There was support for a rewrite/revision/update of the USL Code/AS 4132. However, opinions differed on how this might be achieved. Some participants felt the task should be performed by a committee made up of representatives from industry and the state and territory jurisdictions, while others preferred that a separate entity should perform the task. This entity could be a classification society or a highly-experienced person or a small, select committee of highly-experienced persons.

While not unanimous, there was majority support that the deemed-to-satisfy solution for vessels greater than 35 m measured length was for these vessels to have a full certificate of class from one of the six classification societies that are recognised by AMSA. Some participants noted that this might discriminate against vessels such as low-wash smooth-water ferries, uncomplicated landing barges and simple barges, where having to meet full class requirements may be an unnecessary burden. It was noted that an equivalent solution approach is, however, an option for such craft.

The outstanding issue requiring resolution from the workshop was on the rules for vessels in the 6 to 24 m and 24 to 35 m range. A decision was made to approach the six AMSA-recognised classification societies, inviting them to quote (if they are interested) on three separate programs; revising the USL Code to two different and distinct levels of sophistication and, thirdly, adopting existing rules. This may even cover all vessels up to 35 m length (although this just an option). This resolution was:

- To write to the six AMSA-recognised classification societies requesting (if interested) that each society submit tenders to do each of the following:
 - (a) Critically assess AS 4132/USL Code and rewrite to higher level of sophistication and provide support and training on use of the rules.
 - (b) Have NMSC adopt society's established rules as NSCV Construction rules, with society to supply support and training on the use of the rules.
 - (c) Review, update, and rewrite AS 4132/USL Code and rename as 'NSCV Part C Section 3 — Construction' and provide support and training.
- To be included in each tender is the cost of developing and implementing a methodology for continual improvement in each option.

Summary of Issues Paper and Classification Society Working Group Responses to NSCV Construction Section Options

Option A — Review USL Code and AS 4132 and incorporate into NSCV

Benefits

- Already significant experience and familiarity with these documents.
- Other materials could be redrafted in first-principles style of AS 4132.
- Control of the document remains in Australia.
- Less “retraining” of users and approvers.
- Conservative and proven.
- Little change in costs to operators.
- As in the present situation, a single document will cover all vessels.

Costs

- Would need considerable input from and coordination between stakeholders.
- Potential for blow-out in costs and time if drafting process not properly managed; interest wanes as a result.
- Needs to be drafted into NSCV-style format.
- If not drafted carefully, the issue of differences in interpretation may remain.
- Measures need to be put in place to keep the standard current.
- In the drafting process, few people really have time to “test” the standard fully.
- USL Code is not recognised internationally.
- Approvals not performed by specialists.
- Would need modification to cover light, high-speed craft.
- The 35 m upper limit has the effect of discriminating against vessels such as low-wash smooth water-ferries, uncomplicated landing barges and simple barges.

Option B — Adopt ISO 122515

Benefits

- Deals with broad range of construction materials.
- International standard.
- No further drafting required; may be easily modified by incorporating safety or service factors.
- Advantageous for hire- and drive-vessels.
- Opens up global market for designers and builders.
- Input from international sources.
- Possible slight reduction in costs to users.
- More comprehensive coverage of FRP and timber than AS 4132.

Costs

- ISO 12215 is intended for recreational vessels.
- Does not reflect the heavier loadings to which commercial vessels are subjected during their normal operations.
- Would introduce the issue of how to deal with vessels in 24 to 35 m range.
- Not aligned with current USL code service classes or limits.
- ISO 12215 refers to a large number of other standards.
- Overall control of standard not with Australia.

Option C1 — Direct use of Class Rules Without Input from, nor the Specific Agreement of, the Classification Societies

Benefits

- In public domain.
- Current arrangement.
- Little development required for rules
- Positive for customers.

Costs

- Difficulties for jurisdictions interpreting numerous different rules.
- Potential liability for jurisdictions.
- Potential liability for users.
- Some class societies do not condone.
- No access to training, instructions or management systems behind rules.
- May reduce mutual recognition and national consistency.
- Negative for jurisdictions.

Option C2 — A Single Classification Society Selected by Tender to Draft the Design and Construction Rules of the NSCV *(Add the provision of maintenance of the document(s) and the provision of Training and Technical Support)*

Benefits

- Some class societies have already been involved in working with bodies to develop rules (eg Naval rules, Nordic rules).
- Potential to direct text adopt (clone) rules from a class society.
- Uncouples the particular class society from identification with the rules (reduces misrepresentation).
- Reduces chance of liability for class societies.
- Single set of standards facilitates competence and uniform delivery.

Costs

- Must purchase intellectual property for distribution under cover of NSCV; could be expensive.
- Issue of initial and ongoing support and maintenance of rules; involves ongoing costs to NMSC.
- Cost of Maintenance of the document to update as basis class society rules is updated.

Option C3 — Direct use of Class Rules with a Single Classification Society Selected by Tender to provide Training and Technical Support

Benefits

- Provides a controlled environment for application of class society rules at lower cost.
- Access to training and technical support reduces liability and improves uniformity and mutual recognition.
- Single set of standards facilitates competence and uniform delivery.
- Significant marketing potential for the successful class society.
- Access to class society computer programs.
- International compatibility of class society standards (import and export benefits).
- Independent arbitrator for interpretations.

Costs

- Concerns over contract being limited to 5 years, needs to balance benefits of competition with costs of potential disruption.
- Application to small end of market (may be overcome by new small boat standards based on ISO).
- Concerns that unsuccessful class societies would be shut out (could be overcome by alternative deemed-to-satisfy solution, which allows for class and potential equivalent solutions).
- Some class societies indicated that this was not part of the core business.

Option C4 — Direct use of Class Rules with more than one Classification Society providing Training and Technical Support

Benefits

- Similar advantages to option C3, plus:
- Creates competition (however, this is still the case in C3 via alternative deemed-to-satisfy and equivalent solutions).
- Little value added over C3.

Costs

- Similar disadvantages to C3 plus:
- Jurisdictions must pay for and absorb training and instructions for the additional rules.
- Reduces the benefit for the 'winning' class society.
- Increased risk of rule shopping.

Option C5 — Direct Use of Class Rules with Plan Approval by Classification Societies

Benefits

- Provides class society competence and quality input into the plan approval process promoting consistency and national uniformity.
- Currently applied by many class societies.
- International compatibility of class society standards (import and export benefits).
- Independent arbitrator for interpretations.

Costs

- Potential liability associated with jurisdictions approving construction to class society approved plans.
- No access to training and instructions by class society.
- Additional cost of plan approval to applicants.
- Time delay in plan approval, especially if plan approval office is overseas.
- Costs likely to be excessive for smaller vessels as this is outside normal service of class society.

Option C6 — Direct Use of Class Rules with Plan Approval and Initial Survey (Construction Certification) by the Classification Societies

Benefits

- Supported by all but one classification society.
- Provides class society competence and quality input into the plan-approval and survey-inspection process promoting consistency and national uniformity.
- Currently applied by many classification societies.
- International compatibility of class society standards (import and export benefits).
- Independent arbitrator for interpretations.

Costs

- Cost to client is significantly increased.
- Jurisdictions have to maintain periodic survey without benefit of being involved in initial approval, unsure of basis of assumptions and rulings.
- No access to training and instructions by class society pertaining to periodic survey.
- Time delay in plan approval, especially if plan-approval office is overseas.

Option C7 — Vessels required being in Class with the Classification Societies as the deemed-to-satisfy solution (*Will continue to be available as an alternate now*)

Benefits

- Potentially viable for classification societies as this is core business.
- Low liability to jurisdictions.
- International compatibility of class society standards (import and export benefits).
- Independent arbitrator for interpretations.

Costs

- High initial and ongoing costs to clients.
- Perceived to be “Rolls Royce” service that would be excessive for domestic industry.
- Concern that class societies would not be able to offer a service that gave value for money at smaller end of market.
- Difficulties delivering service in outports nationwide.

Option D — “Open Market” on Classification Society rules

Benefits

- Competition between societies should result in lower costs for users.
- Flexibility to match most appropriate design rules to specific vessel functions or type.

Costs

- Arrangement may favour societies having the lowest standards and/or the lowest fees (reflecting less scrutiny in the plan-approval process) and will therefore work against improvement in marine safety.

Option E — Other options — Combined use of the above options

Benefits

- Rules can be used appropriate for the size and class of vessel. For example, ISO 12215 for “light commercial service” charter vessels, hire and drive <24 m, and class rules for >35 m.
- No drafting required.
- Possible to employ reduced requirements for vessels <6 metres (or <7.5 metres).

Costs

- Increased volume (and so cost) of documentation for users and approvers.
- More training required for users and approvers.

ARE YOU MOVING?

Moving house can be...well, not one of life's greatest pleasures. It is easy to overlook telling those who would like to know where you are. If you are about to change your address, then please add an item to your check list to tell Keith Adams, so he can ensure that *The ANA* and other important communications from RINA continue to arrive.



The Los Angeles-class fast-attack submarine USS *San Francisco* (SSN 711) in dry dock at Apra Harbour at Guam on 27 January to assess damage sustained after running aground while submerged approximately 350 n miles south of Guam on 8 January 2005 en route to Australia. The Navy's floating dry dock known as *Big Blue* is capable of docking ships that displace up to 40 730 t, but required specific US Navy certification for the one-time docking of *San Francisco*. *San Francisco* is based at the US Naval Base at Guam
(US Navy photograph)

Tenix to convert *Delos* for RAN

Tenix Defence Pty Ltd has been selected as the preferred tenderer to upgrade and refit the recently-acquired commercial tanker which will replace the Royal Australian Navy's ageing auxiliary oiler, HMAS *Westralia*, Defence Minister Robert Hill announced on 11 February 2005.

The purpose of the conversion will be to modify the vessel so that it has the latest technology and equipment capable of refuelling Navy vessels, including the Anzac-class and guided-missile frigates and the new air-warfare destroyers that will enter service from 2013.

The contract, valued at around \$60 million, is for the design, initial logistic support and modification of the merchant tanker *Delos*, with the modified ship to enter service in June 2006.

Senator Hill said the modifications to the ship will be carried out at the Common User Facility at Henderson, south of Fremantle, in Western Australia. The project will create new jobs and further consolidate the specialised skills needed in Australia's naval shipbuilding and repair sector. It will have an Australian industry involvement component of 95 percent.

"The modification of *Delos* will provide the Navy with a significantly-improved capacity for the at-sea replenishment of fuel," Senator Hill said.

"At 176 m long and 37 000 t, *Delos* is an impressive vessel by any standard."

Some of the specific modifications will include:

- the installation of a replenishment-at-sea rig;
- various accommodation modifications for Navy personnel including heating, ventilation, air-conditioning, freshwater and sewerage; and
- a number of other additions include a helicopter landing pad, rigid-hulled inflatable boats and a related crane, and Navy life-saving and damage-control works.

Delos is currently chartered to Teekay Shipping Singapore under a commercial arrangement. Following contract negotiations she will be delivered to Western Australia.

Once complete, the crew of the ship will be transferred from HMAS *Westralia*, ensuring a seamless transfer of operational capability to the Navy. *Delos* will be commissioned as HMAS *Sirius* on completion of the project.

INDUSTRY NEWS

Dual-fuel-electric machinery for new LNG carrier

Wärtsilä has received an order from Alstom Chantiers de l'Atlantique of France to supply one set of Wärtsilä 50DF dual-fuel engines to power the 154 000 m³ dual-fuel-electric LNG carrier *Gaselys*. This ship was ordered a few months ago by a joint-venture between Nippon Yusen Kaisha (NYK) of Japan and Gaz de France and is scheduled for delivery from Chantiers de l'Atlantique's shipyard in Saint Nazaire at the end of 2006. Just like her sister ship, *Provalys*, she will be powered by three 12-cylinder and one 6-cylinder Wärtsilä 50DF dual-fuel engines with an aggregate power of 39.9 MW. Delivery of these engines from Wärtsilä's engine factory in Trieste, Italy, is scheduled for October 2005.

"Both Wärtsilä and Alstom Chantiers de l'Atlantique have very actively promoted the dual-fuel-electric machinery concept for LNG carriers during the past few years and the latest orders confirm that the concept is getting well-established in the industry", said Mikael Mäkinen, Group Vice-President, Wärtsilä Ship Power. "Firm orders to supply dual-fuel engines for seven ships have been placed, and there are options to supply dual-fuel engines for four more ships."

For application in LNG carriers, Wärtsilä has so far received firm orders to supply twenty-eight Wärtsilä 50DF dual-fuel engines. The first four engines were delivered to Alstom Chantiers de l'Atlantique last year and are about to enter service onboard the 75 000 m³ dual-fuel-electric LNG carrier *Gaz de France Energy*. A further four engines were delivered to Chantiers de l'Atlantique last month and will be installed onboard the 154 000 m³ dual-fuel-electric LNG carrier *Provalys*. This ship is scheduled for delivery to Gaz de France at the end of next year. The delivery of sixteen engines for a series of four 155 000 m³ dual-fuel-electric LNG carriers for BP Shipping at Hyundai Heavy Industries and Hyundai Samho Heavy Industries in Korea will commence at the beginning of 2006. The delivery of these ships is scheduled from the middle of 2007 onwards. Wärtsilä holds an option to supply another sixteen dual-fuel engines for four optional vessels for BP Shipping at Hyundai Heavy Industries and Hyundai Samho Heavy Industries. More dual-fuel engine orders for LNG carriers can be expected within the next few months.

In addition to the application in dual-fuel-electric LNG carriers, Wärtsilä's unique dual-fuel engines have been applied in FPSOs, dual-fuel-electric offshore supply vessels, and a significant number of onshore power plants.

New Face-type Stern Tube seals from Wärtsilä

Wärtsilä Corporation has introduced a new family of face-type seals specifically for water-lubricated stern tubes. These new Deep Sea Seals brand ManeGuard seals are ideally suited to vessels sailing frequently in coastal or other waters with high sand and silt contents. Even under such aggressive conditions, they provide robust seals with high reliability and long service intervals.

ManeGuard face-type seals are produced for shafts of 70 to

240 mm diameter, and are either partially split (PS type) or fully split (FS type). They are able to accept high shaft speeds up to 2700 rpm.

With ManeGuard seals, worn shafts or liners, leaking gland plates and continuous maintenance with their associated costs can be left in the past. The simplicity of their design provides maximum sealing capability for all types of water-lubricated bearings. For stern tubes with closed water systems, ManeGuard seals can be used both inboard and outboard.

The seals incorporate interface materials with a high abrasion resistance which, together with a design to minimise galvanic corrosion, dramatically reduce maintenance costs. They thus feature low through-life costs. With their statically-mounted elastomeric body, the seals accept misalignment in all planes and compensate for vibration which can be inherent in vessels involved in coastal trade such as ferries, general cargo vessels, fishery craft, workboats and river craft.

The seals also have various safety features. For example, they automatically compensate for bearing wear. They also have a low magnetic signature. An inflatable emergency seal is fitted as standard. All seals are factory tested before shipping.

The ManeGuard seals are compact in length and are suited both for retrofit of existing sealing systems or packed glands, and for new construction. Their installation can be easy and quick. In the case of retrofits, the fully-split versions allow the ManeGuard seals to be fitted with the shaft still in place.

Wärtsilä Establishing Thruster Production Plant in China

Wärtsilä is developing the propulsion business and is setting up a wholly-owned, state-of-the-art factory for transverse thrusters in Wuxi, Peoples' Republic of China. Production will start in mid 2005. Wuxi is located approximately 100 km west of Shanghai. The name of the company is Wärtsilä Propulsion (Wuxi) Co. Ltd.

The company will produce Lips brand transverse thrusters and will serve the global shipbuilding market. Transverse thrusters, also known as bow thrusters or tunnel thruster, are used in all kinds of vessels. Nearly every vessel has one or more transverse thruster(s). The thruster is used as a manoeuvring aid or for dynamic positioning purposes. Wärtsilä will also complete its portfolio by adding new sizes of transverse thrusters giving better market coverage.

"This venture brings Wärtsilä even closer to Asian customers, which will help us to serve them better. As the focus of the world's shipbuilding industry shifts heavily to Asia, Wärtsilä has the opportunity to increase its market share in transverse thrusters", says Mikael Mäkinen, Group Vice-President, Wärtsilä Ship Power.

The value of the factory investment is •6.6. million. The factory will employ some 120 employees in a step-by-step approach according to volume development.



The Wärtsilä Plant in Wuxi manufactures transverse thrusters, which are used as a manoeuvring aid or in dynamic positioning applications (Photo courtesy Wärtsilä)

Wärtsilä to Acquire Deutz Service Business

Wärtsilä announced in January that it will acquire the assets of the Deutz AG's medium and large marine engine service business. The acquisition price is •115 million, including fast-moving spare parts stock.

The business consists of original spare parts sales, repair and maintenance for Deutz medium and large marine diesel engines. This portfolio covers medium-speed and high-speed engines with outputs ranging up to 7 250 kW.

This deal will increase the installed engine base for Wärtsilä Service by 12 500 MW or by 9%. Today Wärtsilä's installed engine base is 130 000 MW.

Wärtsilä will use the Deutz Marine brand name and will be the supplier of original spare parts and services, including technical support, for the Deutz medium and large marine engines worldwide.

Deutz retains new sales and service of compact engines, stationary power and gas engines.

The parties aim to close the transaction in the first four months of 2005. The deal is subject to competition authority approvals.

Wärtsilä's President and CEO, Ole Johansson: "Wärtsilä has consistently and successfully expanded its service business in recent years by increasing the scope of services and by acquisitions in the ship power market — in line with our strategy. The transfer of the Deutz marine service business to Wärtsilä is a logical step to further strengthen our position globally. Deutz marine customers will benefit from Wärtsilä's wide range of services and global network in 60 countries".

Wärtsilä Nederland B.V., in Zwolle will act as the product company for Deutz medium and large marine engines. The Deutz workshops in Hamburg, Harlingen, and Montreal will be taken over by Wärtsilä and remain operative. In other locations Deutz marine service will be integrated with Wärtsilä.

The transfer of the marine engine service business comprises the customer information, know-how, use of brand, use of intellectual property, spare parts stock and logistics worldwide. Approximately 200 people from Deutz's organization will move to Wärtsilä in different parts of the world.

The Deutz service portfolio for medium and large marine engines covers the following engine types:

- Medium-speed engines: 628.
- High-speed engines: 616 and 620.
- Older medium-speed and high-speed engine types, including: 716, 816, 232, 234, 601, 602, 603, 604, 528, 440, 441, 444, 500, 501, 510, 540, 640 and 645.

The acquisition is in line with Wärtsilä's strategic focus to grow in the service and ship power markets. Wärtsilä will benefit from an increased customer base and new prospects for ship power service sales. Owners will benefit from engine lifetime extension through:

- Wärtsilä's worldwide service network and support.
- Service and maintenance agreements.
- Reconditioned parts and reconditioned engines.
- Upgrades and modernization packages and special products.

With annual sales of about •1.2 billion Deutz is one of the world's leading independent suppliers of diesel and gas engines that are used in construction and agricultural machinery, power generating plant, ships, and commercial and rail vehicles.

Deutz customers are served by 22 subsidiary companies, 14 representative offices, 20 service centres, and more than 800 sales and service partners in more than 130 countries all over the world.

Wärtsilä in Joint Venture for Auxiliary Engine Production in China

Wärtsilä has signed a letter of intent with China Shipbuilding Industry Corporation (CSIC) to set up a 50/50 joint venture to manufacture marine auxiliary engines in China. The location of the new factory will be in the Shanghai area.

The intention is to start the production of the defined Auxpac W20 generating sets for the growing shipbuilding market in China and to sell these through Wärtsilä global network. Auxiliary engines are used for producing electricity in ships. The parties aim to finalize the negotiations during the first half of 2005.

CSIC is one of the largest groups in China in the field of design, manufacture and trade of military and merchant ships, marine engineering and marine equipment. CSIC consists of 47 industrial enterprises, 28 scientific technological research institutes and 20 share-holding companies.

In 2004 CSIC's ship deliveries totalled 2.14 million DWT with an actual order book of 10.2 million DWT. The total number of employees is 160 000.

Wärtsilä Corporation is the leading ship power supplier for builders, owners and operators of vessels and offshore installations. Wärtsilä has a global service network to take complete care of customers' ship machinery at every lifecycle stage in more than 60 countries. In 2003 Wärtsilä generated net sales totalling •2.4 billion. It has 12 000 employees.

MEMBERSHIP NOTES

Neil Cormack 50 Years Membership and Fellow

Neil Cormack was recently honoured at a dinner hosted by IMarEST in Adelaide. He was presented with a certificate attesting his fifty-year membership of RINA by the RINA Coordinator for South Australia, Peter Crosby, and promoted to the grade of Fellow. Neil was recognised both for his service to RINA and his significant contribution to the maritime sector in South Australia.

Neil Cormack was born in Adelaide and established a career as a boat builder, initially working for his father and, later, for J.P. Clausen and Sons as their shipwright foreman. He also served as a Naval Reserve instructor, finishing up as the Commanding Officer of the Cadet Unit at HMAS *Encounter*. Neil designed a number of boats in the 1950s, including the 90 ft (27.4 m) tuna boat *Sirenia Pearl*. In 1955 he was appointed by the Australian Yachting Federation as an Official Measurer for the 5.5 metre class yachts at the Melbourne Olympics and, for many years, served as an official measurer for the Royal Yachting Association. Neil served for twenty-four years as a shipwright surveyor in the South Australian Harbours Board, from which he retired in 1988 as its Senior Shipwright Surveyor.

Neil has written three books, *Herzogin Cecilie — The Flagship of the Gustaaf Erikson Fleet*, *Sagas of Steam and Sail* and *Port Victoria, 50 Years On*. He has also written a number of technical papers on a variety of subjects, ranging from the construction of wooden tuna boats to the loss of large steel-hulled sailing ships in the first half of the 20th Century, and it is his knowledge of the naval architecture and construction of these steel barks that is arguably Neil's greatest area of historical expertise. Neil is the current Secretary of Cape Horners Australia Inc., and Editor of their journal, *The Cape Horner Journal*. He has been instrumental in setting up displays at the Maritime Museum of South Australia.

Peter Crosby

RINA Coordinator for SA



Peter Crosby and Neil Cormack at the presentation
(Photo courtesy Peter Crosby)

Australian Division Council Meeting

The Australian Division Council met on 2 December, with teleconference links to all members and the President, Robin Gehling, in the chair. Matters, other than routine, which were discussed included:

- National Professional Engineers Register (NPER): Council is still pursuing this matter with the National Engineering Registration Board (NERB) and has enlisted the aid of the Joint EA/RINA Board. Council is hoping for a speedy and successful determination by the NERB. This would allow the establishment of the Competency Panel which would recommend applicants for registration on the NPER. The matter of CEng/CPEng is again under active negotiation between RINA and Engineers Australia.
- RINA Council Meeting in London: RINA Council met on 26 October 2004 and the meeting was attended in person by Mr Chapman. The RINA Budget was presented at the meeting. The Small Craft Committee reported concern over the lack of papers submitted for publication in *The International Journal of Small Craft Technology*. The next meeting of Council is scheduled to be held in London on 19 January 2005.
- Membership of the Australian Division Council: Following the recent call for nominations of corporate members to fill six vacancies on Council that become vacant (in accordance with the By Laws of the Division) at the next Annual General Meeting, Council confirmed the new appointments to Council. These appointments will be announced at the Annual General Meeting to be held on 8 March 2005.
- Appointment of President: Council agreed to the re-appointment of the current President, Mr Rob Gehling, for a further term of two years.

The next meeting of the Australian Division Council is scheduled for 8 March 2005.

Keith Adams
Secretary

MISSING IN ACTION

The following members are Missing in Action:

Mr J. G. Baker, former address William Street, Fremantle, WA,

Mr M. Martens, former address West Perth, WA, and

Ms M Wickramaarachachi, former address Werrington, NSW.

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

Vale Andy Tait

It is with sadness that *The ANA* records the passing of Andrew Richard Luckley Tait on 27 December 2004.

Andy was born on 16 April 1927 at Swansea in Wales, UK, son of Roderick and Dorothy Tait. During his early years he was a member of the Swansea sea scouts and it was at this time that he formed his great love of the sea and everything nautical. As a young man towards the end of the Second World War, he joined the Royal Navy in the signals department and here he made the acquaintance of a beautiful, charming girl, who was also in the signals department in another county. They exchanged photos and, very soon, made a date to meet in person under the clock at Kings Cross railway station.

Of course, like all true-life stories, Andy and Betty fell in love at first sight. After their courtship of eight years, they married on 25 April 1952. On the way to their honeymoon their best man, John Harmer, forgot to give Andy the train tickets and they only just caught the train as it was pulling out. John called out "Andy, Andy, the tickets", but he could not run fast enough! Luckily, the football club fans heard John and from one end of the train to the other they shouted "Andy, Andy the tickets!" This was all to the utter embarrassment of the newlyweds; however, it was their beginning of fifty-two years of wedded bliss.

After several years working with Harland and Wolfe, Andy joined Bureau Veritas and it was during this time in England that Andy and Betty adopted Christopher and Sandra to complete their family picture.

After executing excellent service for Bureau Veritas, Andy was appointed overseas representative for the Asia-Pacific Region, which included Australia and New Zealand, and they transferred to Sydney, Australia.

Andy was a member of the Royal Institution of Naval Architects and in later years, served on the Australian Division Council. On arrival in Sydney he joined the Institute of Marine Engineers and, from 1989 to 1991 he served as Chair of the Sydney Branch with distinction. He also represented the New Zealand Division for two years and was then elected Treasurer. During his many years in this position, he brought to it his delightful brand of philosophy and pragmatism. Andy was always busy. He was also appointed the representative on the Maritime Panel, Sydney Branch, and was dearly loved and respected by all his colleagues.

My first contact with the Tait family was on Collaroy Plateau. We lived around the corner and jointly ministered to an aged couple living opposite our house. Andy and Chris and I kept the grass mowed and garden weeded whilst Betty and my Jean helped with the cooking and cleaning in their home. Our friendship blossomed and we shared many parties and functions together. We had some delightful holidays away with our families, at times up to five vans enjoying the great outdoors and each other's company.

Andy joined my lodge in Dee Why, which he always enjoyed. He soon progressed through the various offices and was distinguished worshipful master. Here again he was well loved and respected by all his brethren.

Andy was also a valued member of Bert Williams' volunteer Peninsula Senior Citizens toy repair group and served as their treasurer for many years. He spent many happy hours repairing toys for underprivileged children

With our neighbour and friend, Ross Smith, Andy and I walked around the Plateau Boulevard, sitting on the rocks and enjoying the beautiful scenes of Narrabeen and Collaroy, often taking our little ones with us. Fishing, prawning, boating and other activities were enjoyed by us always, along with righting the wrongs of the world. Our Andy was always intrigued with gadgets and loved to pull them to pieces to see how they worked, and we were always careful to conceal our gadgets from him.

I, personally, loved the way Andy would read and communicate to young children. His gentle, kind and loving manner would light up his countenance. We loved and respected Andy and will always hold his memory close to our hearts.

John Gault



NAVAL ARCHITECTS ON THE MOVE

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

Nick Billett, a graduand of the Australian Maritime College, has taken up a position as a naval architect with Winning Yachts in Brisbane

Jacqui Blackney (née Rovere) has moved on from Australian Hearing in Cairns, and has been doing a Graduate Diploma in Secondary Maths Education through the University of New England. She married Roger Blackney (naval architect with G.A. Glanville and Co.) last year, and they now have a son, Lachlan. Jacqui says that they enjoy the Cairns lifestyle, and so will remain there a while.

Adam Brancher is now consulting as Brancher Marine Australia at Airlie Beach, Qld, doing mainly commercial and recreational vessel surveys up and down the coast. Find out more about the company and capability at www.marinesurvey.com.au. He has also commenced a part-time PhD at Griffith University on the topic of *Osmotic Blistering in Marine Structures*.

Anthony Brann, a graduand of The University of New South Wales, has taken up a position as a naval architect with Australian Defence Industries at Garden Island, Sydney, working on the FFG upgrade project.

Grant Brunsdon has moved on within the Austal Group and has taken up a position as a naval architect with the Littoral Combat Ship project in Fremantle.

Glenn Cobb has taken up the position of General Manager for Australasia with Lloyd's Register in Melbourne. Originally from the UK, Glenn was previously the Operations Manager for the Great Lakes and Atlantic Canada area for LR North America and, prior to that, spent over 20 years in the Vancouver office of LR.

Kyle Dick, a graduand of the Australian Maritime College, has taken up a position as a naval architect with Alloy Yachts International in Henderson, New Zealand.

Alan Dowd has moved on from Image Marine and has taken up a position as Director of New Product Development with the Riviera Group in Coomera, Qld. Riviera build about 450 boats per year at the moment, ranging from 9 to 18 m in length.

Bill Edwards, a graduand of the Australian Maritime College in marine and offshore systems, has taken up a position with the Royal Australian Navy.

Jareth Ekin has moved on within the Austal Group and has taken up a position as a naval architect with the Littoral Combat Ship project in Fremantle.

Adam Evripidou moved on from JRS Owen and Associates many moons ago, and then worked for Murray, Burns and Dovell in Sydney, before moving to Brisbane eight years ago to take up a position as a naval architect with boatbuilder Norman R. Wright and Sons. Adam says that he enjoys the work, as the boats are built outside his door, and he likes the project-management side and the variety of vessels as well.

Lee Fennell, a graduand of the Australian Maritime College,

has taken up a position as a naval architect with Austal Ships in Fremantle.

James Fenning has moved on within the Austal Group and has taken up a position as a naval architect with the Littoral Combat Ship project in Fremantle.

Steve Fitzsimmons has moved on within the Austal Group and has taken up a position as a naval architect with the Littoral Combat Ship project in Fremantle.

Andrew Forbes has moved on from WaveMaster International and has taken up a position as a naval architect with Image Marine in Fremantle.

Craig Gardiner has moved within the Maritime platforms Division of the Defence Science and Technology Organisation, and is now on a year's exchange program at Defence Research and Development Canada (Atlantic), based in Halifax, Nova Scotia, and working on extreme and non-linear loadings and structural response.

Ben Gilkes, a graduand of the Australian Maritime College, has taken up a position as an ocean engineer with Technip in Perth.

Alan Goddard, a graduand of the Australian Maritime College, has taken up a position as a naval architect with SP Systems (Australia) in Sydney.

Suzanne Hayne, a graduand of the Australian Maritime College, has taken up a position as an ocean engineer with Australian Marine and Offshore Group in Melbourne.

Ben Healy, a graduand of the Australian Maritime College, has taken up a position as a naval architect with Commercial Marine Solutions in Melbourne.

Jamie Howden, a graduand of The University of New South Wales, turned his position as a sliphand at the Castlecrag Marina in Sydney, which he had filled part-time during his later years of study, into a full-time position for a month after completing his coursework. He continued towing, launching and slipping boats as well as antifouling and minor repairs to hulls and topsides, and being covered from head to foot in an array of paints and sealants. He then had two weeks in Vanuatu before taking up a position as a naval architect with Austal Ships in Fremantle.

Ruth Jago, a student in naval architecture at The University of New South Wales, has taken up a part-time position as a naval architect with North West Bay Ships at Kogarah while she completes her degree.

Zoran Jaksic has taken up a position as a naval architect with Australian Defence Industries at Garden Island, Sydney.

Colin Johnson, a graduand of the Australian Maritime College, has taken up a position as a naval architect with Alloy Yachts International in Henderson, New Zealand.

Sean Johnston continues consulting in Melbourne, but has set up a new company, Commercial Marine Solutions, so that the company name better reflects the service, which is not confined to yachts in which to brave sou'westers. Sean says that he has several vessels on the go, including a dredge,

new restaurant boats for the Yarra, and a 15 m gentlemen's cruiser. Find out more about the company, vessels designed and capability at www.commercialmarinesolutions.com.au.

Scott Jutson has moved to Vancouver, Canada to take up the position of Chief Executive Officer of Mercator Studios, which evolved from Jutson Yacht Design. Mercator Studios is the first (design) division of a new company, Mercator Multihulls, which aims to expand to have further divisions in building and charter operations.

Sergy Kamkin, a graduand of the Australian Maritime College, has taken up a position as a naval architect with GoolwaCraft Marine in Goolwa, SA.

Holley Lees, a graduand of the Australian Maritime College, has taken up a position as an ocean engineer with Intec Engineering in Perth.

Geoff Leggatt has moved on within the Austal Group and, from Oceanfast Marine, has moved to take up a position as a naval architect with the Littoral Combat Ship project in Fremantle.

Richard Liley has moved on within the Austal Group and has taken up a position as a naval architect with the Littoral Combat Ship project in Fremantle.

Gordon MacDonald has moved on from the role of Director of Navy Platform Systems in Defence to see what life is like on the other side. He has taken up the position of Principal Naval Architect at Australian Maritime and Offshore Group (AMOG) in Melbourne where he is responsible for the Defence/Navy business stream. AMOG is a medium-sized consultancy specialising in all facets of the maritime environment, including defence and offshore.

Scott McErlane has moved on after eighteen months on a 53 m sail/motor yacht built by Perini Navi in Italy. He then completed his MCA Y4 Yacht Engineer's certificate in France and returned to Australia and picked up his Marine Engine Driver Grade 1 and Master Class 5 certificates. He returned to the Mediterranean and signed on as Chief Engineer on the 38 m Fedship vessel, MV *Ladina*. Fedship is the Dutch Federation of Shipbuilding, the federation of yards in The Netherlands which build superyachts, and have a well-deserved reputation for quality and good workmanship in the industry. He has just finished a lap of the Mediterranean and Black Seas and, after a brief yard period in Barcelona, the owner has taken the vessel to Ft Lauderdale, USA, to put her up for sale, so he is now looking for another vessel. However, he likes what he is doing, and has no short-term plans to come ashore.

John McKillop has moved on from Image Marine and has taken up a position as a project manager with North West Bay Ships in Hobart.

Kevin McTaggart has joined the Maritime Platforms Division of the Defence Science and Technology Organisation in Maribyrnong, Vic, on an eighteen-month exchange program from Defence Research and Development Canada (Atlantic). He is working on virtual ship modelling and simulation, and the interaction of various systems, such as weapons, radar, etc.

Keir Malpas has moved on from Defence Maritime Services

after nearly seven years of providing sail-training services to the RAN as Master of SV *Salthorse* at Jervis Bay. Keir has joined Australia Pacific Projects Corporation in Canberra, working as a consultant to Defence on the Headquarters Joint Operations Command Project at Bungendore, Australia's version of the Pentagon-in-the-Bush. For those who think that naval architecture is a narrow field, Keir was delighted to find that Ray Duggan is one of the other twelve key people on the project — a good ratio of naval architects to others!

Jesse Millar, a graduand of the Australian Maritime College, has taken up a position with the Royal Australian Navy.

Kay Myers, a graduand of the Australian Maritime College, has taken up a position as a naval architect with Tenix in Williamstown, Vic.

Cameron Nilsson-Linne, a graduand of the Australian Maritime College, has taken up a position as a naval architect with Austal Ships in the Littoral Combat Ship project in Fremantle.

Oscar Palos, a graduand of the Australian Maritime College, has taken up a position as a naval architect with Black Watch in Gold Coast, Qld.

Sean Phelps has moved on with Jutson Yacht Design and, while Scott was moving camp from Sydney to Vancouver, Canada, Sean did three months of contract work for Spear Green Design in Sydney. He then moved to Vancouver to take up a position as a naval architect in Scott's new company, Mercator Studios.

Adam Podlezanski has moved on from consulting and has taken up a position as a senior naval architect with Australian Defence Industries at Garden Island, Sydney.

Luke Pretlove, a graduand of the Australian Maritime College, has taken up a position as a naval architect with Austal Ships in Fremantle.

David Purser has moved on within the Department of Defence and, after leaving the Directorate of Navy Platform System many moons ago, spent some time on the LPA project at Forgacs in Newcastle. He then, about four-and-a-half years ago, took up a position in the Mine Warfare and Clearance Diving System Program Office of the Defence Materiel Organisation in Canberra.

Tom Ryan, a graduand of the Australian Maritime College, has taken up a position as a naval architect with G.A. Glanville and Co. in Cairns.

Dmitry Sadovnikov has moved on from WaveMaster International and has taken up a position as a naval architect with Austal Ships in Fremantle.

Jonathon Schultz, a graduand of the Australian Maritime College, has taken up a position as an ocean engineer with Australian Marine and Offshore Group in Melbourne.

Anton Schmieman has moved on within the Austal Group and, from the R&D Department, has moved to take up a position as a naval architect with the Littoral Combat Ship project in Fremantle.

Tim Speer has moved on within the Austal Group and, from design, has moved to take up a position as liaison with the

USA partners in the Littoral Combat Ship project in Bath, Maine, USA.

Jude Stanislaus has moved on from the Australian Submarine Corporation and has taken up a position as a naval architect with Transport SA in Adelaide.

Harry Stronach continues in his own naval architecture consulting business, Stronach and Associates, in Akaroa, NZ, which he set up in about 1990 and is one of only two in NZ. He says that he does mainly technical stuff in relation to the fishing industry and commercial shipping, although you are expected to know a bit about everything that floats! He has also recently acquired a share in Dickson Marine, a yacht building/repair yard in Nelson. The yard handles yachts and small commercial vessels up to about 30 m and 50 t, and tries to specialise in major refits of overseas yachts which find their way to the South Pacific. However, he would not seriously recommend owning a boatyard as a sound career move!

Samantha Tait has moved on from the Anzac Ship Project Management Office and has taken up a position as a project manager with Codarra Advanced Systems in Melbourne. They are contracting to the Land Systems Division of the Defence Materiel Organisation, and Sam is managing the project to upgrade a fleet of army vehicles to carry a new weapons system.

Todd Tippet, a graduand of the Australian Maritime College in marine and offshore systems, has taken up a position with the Royal Australian Navy.

Carl Vlazny has moved on from consulting and has taken up a position as a naval architect with the Commercial Operations Branch of the NSW Maritime Authority in Sydney. Under their training program, Carl will spend the first year in plan approvals.

Mark Williamson, a recent graduate of The University of New South Wales, completed his coursework requirements many moons ago. Since then he worked for a number of consultancies, including WaveMaster International, Precision Marine, Lexcen Lowe Yacht Design and Austal Ships, before setting up his own consultancy, Mark Williamson Design, in Brisbane. Find out more about the company, vessels designed and capability at www.mwdesign.net.au.

Dominic Worthington has moved on from *Scottish Bard*, and has taken up a position as Second Engineer on Board *Juniper*, a tanker servicing the west coast out of Kwinana, WA, for BP Australia.

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

Gregor Macfarlane



The historical 18-footer *Tangalooma* and the barque *James Craig* taking part in Australia Day celebrations on Sydney Harbour. In early February *James Craig* set sail for Tasmania to take part in the Wooden Boat Festival in Hobart
(Photo John Jeremy)



This fine photograph, taken in the late 19th century, shows Campbell's Cove in Sydney looking east towards Bennelong Point. The challenge for readers of *The ANA* is to identify the ships and date the photograph. This should not be too difficult for the experts in the Australian Division — have a go and let us know what you think. The Editors have some ideas but they may be wrong!
(Photo courtesy David Gosling)



The French Navy's force projection and command ship *Mistral* after launch at Brest on 6 October 2004. A stretched version of *Mistral* is one of two designs (the other is by Izar of Spain) under consideration for the RAN's LHD project
(Photo courtesy DCN)

Austal unveils New Military Support Vessel Designs

Austal unveiled a new series of high-speed military-support vessel designs at the Euronaval international naval force equipment exhibition held in Paris in late October 2004.

Theatre Support Vessels (TSV) such as the 101 m Austal catamaran *WestPac Express* have already proved a highly-reliable method of transportation that is faster and more versatile than existing sealift and airlift while simultaneously reducing capital and operating expenditure.

Based in Okinawa, Japan, *WestPac Express* was contracted in July 2001 for operations throughout the Western Pacific supporting the Third Marine Expeditionary Force (III MEF) of the United States Marine Corps. Capable of transporting a complete battalion of more than 950 Marines and up to 550 t of vehicles and equipment in one lift, the vessel covers approximately 75 000 nautical miles annually under rigorous military service conditions and through waters that are often beset with typhoons and tropical storms.

By incorporating a range of additional features, Austal has enhanced the basic TSV to meet requirements for high-speed ships that are able to undertake and support an even wider range of military operations. In addition to being able to rapidly deploy troops and military hardware, the capabilities of these multi-mission ships include:

- Deployment and support of helicopters and Unmanned Aerial Vehicles (UAVs) for reconnaissance, combat, search and rescue, vertical replenishment, special warfare support, airborne mine countermeasures and other military activities.
- Amphibious assault operations using small boats and amphibious vehicles.
- Co-ordination and command of other vessels including Unmanned Underwater and Surface Vehicles (UUVs and USVs).
- Reconnaissance, surveillance and patrol duties.
- Afloat support of smaller vessels including connected replenishment.
- Deployment of police and customs teams and their supporting vehicles and logistics.
- Disaster and humanitarian relief operations including the provision of medical facilities, supplies and evacuation of personnel and equipment.

Designs unveiled at Euronaval range from a 45 m catamaran with capacity for 285 troops and six utility vehicles through to a 127 m, 38 kn trimaran complete with flight deck, helicopter hanger, command and control spaces, berthed accommodation for 100 crew, seats for 260 transit personnel and a 1900 m² deck for vehicles and cargo



Austal's 127 m trimaran design
(Image courtesy Austal Ships)



Austal's 72 m catamaran design
(Image courtesy Austal Ships)

In addition to designing vessels of all sizes, Austal offers ships based on both catamaran and trimaran hull forms. The catamaran dominates the commercial fast ferry market and Austal's highly-developed hull form is recognised as the market leader. The more-recently developed trimaran has been applied to both ferry designs and the US Navy's Littoral Combat Ship (LCS) program.

Regardless of its size or hull configuration, the vessels can offer a choice of medium-speed diesel engines, gas turbines or combination arrangements. Each vessel is provided with sufficient fuel capacity for ocean transits and, where required, can be equipped for replenishment at sea.

The various designs have a number of common features that are considered central to the majority of military applications.

Chief among these is the mission deck which, depending on vessel size, provides space for a range of military hardware including wheeled vehicles, tanks, amphibious vehicles, helicopters and small boats. Ship-based ramps enable fast and efficient loading and discharge of this deck, even in the most basic of ports, and facilitate the launch and retrieval of amphibious vehicles at sea. A separate boat launcher is used for small boats and unmanned underwater and surface vehicles.

Troops are provided with business-class reclining seating with armrests and tray tables to ensure comfort in transit and thus operational readiness. Seating can be quickly removed to make way for temporary berths required for long-haul transport. A dedicated galley and servery ensures the troops are well catered for en route. A first-aid room, showers and storage for personal equipment provides comforts far removed from the traditional troop-transport aircraft.

For the ship's crew, permanent cabins, mess and recreational areas, showers and laundry facilities are provided, as is an office for administration and planning. Command and control spaces are configured according to user needs.

All the new designs also have an aviation capability. On the TSV-style vessels this is limited to a vertical replenishment deck, while the larger multi-mission vessels can fully support helicopter operations with a full flight deck and hangers for two aircraft. In each case cargo delivered to the vessel by helicopter can be transferred to the mission deck using cranes. These cranes are also used for over-side cargo handling.

FROM THE ARCHIVES

THE BUILDING OF THE CAIRNCROSS DOCK

Last year saw the sixtieth anniversary of the opening of the Cairncross Dock in Brisbane. This major asset is now operated by Forgacs and continues to provide docking and repair services to the maritime industry of Australia. To commemorate this anniversary, we reproduce a report on the construction of the dock that appeared in Shipbuilding, Ship Repair & Services on 31 August 1948.

Brisbane Graving Dock is one of the largest in the southern hemisphere and was built during World War II by Australian workmen under Australian management. In less than two years the construction was brought to a stage where ships could be docked — an important achievement.

The dock can accommodate any vessel which is capable of negotiating the Brisbane River and accommodation can be provided with reasonable comfort for a single merchant vessel 800 feet (242.4 m) long, 80 feet (24.2 m) beam, with 32 feet (9.7 m) draught. Ships of larger size may be docked, for the width over the sill at sill level is 110 feet. This is the narrowest dimension. The equivalent of two ships, each 400 feet (121.2 m) long, can be handled.

The length from the inner side of the inner sill to the head of the dock is 829 feet 6 inches (251.4 m) at floor level, 830 feet (251.5 m) at the level of the sills and blocks, and 835 feet 4 inches (253.1 m) at coping level.

When in place, the caisson projects inwards from the inner side of the sill to a maximum of 16 feet 5 inches (5 m) at a height of 26 feet 2 inches (7.9 m) above the sill level. If measured from the outer sill, all the lengths given above will be longer by 50 feet (15.2 m).

The clear length between verticals from the fender on the caisson to the head of the dock at block level is 813 feet 7 inches (246.5 m) with the caisson on the inner sill, or 863 feet 7 inches (261.7 m) with the caisson on the outer sill. These dimensions control the maximum length of ship which can be docked, provided that the keel, or structures at keel level, do not extend so far aft beyond the blocks that the vessel would rest on the concrete of the sill structure.

The length at floor level from the sill structure to the head of the dock is 814 feet 6 inches (246.8 m). The floor of the dock at keel line is 34 feet (10.3 m) below datum, and it slopes outwards at 1 in 100 to drains near the walls. Four bilge altars, each approximately 1 foot (0.3 m) in height, bring the level at the side walls to 30 feet (9.1 m) below datum, this being the same as the level of the sills and the top of the keel blocks, and at this level the dock is 110 feet (33.3 m) wide.

Clearance between altars at any level is at least as great as the distance between the walls of the entrance structure at the same level. Width between copes is 121 feet 9 inches (36.9 m) for approximately 90 feet (27.3 m) at the entrance, and 127 feet 6 inches (38.6 m) throughout the chamber.

There are two sills, both at 30 feet (9.1 m) below low water datum — that is, the, mean height of the lower low waters at springs. The height of tides at the dock is approximately that at the Brisbane River Bar, where mean spring rise is 6 feet 7 inches (2 m) above datum, and mean neap rise is 5 feet 3 inches (1.6 m) above datum.



The entrance to the Cairncross Dock under construction

The floor of the dock is 4 feet (1.2 m) below the sills, that is, 34 feet (10.3 m) below datum. The coping of the dock is 17 feet (5.2 m) above datum. The four altars, two of which are cantilevered out from the walls, are respectively at 8 feet (2.4 m) above, and 1 foot (0.3 m), 7 feet (2.1 m) and 16 feet (4.8 m) below datum.

The outer, or emergency sill, is an open or one-sided sill granite-lined. The inner, or working, sill is 50 feet (15.2 m) from the other sill and is of the slotted type which will permit impounding water in the dock, but it is granite-lined on the inner side only.

Walls of the entrance structure, which contain the, two sills, slope outwards from the centre line at 1 horizontal to 8 vertical. The line of the walls intersects that of the sill at 55 feet (16.7 m) from the centre line, but walls and the floor level at the sills are joined by a curve of 5 feet 9 inches (1.7 m) radius.

Walls of the dock are of natural sandstone and these have been cement grouted. The floor is of concrete, with a mini-



The caisson under construction in the dock

mum depth of 2 feet (0.6 m). Underground drainage has been provided. The centre keel slab is 8 feet (2.4 m) wide and 6 feet (1.8 m) deep.

The entrance structure supporting the granite-lined sills, against which the ship-type caisson is seated, is of concrete. Filling sluices, one on either side, are embodied in this entrance structure.

In the immediate vicinity of the emptying culvert, and at a few other points, the walls are of concrete, but elsewhere concrete piers 3 feet 6 inches (1.1 m) wide have been built against the sandstone walls at intervals of 20 feet (6.1 m) centre to centre. The face of these piers conforms to the shape of the altars formed on the concrete walls. The piers are connected by timber planks which thus provide a continuous gangway at the level of each of the four altars.

Pumping Equipment

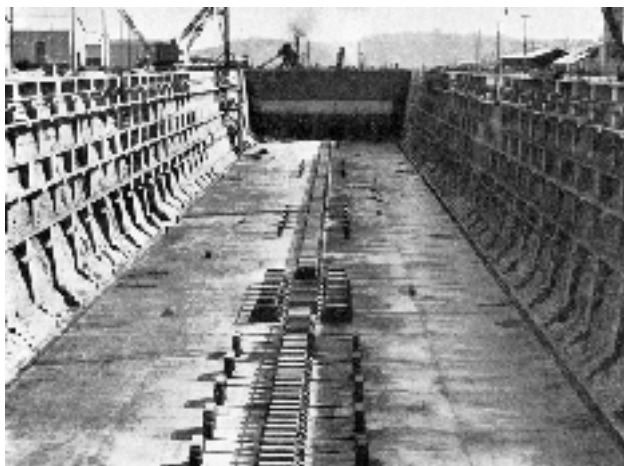
The emptying culvert runs under the floor at about one-third length of the dock and leads to a circular pump well, 46 feet in diameter. Equipment in the pump well comprises one 30 inch (0.76 m) centrifugal pump driven by a triple-expansion steam engine supplied with steam by four boilers on the surface; two 15 inch (0.38 m) electrically-driven centrifugal pumps; and one electrically-driven 6 inch (0.15 m) drainage pump with automatic float control. Water is delivered directly to the river adjacent to the pump well. Forced ventilation is provided for the pump well. The combination of steam and electric pumps is due to wartime restrictions on plant, but has the advantage of providing alternate sources of power for pumping.

The main steam pump is the dredge pump from the old dredge *Hercules*, driven by a triple-expansion engine from the same dredge. Of the four boilers, two are reconditioned boilers of the old *Australia*, and two are from the dredge *Hercules*. The four boilers were erected under the supervision of Messrs. Babcock and Wilcox, and the general direction of the Department of Harbours and Marine.

The volume of water contained in the dock at mean sea level, that is, 3 feet 6 inches (11.6 m) above datum, without a ship in, is 24 million gallons (109 106 m³) with the caisson on the outer sill, and 22.6 million gallons (102 742 m³) with the caisson on the inner sill. The estimated times required to de-water the dock are 6 hours 45 minutes, and 6 hours 4 minutes, respectively. At H.W. Springs the volume of water will be approximately 8 per cent greater. With a 10 000 t ship in dock, the times for emptying will be reduced to 5 hours 50 minutes, and 5 hours 10 minutes respectively.

Operation of Caisson

The dock is closed by a steel ship-type floating caisson equipped with electrically-driven pumps. The caisson was constructed inside the dock by Evans Deakin & Co. Ltd. When not in use, the caisson is berthed in a recess in the wharf which was built along the south side of the dredged approach channel to facilitate handling vessels coming into or out of dock. The caisson will be manoeuvred by small electric winches placed one on either side of the dock entrance. The caisson is fitted with twelve 12 inch (0.3 m) inlet valves for letting in water ballast and four 8 inch (0.2 m) centrifugal pumps for removing water ballast when the cais-



The completed dock

son is in operation. The dock is flooded when in operation by two sluice gates, one in each main sill wall, electrically operated.

Cranes, Machinery and Tools

Cranes installed at the dock include two mobile cranes on either side having a capacity of 3 tons at 28 feet (8.5 m) or 2 tons at 45 feet (13.6 m). There is also one 40-ton stiff legged crane with a radius of 65 feet (19.7 m) mounted on the south side near the entrance, with its mast 69 feet 10 1/2 inches (21.2 m) from the centre line.

Sufficient machinery and tools have been provided as part of the permanent dock equipment to enable repairs of a comparatively light nature to be carried out. Negotiations with the Munitions Department, with the view to increasing the number of machine tools, are in hand. It is intended that all heavy work will be carried out by engineering contractors.

Four electrical compressors, driven by 90 hp (67.14 kW) motors, provide a permanent supply of compressed air to the dock through a 4 inch (0.10 m) compressed-air line laid alongside. AC and DC electricity are also provided to the site for connection to ships.

The dock is equipped with salt water services for fire-fighting or for washing down ships. The water for fire purposes is obtained from the high-pressure pump installed in the northern sill wall and the washing down water by a low pressure pump, pumping into the same main and also situated in the northern wall of the sill structure. In addition, provision has been made for a supply of salt water through a 9 inch (0.23 m) main for the circulating of water for ships. Adequate fresh water supply is available for ships in dock, and facilities such as telephone and steam lines.

For convenience in handling ships a breast wharf has been constructed north of the entrance. This wharf is provided with electric power, compressed air and fresh water facilities to enable it to be used as a fitting out wharf. A winch capable of handling vessels to and from the breast wharf has been installed. It is proposed to install six electric capstans.

Permanent buildings erected at the dock comprise a store, workshop, blacksmith's shop, boiler shop, shipwright's shop and sub-station buildings.

In addition to the usual lavatory and dressing accommoda-

tion for dock employees and employees of contractors, a cafeteria, with seating accommodation for over 200, has been provided. For the benefit of crews a separate kitchen, capable of providing meals for 1 000 men, has been constructed. In addition, lavatory, washing and bath facilities for ships' companies have also been provided.

Why the Dock was Constructed

The exigencies of war necessitated the provision, at the earliest possible date, of major docking facilities in Brisbane at a time when the capital city of Queensland was considered to be in the front line. The job was tackled with such vigour and efficiency that, within twenty-two months of actual commencement of work, the dock was flooded and the first vessels were received. It has since been in continuous occupation. This achievement was recorded despite the fact that the large number of tractors, scoops and bulldozers which had been assembled to undertake the initial work of excavation were removed for service in battle areas. Power shovels took the place of the tractors, scoops and bulldozers and, throughout the period of excavation, work was carried out for three shifts twenty-four hours per day for six days per week.

The greatest number of men employed at one time was 850, this maximum being retained for a period of two months, when concreting and earthworks were together at their peak. The quantity of earthworks removed was approximately 350 000 cubic yards (257 594 m³), the vast majority of which was solid sandstone. Approximately 40 000 cubic yards (30 582 m³) of concrete was placed.

Efficiency of Dock Proved

The Brisbane Graving Dock has already proved that it is an efficient major repair unit. It has been in operation since June 1944. In addition to two aircraft carriers — *Unicorn* and *Slinger* — of 26 782 and 15 012 tons respectively, a total of 203 vessels (aggregating 710 691 gross tonnage), including merchant ships, tankers, destroyers, submarines, and armed merchantmen were docked up to 31 May 1946.

A sufficient area of land has been reserved to enable an extension of the dock proper, if desired, and to provide for the establishment of engineering works and allied trades.

Constructing Authority

The Coordinator-General of Public Works, Mr I. R. Kemp, was entrusted by the Queensland Government in August 1942, with the construction of the dock. The project, being subsidised by the Commonwealth Government, consequently became an Allied Works Council project of high priority.

The Main Roads Commission and Department of Harbours and Marine were delegated as the Chief Constructional Authorities. The Coordinator-General appointed a board to continuously report and advise him, and to consult with the Royal Australian Navy on matters of design, direction and coordination. The board consisted of:

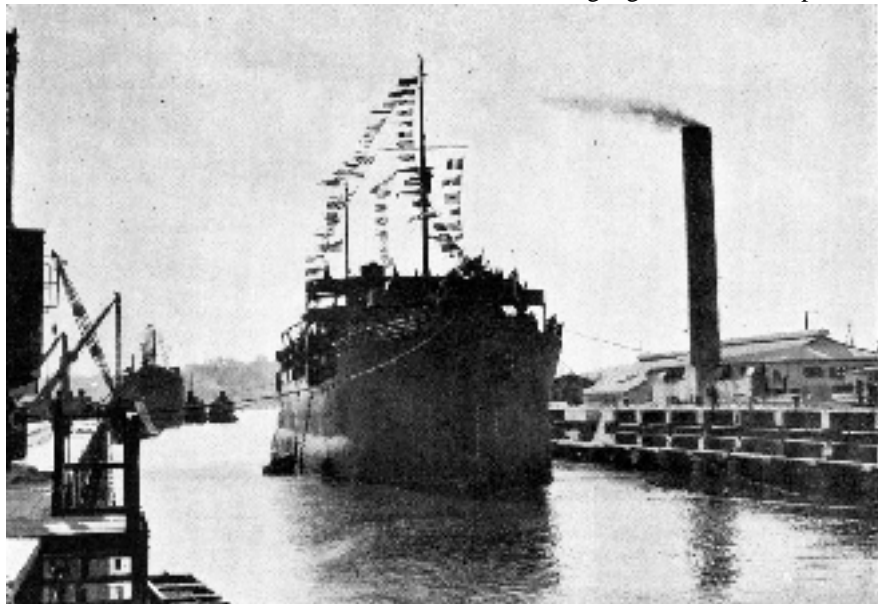
Chairman: W. H. R. Nimmo, Chief Engineer, Stanley River Works Board and member of the Coordinator-General's staff. Members: L. J. Price, Assistant Deputy Director-General of Allied Works, Queensland, and Chief Engineer, Brisbane City Council; W. T. Evans, Engineer, Harbours and Marine Department; C. M. Calder, Construction Engineer for the project; D. Fison, Consulting Engineer, Department of Harbours and Marine; G. W. Watson, Deputy Coordinator General.

The Coordinator-General, who is also chairman of the Stanley River Works Board, which is the constructing authority for the Somerset Dam, arranged for the utilisation of the board's staff, under Mr. Nimmo's direction, to prepare the necessary plans and transfer skilled workmen and plant to the works. These workmen, together with others from state and city council jobs, were subsequently enlisted in the Civil Construction Corps of the Allied Works Council.

An addition to the establishment recently provided has been the provision of rectifiers in the sub-station for increasing the quantity of DC current for the use of ships in dock. It is now possible to make available 2000 amps at 220 volts in addition to the 300 amps at 110 volts. .

Recent visitors to Cairncross included *River Burdekin* and the new E-class vessel *Enfield*, as well as Queensland Government vessels. The Shaw Savill MV *Taranaki*, en route from Cairns to NZ, entered dock on July 17 for rudder repairs, which were undertaken by A.U.S.N. Co.'s Workshop, and involved work on all rudder gudgeon bushes and pintles.

USS *Carondelet* was the first ship to enter the Cairncross Dock in June 1944





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