THE AUSTRALIAN NAVAL ARCHITECT

Volume 12 Number 4
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Cover Photo:
Built by Aluminium Marine, the 400-passenger ferry *Bo Hengy 2* recently completed trials in Brisbane before delivery to her owners, Bahamas Ferries
(Photo courtesy Oceanic Yacht Design)

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CONTENTS

RINA Australian Division
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From the Division President

Since my last column in *The Australian Naval Architect,* I have conducted a number of Professional Review interviews for members who wished to gain both corporate membership of RINA and chartered-engineer status with the Engineering Council. All candidates presented themselves very well — they summarised their careers succinctly and could address many of the questions posed to them. This is probably because they are proud of their achievements and wished to explain how they had contributed to the profession. However, in my opinion, when the interview changes direction to consider the future, many of the candidates are not as well prepared. As soon as a professional reviewer mentions the words 'continuing professional development' the enthusiasm stops and candidates start to lose a little direction. Exactly why this occurs is difficult for me to explain. During my early career development I found myself a mentor who accepted the challenge of making sure that I achieved the requirements for chartered membership and prepared me well for the review. My mentor discussed with me my continuing professional development and I outlined my plan at the review in what seemed a confident approach. When I look back and reflect on the process that I followed, it becomes evident that this approach is not used by many potential members today.

My mentor was not employed by the company for which I worked. In fact, he had retired about a year before I met him at a local technical meeting. Each month, where possible, I would attend the technical meeting and meet up with my mentor to discuss the activities I had carried out that would contribute towards my professional review documentation. Once he believed that I had achieved the required standard for corporate membership, the discussions focused on the continuing professional development. I was encouraged, often over a beer, to discuss the activities that could be accounted for if I was required to justify my CPD. The relationship we achieved was similar to that between a student and their final-year research-project supervisor. This was incredibly useful and I could discuss my future career ambitions outside of the work environment. Each month I would list the activities under generic headings. These included formal education and training, informal learning, conferences and meetings, presentations and papers and, finally, Institution activities. The allowances for each of these groups were known and time was allocated to each. To this day I often sit down with a pen and paper and add up my CPD hours under each of these headings to verify that I meet the requirements. First and foremost on my list is the informal learning — something that you are currently doing now. The reading of *The Australian Naval Architect* clearly falls into this category and therefore can be credited. The key question is how many hours can we claim and what proportion of the total CPD hours to attribute? The attendance at a technical meeting also contributes to the CPD. It did not concern me what the presented subject matter was — I always found that I learnt something at the meetings. This learning is often through discussion with other members, before the meeting, on topics that are of mutual interest or where I needed some assistance or advice on a particular problem I was trying to resolve at work. It is for this reason that I place importance on the attendance at technical meetings. I would encourage you all to attend the Section meetings and, when traveling home, to consider the benefits which you gained from the meeting.

A further important aspect of the CPD is Institution involvement. Many members at the start of their career consider the Institution as an organisation that guides them through their career. It provides the mechanism for gaining chartered-engineer status, it organises technical meetings and provides the journals you read as part of your development. At some stage the tide turns and it is time to think about what you can contribute to the Institution to help other members. This may include contributing to *The Australian Naval Architect*, standing for a position on a local committee or offering yourself for election to the Division Council.

If you are not too sure of the exact requirements for continuing professional development then take the time to investigate the documents that describe them. These are available on the RINA website. Also, I would encourage you all to attend Section meetings and perhaps offer your services as a mentor to junior members who are starting to develop their careers. Hopefully, the outcomes will be noticed when the time comes for the professional review and all will leave the event feeling very satisfied.

Stuart Cannon

Editorial

The recent announcement by the Minister for Defence of funding for the first stage of Project SEA 1000, the future submarine of the Royal Australian Navy, marks the start of another ambitious project for the RAN and Australian industry. To some of us, it seems like only yesterday that the project began which resulted in the six Collin-class submarines, but time flies and the start of planning for the replacement of the Collins class is none too soon.

The future submarine was the focus of discussion at the Submarine Institute of Australia's fourth biennial conference in Canberra in early November. Attended by over 200 submariners (past and present), Australian industry representatives and naval and industry representatives from the United States and Europe, the conference was, understandably, full of enthusiasm for the project. However, many expressed some frustration at the time likely to be taken by the decision-making process of government. The life of submarines is not easily extended, and the first of the new submarines needs to be completed in about fifteen years if there is to be a smooth transition from the present submarines as they reach end of life, and work needs to move ahead smartly if that deadline is to be met.

The role of the new submarines, and the likely number to be acquired, remains somewhat speculative as we await the new White Paper on defence to be released early next year. It is clear, however, that the government supports Australian construction, and this was affirmed by the Parliamentary Secretary for Defence Procurement, Mr Greg Combet, in his speech at the conference dinner. The submarines will be built in Adelaide but, despite their obvious advantage in resources, experience and facilities, ASC will have to compete for the contract to build the new boats. Whilst this process of competition will frustrate many who see it as unnecessary, others will emphasise the importance of

achieving value for money in what is likely to be the most costly defence project so far.

Past experience suggests that the process of competition for such a large, high-profile project brings with it the risk of dilution of scarce resources as firms compete to build up credible teams for the project. Australia's new submarines are likely to be unique — designing and building them will be a considerable challenge. The development of Australian capability during the Collins-class project was remarkable and the hard-won skills we now have must be preserved and further developed in coming years to ensure the success of SEA 1000.

John Jeremy

Letters to the Editor

Dear Sir,

I read with interest Kim Klaka's observations in the August 2008 issue of *The ANA* concerning design loads for yachts. I would have to say that I agree that he has made a significant point.

By coincidence, the day before reading Kim's letter, I came across IMO document MEPC 58/18/1 dated 1 August 2008 and titled *Development of a Guidance Document for Minimizing the Risk of Ship Strikes with Cetaceans*. The document discusses the compilation of a strike database by the International Whaling Commission on the locations and frequencies of strikes, including mortality (where known), and the effect of speed, etc. Whales may even become stuck on the bow at speeds in excess of 14 kn! The document also gives some other relevant references.

Having said that, what about collisions of yachts with other watercraft and, possibly, the floating containers; shouldn't they also be considered? In both cases, what is the acceptable level of damage for such events? Does consideration of structural damage need to be linked with the damaged stability of the yacht following such a collision, including possible loss of keel etc? It all gets quite difficult to assess. Thankfully, I am not in the yacht design business!

Martin Grimm

Dear Sir,

I received an interesting query the other day concerning the assessment of the lifting loads exerted on davits and the like when lifting boats from the water. The concern is how to account for the hydrodynamic effects acting on the boat as it is lifted. In particular, consider two vessels: a rigid inflatable with a typical V-bottom planing hull, and a slower barge-type vessel with a relatively flat bottom. How would the hydrodynamic effects differ, depending on hullform?

In calm water, if the ascent rate of the lifted vessel is low, then the scenario could probably be treated as a simple hydrostatic case where support of the weight of the boat is progressively transferred from buoyancy to tension in the sling and, as such, the sling load will never be significantly higher than the weight of the boat.

However, when recovering a boat in waves, the advice I have received is that such an approximation, considering only the hydrostatic term, would no longer be appropriate. Methods would surely be available for calculating lifting loads for offshore industry applications where the hydrodynamic terms are considered.

When lifting a boat in waves, I anticipate that the snap loads which occur in the lifting slings if they suddenly become taut after being slack may be quite severe, and need to be accounted for. This effect may be even more significant than the hydrodynamic added mass and damping terms.

I am wondering if anyone has had experience with this scenario and can offer some deeper insights? In particular, I would be interested to hear whether any readers are familiar with the use of numerical codes which could be adapted to the case of the lifting of a small craft in waves.

Martin Grimm

Gaff-rigged and other classic yachts put on a fine show on Sydney Harbour on 19 October in perfect weather for the Sydney Amateur Sailing Club's Gaffers Day
(Photo John Jeremy)

LATE NEWS

Austal Awarded US JHSV Contract

Austal announced on 14 November that it has won the contract to design and build the US Department of Defence's next generation multi-use platform, the Joint High Speed Vessel (JHSV), as part of a program potentially worth over US$1.6 billion.

As prime contractor, Austal will design and build the first 103 m JHSV, with options for nine additional vessels expected to be exercised between FY09 and FY13.

Similar to the Austal-built *WestPac Express*, operated by the US Marines for the past seven years, the JHSV will be capable of transporting troops and their equipment, supporting humanitarian relief efforts, operating in shallow waters and reaching speeds in excess of 35 kn fully loaded. The vessels will be joint-use craft operated by both the United States Army and Navy.

Austal Managing Director, Bob Browning, said, "Being selected as prime contractor for a major US Department of Defence shipbuilding program demonstrates Austal's capabilities as a defence supplier. Austal is very proud to have been selected to build an important part of the US Navy's fleet. This ten-vessel program is an important step in Austal's strategy to create longer-term, more predictable earnings for our investors."

The vessels will be built at Austal's US shipyard located in Mobile, Alabama, where work is continuing on the first phase of a new state-of-the-art Modular Manufacturing Facility (MMF). Upon completion in mid-2009, the first half of the 70 000 m^2 MMF will be available for the fabrication of all JHSV modules.

An impression of Austal's JHSV
(Image courtesy Austal Ships)

Austal USA's 1000-strong workforce, which is currently completing the US Navy's 127 m littoral combat ship, *Independence*, as well as a 113 m high-speed catamaran for Hawaii Superferry, will grow to more than 1500 as a result of the JHSV programme.

NEWS FROM THE SECTIONS

Western Australia

Members of the Western Australia Section have been treated to a busy couple of months of RINA activities. Alongside the usual technical programme, September saw a successful social bowls day held at the East Fremantle Bowls Club. In October the Section was lucky enough to be visited by past President Nigel Gee, and the following day members were treated to a visit of the historic ocean liner, MV *Doulos*.

The social bowls day was organised to give RINA members a chance to meet others in the industry in a relaxed atmosphere. The weather did not disappoint, with the bowls rolled in blazing sunshine. Seasoned bowls player and local IMarEST Branch Chair, Harry Arnold, was on hand to provide tips for the uninitiated, whilst local RINA Section Deputy Chair Kristofer Rettke dished out the BBQ sausages. It was an enjoyable day out all round, and the committee is keen to arrange similar events in the future.

Naval architects at play
(Photo courtesy Max van Someren)

Nigel Gee drew upon his wealth of experience to present a short talk on catamaran cross-deck slamming at the October technical meeting. Also speaking at the same meeting was Daniel Veen, a Curtin University PhD student, on the use of smoothed particle hydrodynamics in the study of slamming phenomena.

Nigel Gee's talk provided an overview of the influence of slamming on the design of the X-Craft for the US Navy. Videos of model tests dramatically illustrating the difference which hull shape has on slamming phenomena were shown. A summary of the design process was provided, and the chosen solution presented.

Daniel Veen's talk lent a more technical angle to the discussion. He provided a very clear description of the use of cutting edge 'smoothed particle hydrodynamics' to study fluid flow and how it could be applied to the study of slamming. Members were particularly impressed by the videos which he presented showing the potential accuracy of the technique in replicating real-world fluid flow.

The visit to MV *Doulos* the following day provided members with the opportunity to get their hands dirty aboard the world's oldest ocean-going passenger liner. Members of the ship's crew provided a presentation which outlined the vessel's history and current mission, before tours around the ship in small groups. Unsurprisingly, it was the engine room which drew most attention. In particular, it was impressive walking the full length of the shaft tunnel from the centre engine room to the stern tube.

The section committee would like to thank all those members, and often their families too, who came along to these events and made them a resounding success.

Large RINA (WA) Technical Library Donation

The Western Australia Section of RINA has received a donation of over one hundred books from Dr Prabhat Pal. The generous donation adds to the already-large technical library maintained by the Section, which is available for use by all members.

The Section committee extends their thanks to Dr Pal, not only for his contribution, but also for his time spent meticulously cataloguing the new additions. The material covers a number of years and includes Institution transactions, conference proceedings and technical books.

The library catalogue can be browsed on the WA page of the RINA website at www.rina.org.uk/wa_section.html. To borrow an item, please contact the RINA (WA) Section committee using the details provided on the website.

Max van Someren

South Australia and Northern Territory

The new Section has continued to participate in the joint technical meetings held with the South Australia Branch of IMarEST. Attendance at these meeting is continuing to grow. The meeting schedule for next year will include several offsite technical meetings which promise to be exciting.

Membership numbers are on the increase. There are still many naval architects in Adelaide who are not RINA members and it is hoped that the SA and NT Section will continue to expand.

The Section will be having an Annual Dinner on 28 November at the Glenelg Golf Club. The dinner is being held jointly with the SA Branch of IMarEST and the local chapter of Master Mariners.

Ruben Spyker

New South Wales

Committee Meetings

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

- SMIX Bash 2008: The model for the silent auction will be of the Sydney Heritage Fleet's vessel *Boomerang*, and the lines plan has been obtained; sponsorships have begun to arrive, and registrations are rolling in, thanks to the early placement of the advertisement in the August issue of *The ANA*.
- Committee Membership: Lina Diaz has retired as Secretary; Craig Boulton has agreed to take up the position of Secretary and look after the membership database; Rozetta Payne has agreed to take up the position of Assistant Secretary and take minutes of meetings; Matthew Stevens has been invited to join the committee.

- Engineers Australia: After the Chair's meeting with EA, we are now receiving coverage of technical meetings on their website, and notices of our meetings are being circulated in their monthly journal and weekly electronic newsletter.
- Program of Technical Meetings for 2009: A proposed program for 2009 has been roughed out, with possible dates and topics to be canvassed, including a panel discussion/forum on harbour ferries.

The NSW Section Committee also met on 14 October and, other than routine matters, discussed:

- SMIX Bash 2008: Registrations for the event are mounting. The model for the silent auction has been completed by Bill Bollard, and collection and delivery will be arranged.
- Committee Membership: Matthew Stevens has joined the committee.
- National Approach to Maritime Safety Reform: In July the Australian Transport Council (ATC), representing all federal, state and territory transport ministers, agreed to support a national approach to maritime safety regulation in relation to commercial vessels, subject to the outcome of a regulation impact assessment (the RIS process). For the purpose of this consultation RIS, commercial vessels are defined as all non-recreational vessels. The ATC stated that, in achieving a national approach, they were inclined towards broadening the application of the Commonwealth Navigation Act 1912 to apply to all commercial vessels. This reform is being considered as part of a broader suite of initiatives on national uniformity of transport regulation. A series of consultation meetings had been held in the state capital cities, with the one in Sydney being held last Thursday 9 September. A RIS on the costs and benefits of the proposals had been circulated, and comments were due on 15 October, only a week after the Sydney meeting! This move is of concern to naval architects nationally.
- Program of Technical Meetings for 2009: The proposed program for 2009 has been firmed up, with several presentations confirmed, and other proposals being checked for each date.

The next meeting of the NSW Section Committee is scheduled for 24 November 2008, principally to discuss developments in National Approach to Maritime Safety Reform.

The Four-masted Barque, *Passat*

Alston Kennerley, maritime historian, gave a presentation on *Trade Wind Days: A Personal and Ship Biography* to a joint meeting with the IMarEST, the Company of Master Mariners of Australia and the Nautical Institute, attended by thirty-three on 19 August at the NSW Sports Club, Sydney.

Introduction

Alston was introduced by Ted van Bronswijk of the Company of Master Mariners of Australia, with whom Alston was staying in Sydney, and who said that it was a treat to have someone with personal experience of *Passat* to make the presentation. This was especially so, in view of the fact that the NSW Maritime Authority does not now keep records for more than seven years! And they are not alone; Memorial University in St Johns, Newfoundland, offered to archive all the record books of British seafarers, instead of having them thrown out as had been proposed in the UK.

Alston began his presentation by saying that there was a pun in the title; *Passat* is German for "trade wind".

Career Choice

Alston's choice of career was significantly influenced by his family background.

His maternal grandfather, William George Wainwright, was a seafarer and was always called "The Captain" by his mother. He was based in Liverpool on the River Mersey.

His mother was, from 1921 to 1932, a clerk in the India Buildings, in the head office of Alfred Holt and Co. (the Blue Funnel Line). In 1931 she had a month-long holiday in Egypt, travelling free out on SS *Sarpedon* and home on SS *Hector*, both Blue Funnel sister vessels.

His father was, from 1939 to 1947, a radio officer in ships of the blue Funnel line. He was briefly an instructor at the new Outward Bound Sea School at Aberdovey in Wales, and later became Bursar there. Influences from his father included letters and postcards received from all over the world.

His own experience included a voyage, when aged five, from Liverpool to Fremantle via West and South Africa on SS *Ulysses*, and return aged nine on SS *Nestor* via South-west Africa and Gibraltar. He remembers VE day of WWII very clearly and where he was at the time; he was in Gibraltar.

Preparation for Sea

He was apprenticed to Alfred Holt and Co., and was introduced to Lawrence Holt when he signed on. He was asked by Lawrence if he would like to sail on a four-masted barque and, of course, said "yes". Here he showed slides of some pages from his Seaman's Record Book, indicating certificates of discharge.

Holts had decided at that stage to send their ten new cadets to Outward Bound schools, and five were sent to the school at Aberdovey in Wales, and five to the one at Gordonstoun, on Hopeman Harbour, in Scotland; he went to Gordonstoun. Here they did everything that they did at Aberdovey, but also undertook Outward Bound special activities (runs, exercises, etc.) which were organised and run by Kurt Hahn. Hahn decided to have dinner with the cadets, of whom five were from the UK and fifteen from Germany. While having dinner with the UK cadets, they were waited on by the German cadets, who wore open-neck shirts and shorts, and they offered cigars around! They subsequently spent time at Outward Bound in Germany, where they ran obstacle courses, and mingled with apprentices from *Passat* and *Pamir.*

Passat

Passat was one of a number of similar ships built in Germany soon after the turn of the century, and here Alston showed a slide of *Passat.* She had four masts, and was square rigged with six courses (sails) each on the forward three, and fore- and aft rigged on the jigger (aft) mast.

Passat was built by Blohm+Voss in Hamburg (Yard No. 206) for Ferdinand Laeisz, and was launched on 20 September 1911. *Peking* was built at the same time on a parallel slipway, and both are still afloat. *Passat* is berthed in Travemunde, Germany, as a youth hostel and museum ship and has undergone a $10 million renovation, and *Peking*

is berthed in New York, USA, at the South Street Seaport Maritime Museum.

Plan and profile drawings showed that *Passat* had an air draft of 58 m from truck to deck. The Sydney Harbour Bridge has an air draft of 49 m, and so *Passat* would not pass under! The framing plan showed that she had a semi-balanced rudder, which was advanced thinking for the time. She had a gross tonnage of 3000, and could carry 5000 tons deadweight, compared to 3000 tons for the average ship of the time, so the German barques were big. She had a length overall of 115 m, a length on deck of 97 m, a beam of 15 m and a draft of 5 m.

Passat's history reads as follows:

1911 Built at a cost of 680 000 gold marks By Blohm+Voss in Hamburg, Germany

1911–14 Hamburg to west coast of South America in the nitrate trade (2.5 voyages)

1914–20 Interned for WWI at Iquique in France, and passed to the French

1920–21 Iquique to Marseille

1922 Repurchased by Ferdinand Laeisz for £13 000

1922–31 Hamburg to west coast of South America in the nitrate trade (10 voyages)

1928 Collision with SS *Daphne* (which sank)

1929 Collision with SS *British Governor*

1932 Sold to Gustaf Ericson of Mariehamn, Åland Islands

1932–39 Baltic to Australia in the grain trade (7 voyages)

1940–45 Laid up in Mariehamn, Åland Islands

1946–49 Europe to Australia (2 voyages, including deviations); loaded grain at Wallaroo, Port Victoria and Port Lincoln, and timber at Bunbury

1950–51 Laid up in Mariehamn, then sold to Belgian shipbreakers

1951 Sold to Heinz Schliewen, Hamburg, and modernised with *Pamir* as a cargo-carrying cadet ship, including the installation of a diesel engine, the fitting of bulkheads, deep tanks, winches, derricks, etc.

1952 Alston Kennerley joined; the ship loaded cement in bags at Brake on the River Weser (downriver from Bremen), and delivered to Rio Grande do Sul in Brazil, and loaded grain for the return (2 voyages in his 10 months on board)

Mid 1950s School ship of the German merchant marine

1957 Decommissioned

Now Youth hostel and museum ship, Travemunde, Germany

Photos

Alston showed many photographs of the vessel, and illustrations of what life during his 10 months on board was like. These included the vessel in Cape Town in 1947 and Bunbury in 1947, prior to his joining. The sails were huge; the breadth of the lower courses was about twice the beam of the ship, and it needed about 50 sailors to get a sail from the deck up the mast and into position. Furling sails aloft in heavy weather was no job for the faint hearted! Nor was simply moving about the deck, with green water coming aboard over the bulwark rail. There were two pig sties on board to provide fresh meat for later in the voyage.

There are items from *Passat* in the museums at Port Victoria and Wallaroo, including a fid, and a cup, saucer and plate with the Gustaf Ericson logo.

Of the four cadets from the Blue Funnel Line who sailed in *Passat,* one became a shipbroker, one became a master in OCL containerships, one (himself) became a maritime historian, and he has lost contact with the other.

There were two steering positions on *Passat*, one aft and one midships. The capstan on the foredeck had two heads, the upper driving the windlass and the lower driving the anchor capstan; it could take up to an hour to raise the anchor. Getting the anchor over the side to drop, and retrieving it back on deck were also difficult operations, achieved using a davit on the foredeck. To retrieve, one of the crew had to go over the side to connect the line from the davit; dropping was simpler with a quick-release mechanism.

At the start of each voyage, the crew for each watch were chosen by the first and second mates choosing members alternately, to try and distribute the experience and skills evenly between the watches. Jobs on board included scrubbing the decks with caustic soda and sand, then applying linseed oil, polishing brass, splicing, peeling potatoes (never ending!), taking sun sights with sextants, and repairs aloft. He showed photos of painting draft marks on the vessel on staging over the side at anchor in Rio Grande

do Sul, and painting the side of the vessel from staging over the side while on passage! The more difficult jobs included shinning up the jigger mast, and sending a yard down to the deck for repairs.

An excitement on board for first timers was always the Crossing the Line ceremony at the equator, and he showed photos of his first crossing, with Mr and Mrs Neptune coming on board and greeting the captain, together with a copy of his own certificate (in German), signed by the Captain and Neptune.

The total complement was 80 officers and crew. They slept in hammocks, 25 in each watch, port and starboard, and each crew member had to make their own hammock before sailing. In calm weather they rigged their hammocks on deck. Time off watch was spent sleeping, washing, having haircuts, etc. The captain made a full-rigged model of the vessel. One of the crew played a piano accordion, and occasionally entertained everyone with music for songs and sea shanties.

Passat was regarded as a "lucky" ship, in that there were no major accidents, although there were several close calls!

After Alston left *Passat*, in the mid 1950s she spent some time as a *schulschiff* (school ship) in the German merchant marine, before being decommissioned in 1957. She is now a youth hostel and museum ship, berthed at Travemunde (mouth of the River Trave), a borough of Lübeck, the largest German port on the Baltic Sea. Alston showed photos of her taken recently, including being beautifully lit at night.

Statistics

Alston then showed some interesting statistics relating to ex-crew members of *Passat* and *Pamir*.

Time at Sea	**Min.**	**Average**	**Max.**
Age joined crew (years)	14	19	31
Time aboard (months)	5	12	41
Number at sea after one year	0	15	44
Total time at sea (years)	0.5	17	45
Age left sea (years)	20	35	64

Sailing Careers	**Number**
Crew having pre-sea training	36
Crew having no pre-sea training	7
Served on *Passat*	27
Served on *Pamir*	15
Served on both	4
Licensed as A5/Mate foreign-going	38
Licensed as A6/Master foreign-going	35
Held command	21

Other Careers		**Number**
Career in merchant marine		10
Second career as	pilot	5
	nautical teacher	4
	naval officer	5
Coastguard/police		2
Security related		7
School teacher		3
Other		6

Conclusion

Alston concluded his presentation with two photographs; one of himself and Kapitan Peter Kraus, who had signed on together as cadets in *Passat* in 1952, and with whom he is still in touch, and one of *Passat* as the feature on a stamp

Passat at Travemunde
(Photo John Jeremy)

issued by the Falkland Islands, showing her in her Gustav Ericson colours.

[*For those interested,* Passat *shows up in Wikipedia, and there is a video clip of a German documentary on* Pamir *at www.schiele-schoen.de, with the last 30 seconds featuring* Passat *(not under sails) shortly after she was hit by a severe storm in 1957* — Ed.]

Questions

Question time was lengthy, and elicited some further interesting points.

A single course could be clewed up quickly by a few sailors, but it needed twelve or more to fully furl a course. The Germans ran a system of watches broken into 3 × 4 h and 2 × 6 h. In heavy weather they ran double watches, which quickly became all-consuming.

It was reputed that, on *Pamir*, the crew used to have races up the shrouds one side, across and back down to the deck. However, that was mostly kept under control on *Passat*, as the officers were conscious of their duty of safety. In fact, each crew member had a belt with a lanyard and hook, which they were supposed to clip on when aloft (this was the very early days of OH&S!) However, this was not enforced as it was too time consuming and, after their first few times aloft, even the cadets did not bother clipping on.

On one trip to South America, a propeller blade fell off. Fortunately, they carried a spare, and were able to fit it while at anchor in Rio Grande do Sul by unloading the cement bags from the stern first, trimming the ship by the bow sufficiently to remove the faulty propeller and fit the spare. Almost unbelievably, the same thing happened to the spare propeller on the homeward voyage, and so a new propeller was designed and fitted.

The vessel was originally fitted with a donkey boiler. However, it was removed when the ship was modernised in 1951.

On a humorous note it was commented that, if boys were bad in the days of sail, they were not sent to a boys' home, they were sent to sea; if Australia had sail training ships, then we may not have the problems that we do today!

The vote of thanks was proposed by Captain Barkley Ross, who averred that the presentation had been fascinating, and that we had been lucky to have Alston present to us. The vote was carried with acclamation.

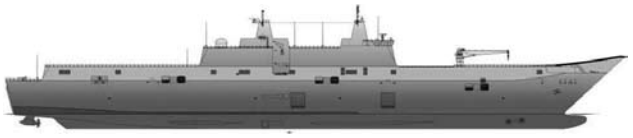
Classification of the LHDs

Adrian Broadbent, Naval Business Manager for Lloyd's Register Asia, gave a presentation on *Classification of the RAN's Amphibious Ship Project* to a joint meeting with the IMarEST attended by thirty-five on 3 September in the Harricks Auditorium at Engineers Australia, Chatswood.

Introduction

Adrian began his presentation with a picture of the launch of *Juan Carlos I* by Navantia at Ferrol, Spain, in March 2008. This vessel is a landing, helicopter and dock (LHD) ship for the Spanish Navy, and a close sister to the two vessels to be built for the Royal Australian Navy. This is one of the largest classification projects ever undertaken by Lloyd's Register Asia, as it is the first time (along with the new aircraft carrier for the Royal Navy) that LR's naval ship rules have been used in their entirety for a large ship.

The prime contractor for this project is BAE Systems Australia Defence, and they have subcontracted the design and hull construction to Navantia in Spain. Navantia's yard at Ferrol, in north-western Spain, will build and fit out the hulls up to the main deck level. BAE Systems in Williamstown will build and fit out the superstructure above the main deck, including the island structure on the starboard side amidships. The Australian version will be similar to *Juan Carlos I*, in that the hull, machinery and electrical fit-out will be the same. However, there are regulatory differences, and these will necessitate some changes in other areas. The customer is the Australian Defence Materiel Organisation (DMO).



Profile of the RAN's LHD ships
(Image courtesy Defence Materiel Organisation)

A profile view of the vessel showed that the ski-jump forward will be retained, giving the capability to launch short-take-off and landing aircraft (although Australia currently has none). There is a light cargo garage on the main deck extending from the aft end of the island structure forward to about the crane position, and a heavy cargo garage two decks down (just above the waterline) extending over the same area. The hangar is on the main deck extending aft of the island structure to the end of the main-deck superstructure. The dock area is directly under the hangar, but two decks down and extending aft to the transom. When the stern door is open, landing craft can be run inside and docked against the forward bulkhead to unload into the heavy cargo garage. Lighter cargoes can be transferred up into the light cargo garage via ramps.

In addition, a bow-on view of the LHDs alongside the RAN's former aircraft carrier, HMAS *Melbourne*, showed that the LHDs really are large vessels.

Principal Particulars of the RAN's Canberra-class LHDs

Length BP	230.82 m
Displacement	27 831 t
Gensets	1 × LM2500 gas turbine (17.4 MW) 2 × MAN diesel generators (2 × 7.2 MW) 1 × Volvo Penta diesel generator (1.396 MW)
Propulsion	2 × Siemens 11 MW electric pods
Thrusters	2 at bow for manoeuvrability
Range	> 6000 n miles
Speed	> 20 kn

Joint command centre
Four large watercraft
6 helicopters on deck
1403 bunks for personnel

The gas turbine is mounted above the main deck, while the diesel generators are down in the hull.

Project Schedule

Sep 2005	1st Pass approval — Design and Development Phase

There were two principal competing designs; one by Armaris of France in association with Thales Australia, and one by Navantia of Spain in association with BAE Systems, and these worked to the capability statement.

July 2006	Tender released by DMO
Nov 2006	Tenders submitted
June 2007	BAE Systems/Navantia selected
Oct 2007	Design and construction contract signed
Jan 2008	Classification contract signed
Feb 2008	LR's Project Manager arrived in Ferrol
23 Sep 2008	First steel cut at Ferrol
July 2009	Design reviews complete
16 Jul 2010	First steel cut at Williamstown
July 2012	LHD 1 hull arrives Williamstown
Jan 2014	LHD 1 acceptance
Feb 2014	LHD 2 hull arrives Williamstown
Aug 2015	LHD 2 acceptance
Jul 2016	Final acceptance into service of both vessels

The project is complicated, in that Navantia are building and fully fitting out the hulls up to the main deck level. The vessels will then be transported to Australia on board a dock ship (which is a major exercise in itself), and the superstructure above the main deck will be built and fitted out by BAE Systems in Williamstown.

Drivers for Change to Naval Classification

DMO selected LR to help them provide technical support and the regulatory knowledge in the tendering process, and LR have been involved from the start of the project. This is contrary to the usual merchant-ship practice, where classification is tacked on at the end.

DMO used the traditional approach in the Armidale-class patrol-boat project. Also, in the *Sirius* conversion project, DMO tried dictating the classification society as LR to Tenix, but this resulted in communication difficulties. For the LHDs, DMO has engaged LR at the outset, and this is working well for both sides.

Why is the navy going to a classification society? There is a number of drivers:

- Navy budgets and their resources and finances are under more scrutiny than ever before.
- Similarly, the rules of naval safety governance, both internal and international, have changed, and bringing classification into the process helps in the governance role.
- Commercialisation of naval infrastructure; e.g. Garden Island Dockyard, previously run by the RAN, is now operated by Thales Australia.
- Technical developments in the commercial marketplace have closed the technology gap between naval and commercial ships.

Objectives of Naval Safety Management

Objectives of naval safety management include providing a "safe" ship; demonstrating equivalence to statutory legislation; having an auditable process which will stand up to external scrutiny; using "risk" processes to allow innovation; and doing all of this at minimal cost.

LR's Involvement to Date

LR has been involved in three areas:

- Classification and Statutory Support Services: Providing support to each designer for class rule and IMO regulation compliance.
- Rule Analysis Services: Reviewing each submitted design specification for class rule and IMO regulation compliance.
- Tender Evaluation: Assisting the evaluation team to identify inconsistencies in the submitted design specifications.

LHD Notations

The LR notations which will accompany the ship listings in *Lloyd's Register* are as follows:

✠100A1 Logistic Support Ship (Dock), SA1, NSA, AIR, ESA1, FDA2, RSA2, CM, *IWS, TA3, ✠LMC, UMS(NS), SMR, ELS, CCS(NS), ICC, NAV(NS), IBS(NS), CEPAC2, RAS(BV)(NT)(NS), Green Passport, EP(B, F, G(NS), N, O, R, S), ESC(NS), FIRE(NS), LSAE(NS), LA(NS) CL, CR, PL, PCWBT, SNC, LI, LMA, SERS.

Whew!

Some interpretations are:

SA1	worldwide operations, but not in ice conditions
NSA	auxiliary naval ship
AIR	aircraft-operations capable
ESA1	extended strength analysis
IWS	in-water surveys
TA3	towing and towed capability
(NS)	naval specification
IBS	integrated-bridge system
RAS(BV)(NT)(NS)	replenishment-at-sea operations capable (abeam and vertical)(NATO)(RAN)
Green Passport	lists all materials in the ship with a view to eventual disposal
EP (B, F, S)	environmental protection additional to MARPOL (ballast, fuel, sulphur oxides)
PCWBT	protective coatings in water-ballast tanks
LI	loading indicators.

This is a far more extensive set of notations than required for your average commercial vessel.

Concept of Operations

LR has put together a concept-of-operations document. The RAN has a well-defined capability statement (some other navies are not so diligent) and this has contributed to a workable document including the following:

- Definition of vessel roles.
- Vessel attributes — length, displacement, speed, endurance, payload, accommodation.
- Survivability (e.g. how many adjacent compartments should be able to survive simultaneous damage, and how many separate fires can be fought at once?)
- Operating environment (e.g. should the vessels be capable of operation in ice conditions?)
- Operating philosophy.
- Maintenance philosophy.

Equipment Certification

Naval shipbuilders are often not familiar with the certification of equipment to classification-society rules, as are commercial shipbuilders, so LR has prepared an equipment certification matrix. This shows clearly the certifications required for the major items of equipment, and will be useful to the shipbuilders.

Rule-tailoring Document

This document has been prepared by LR to identify areas where their Rules need to be tailored to allow for:

- operational requirements different from the default assumptions in the Rules;
- intended application of alternative standards;
- ensuring that the "specification" is not compromised; and
- variances in ambient conditions.

This document is as important to LR as it is to the shipyard and to the customer.

Summary

LR was selected as the classification society by DMO soon after the first-pass approval. This was extremely useful, as it provided direct assistance to the project team to develop designs to meet the capability and regulatory requirements, as the designers' and DMO, knowledge of class requirements needed to be supplemented. There have been few arguments so far, and none of a fundamental nature. This has been one of the first major applications of Lloyd's Register's Naval Ship Rules in their entirety.

Questions

Question time was lengthy, and elicited some further interesting points.

The design reviews have been done between the designer (Navantia) and the RAN. LR has not been directly involved,

except by way of providing design appraisals to the Rules and IMO Regulations to support the design reviews.

Juan Carlos I was not initially classed to LR, but was done to the Spanish naval standards. However, as part of the tendering process for the Australian LHDs, Navantia requested LR to assess the structural design of *Juan Carlos I* to LR's Ship Rules, and they found that she complied. That being the case, they have gone ahead with full classification of *Juan Carlos I* by LR, in addition to classification of the LHDs for the RAN.

Unmanned aerial vehicles have not been planned for, but they could be used.

The vote of thanks was proposed, and the "thank you" bottle of wine presented, by David York, who said that the RAN has to be seen as a good neighbour on the high seas, and that classification emphasises the intention and the capability. The vote was carried with acclamation.

Trends in Tank Testing

Sandy Day, Senior Lecturer and Manager of the Acre Road Hydrodynamics Laboratory of the Universities of Glasgow and Strathclyde, gave a presentation on *Current and Future Trends in Tank Testing in Naval Architecture and Ocean Engineering* to a joint meeting with the IMarEST attended by seventeen on 24 September in Room 101 in the School of Mechanical and Manufacturing Engineering at the University of New South Wales.

Introduction

Sandy began his presentation by saying that thiswould be a personal view of some of the issues facing towing tanks, and how they were being addressed by the Acre Road towing tank.

What do we do about CFD? This is probably the biggest challenge for the future of towing tanks. However, it does *not* mean the end of towing tanks; it merely means that they will not be doing the same things in the same way as in the past; they must do things differently, and better.

Towing Tanks

Sandy then showed a slide of William Froude's towing tank at Torquay on the south coast of England, where it all started in about 1870, including several of Froude's original models which are now housed in the London Science Museum. Froude was the first to separate the viscous and wavemaking components of resistance, and to put scaling of resistance on a firm scientific basis. The cross-section of Froude's tank was almost triangular, and it was not a commercial tank.

The first commercial tank, which looks similar to Froude's tank, was built by Sir William Denny at Dumbarton in Scotland in 1882. It was originally driven by a steam engine with a continuous wire loop. However, it also had a large lead weight which was dropped down a tower to accelerate the model for fast runs. This tank was run commercially until the 1970s, following which it was run by the Universities of Glasgow and Strathclyde for (mainly) research work, and has now become part of the Scottish Maritime Museum.

Some of the other well-known tanks around the world include:

Krylov Institute, Russia	1891
Berlin Model Basin, Germany	1903
University of Michigan, USA	1905
Bassin des Carenes, France	1906
Mitsubishi, Japan	1908
Vienna Model Basin, Austria	1916
Shipbuilding Research Centre, Japan	1927
Haslar, England	1931
MARIN, Netherlands	1932
CEHIPAR (El Pardo), Spain	1934
MARINTEK, Norway	1939
SSPA, Sweden	1940
David Taylor Model Basin, USA	1941
Acre Rd, Scotland	1963
NMRI, Japan	1965
KRISO, Korea	1978
AMC, Australia	1982
Institute of Marine Dynamics, Canada	1985
Ship Research Division, India	1992
Samsung, Korea	1996

The International Towing Tank Conference was instituted in 1933.

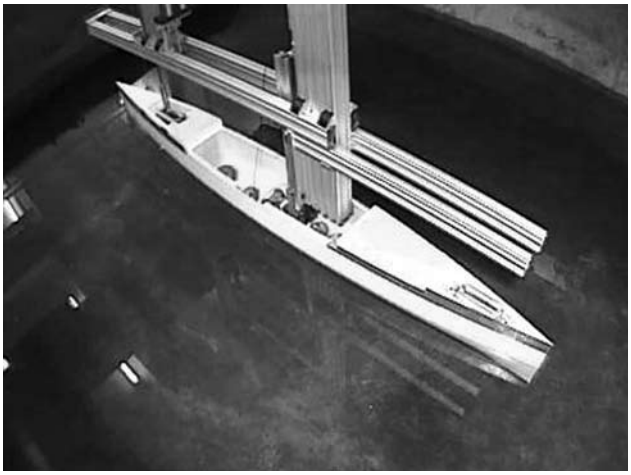
Two slides then showed the distribution of tanks by age (most of the towing tanks were built in the period 1940–1990, with a real peak in the 1970s), and by length (most of the university tanks being 50–150 m, commercial tanks 100–300 m, and there are some giant military tanks, the grand-daddy of them all being the US Navy's 900 m tank!)

Acre Road Hydrodynamics Laboratory

The towing tank in the Acre Road Hydrodynamics Laboratory is 76 m long × 4.6 m wide × 2.5 m depth, and the maximum carriage speed is 4.5 m/s. Waves of maximum height 0.7 m (single frequency) can be generated. The tank is thus of average size for a university tank, a toddler in the commercial world, and a baby in military terms.

The balance of their work comprises about 30% funded research, 30% student projects, 30% commercial testing, and the remaining 10% is taken up by planned maintenance,

Towing Tank at the Acre Road Hydrodynamics Laboratory
(Photo courtesy Sandy Day)



Traditional Resistance Test
(Photo courtesy Sandy Day)

upgrades, installations, etc.

In the traditional resistance test, we measure resistance, speed, sinkage and trim, and calculate the resistance coefficients and scale the resistance to full size. We can also, if required, measure profiles of the generated waves. In the traditional seakeeping test, we measure the speed, motions and wave elevation, and calculate the motion RAOs. Here Sandy showed videos of resistance and seakeeping tests in the Acre Road towing tank.

Challenges

The real challenge for towing tanks is the growth of RANS (and other) CFD solutions for steady motions. Global forces can now be predicted with reasonable uncertainty (typically <5%) as well as local flow-field details (flow vectors, pressures, etc.), even for complex appended geometries, all of which can be modelled in CFD, but which provide challenges in the tank. There are well-established linear and non-linear potential-flow methods for ship motions, and growing CFD interest in motions prediction.

The result of this growth of CFD has been the elimination of some tests, and a reduction in the numbers of tests, e.g. fewer conditions examined, but the same number of jobs. This places pressure on tank-testing economics — especially on fixed costs. This provides particular challenges for smaller tanks.

There are few, if any, totally-commercial towing tanks; many are supported by government, or military/navy interests. In general, you don't get rich by running a towing tank! The main reason is that the economics are skewed. If you build a 3 m model, that could be half the cost of the whole job; if you reduce the number of tests, then the proportion goes up, and the results look like poor value-for-money. This is especially true for the smaller tanks, which are generally regarded as less reliable, so CFD is a real challenge.

So what can we do?

Solutions

Despite what has been said about challenges, the future is actually bright. However, there are things which we have to do to keep it bright. These include improving the efficiency of the pre-test phase, increasing productivity of testing, utilising improved instrumentation, improving confidence (reducing uncertainty), concentrating on problems which are still highly-challenging for computational methods, and examining new applications.

The objective of the ARHL is not to make money, but to conduct interesting research. However, nearly 50% of a manager's time is spent thinking about money!

Improving Efficiency of the Pre-test Phase

We can improve model-making methods and materials. For many tests, the model-making cost is comparable to, or greater than, the cost of the testing program itself. Hence we need to increase the speed of the turnaround and the quality of the end product, reduce cost, and increase the use of CNC machining. We can also look at using new techniques, such as rapid-prototyping technology.

Increasing Testing Efficiency and Quality

We can improve productivity and quality simultaneously with new equipment. For example, absorbing wavemakers reduce the turnaround time (and hence increase productivity), and reduce the influence of reflections (and hence increase quality).

Improving Instrumentation

We can use better (and cheaper) versions of previously existing equipment: e.g. loadcells, encoders, accelerometers, etc., better data acquisition (16-bit not 12-bit), and higher sampling rates due to cheap memory; digitally-controlled drives (e.g. for the carriage, but also for actively-controlled experiments), laser flow measurement devices (LDA/LDV, PIV, PTV, LIF, plus many others), and real-time non-contact motion measurement (optical-tracking/motion-capture systems).

Laser flow-measurement devices are fantastic for non-intrusive flow measurement, but they are eye-wateringly expensive, the base unit of currency being $10k!

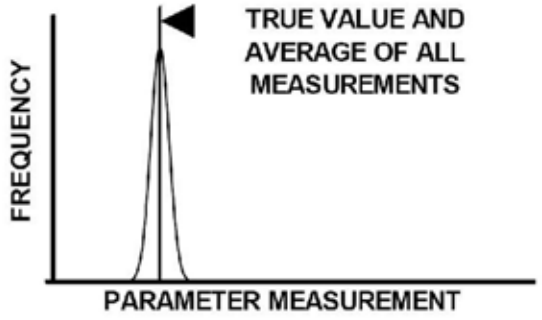
Non-contact measurements using optical-tracking/motion-measurement systems are great for tracking complex 6-degree-of-freedom motions. Sandy quoted the example of a kayaker paddling down the ARHL towing tank, with the motion of the paddle being tracked by three cameras, with three balls on a frame attached to the paddle to give its location and orientation. The output is in "standard" co-ordinates in real time, allowing integration with control systems. This sort of problem is still an insurmountable challenge for CFD, as there is a water entry, dynamic movement in the water (including twisting), vortex shedding, and water exit. The towing tank can still do better on this sort of problem.

Improving Confidence in the Results

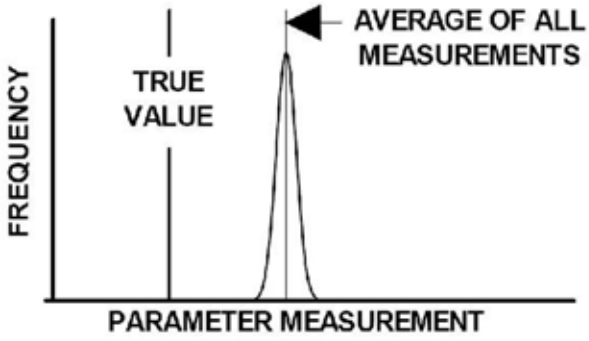
Increasingly, the philosophy of "trust me, we know what we're doing" is being replaced by a formal analysis of uncertainty.

Uncertainty is divided into systematic and random errors. The systematic (or bias) component is the difference between the expected value of the measured data and the true result. The random (or precision) component results in the scatter of the data about the expected value of the measurements. This can be illustrated in the diagrams below.

Consider, for example, the possibility of errors in the calculation of the resistance coefficient from the measurements made in the towing tank. There can be errors in each of the four main measurements; resistance, speed, wetted-surface area and density of water. However, each



Unbiased, precise: accurate



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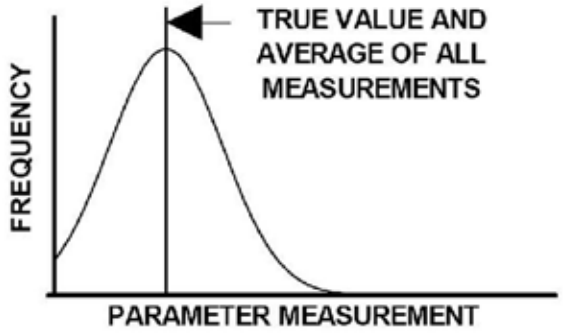
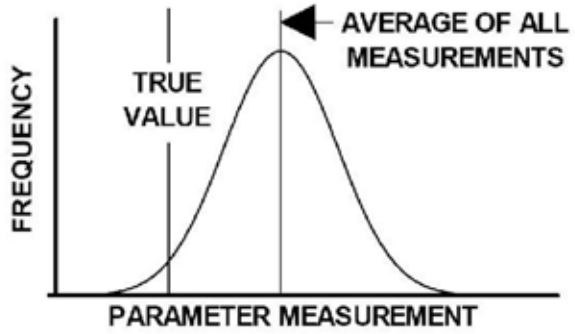


Unbiased, imprecise: accurate



Biased, imprecise: accurate
(Diagrams courtesy Sandy Day)

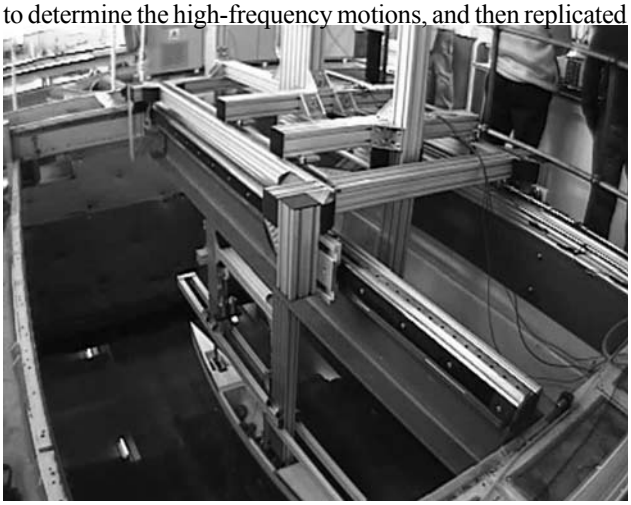
of these subject to contributory errors; e.g. the resistance is subject to calibration errors, errors in calibration weights, errors in alignment of the model in the tank, errors in setting draft and trim, and errors in data acquisition. The result is that the resistance coefficient is dependent on a raft of contributory errors.

However, the result is that we have a formal rigorous approach for estimating "error-bars" for our results, which indicate the range within which the real answer will lie 95% of the time. We also have an indication of how to do things better.

Problems Challenging for CFD

Problems may be challenging for CFD due to modelling challenges, or resource costs. These include highly unsteady flows, highly non-linear flows, and flows in which hydro-elastic fluid-structure interaction is important.

As an example of unsteady flow, they are researching the resistance of a rowing shell, the movement of which is unsteady. They have instrumented a full-sized shell using GPS to determine the mean speed, and then accelerometers to determine the high-frequency motions, and then replicated



Mechanism for imposing unsteady motion onto the mean carriage speed
(Photo courtesy Sandy Day)

the movement of the shell in the towing tank.

Other examples which are challenging for CFD include:

- Damage survivability, e.g. capsize by progressive flooding due to damage on a car deck.
- Roll damping evaluation; as a matter of interest, UGS has a PhD project under way where gyroscopes are being used to *generate* (rather than damp) the roll motions of a vessel; this is very neat, as there is no coupling of the roll with heave, sway, etc.
- Wave impacts, e.g. the slapping of waves onto the bow of an FPSO.
- Yacht slamming, e.g. the slamming of a Volvo Ocean 60 at speed; this is especially tough for CFD as there is water entry and exit involved. The tests could take a week in the tank, but could take years for CFD.

New Applications

We don't have to stick to conventional ship tests. There are many new opportunities for testing; we need to try and see these coming, and equip ourselves for them.

A new application is in the field of marine renewable energy. Tidal energy is now a fact, and the emphasis is now on installation, maintainability, survivability — and especially how to make the equipment able to survive in extreme conditions.

For ultra-deep water oil and gas, they are working in depths of 3000 m, and the problems of installation become important. Steel/wire ropes cannot be used as they are too heavy, so they are now investigating lightweight fibre ropes. There is also the problem of fluid-structure interaction of cables with currents, commonly termed vortex-induced vibration (ViV) on the drill string and cables, and its suppression. This is a horrendously complex phenomenon to understand, and is

simply beyond CFD at present.

Conclusions

CFD is coming — in some cases it's already here — so we might as well learn to live with it!

So in the towing-tank community we have to re-focus, get better, quicker and cheaper, work in areas that are still hard for CFD, and we'll still have plenty of scope for commercial testing and challenging fundamental research.

Questions

Question time was lengthy, and some further interesting points were elicited.

Half of the ITTC Research Committee are CFD-type people, and so there is input from both sides of the fence. CFD is expensive to model, and physical models are also expensive to make. For a fully-appended vessel, the CFD model needs to have a huge variation in density of the elements around the propeller struts, and the time required to do that makes it expensive. If we are clever with our physical model making, we can do it as cheaply, but there are cost issues for both.

For scaling model results to full size, the universal method of extrapolation is that recommended by ITTC 1978: using a three-dimensional form factor approach, with the form factor being determined during the model tests. However, for the calculation of the frictional component of the viscous resistance, Japan uses the Schoenherr (ATTC 1947) friction line, and Europe and the USA use the ITTC 1957 model-ship correlation line. There are others, such as Grigson's (2000), which gives significantly less scale effect when using Prohaska's method to determine the form factor, and is considered by the c*ognoscenti* to be more accurate. Katsui et al. recently presented a new formulation (2005), discussed at ITTC 2008, and this line is close to Grigson's but smoother. However, these other formulations are unlikely to gain wide acceptance soon because of the huge databases of past trials which would have to be converted to enable comparisons to be made. The differences in resistance are of the order of a few percent, and it is not considered worthwhile making the change for commercial vessels. On the other hand, the America's Cup fraternity have not used the ITTC 1957 line for years because, to them, even 0.5% is a match-winning difference, and so they use the most accurate extrapolation available — usually Grigson's.

It is important to make a towing tank economically viable, even if not a financial success. Five years ago the ARHL had eight technical staff, and now they have three plus an on-site manager. There is a number of issues. The tank is a potentially-dangerous place, and the nightmare is for someone to fall into the tank and drown. Someone (the same person!) fell into the Denny tank three times in one year; fortunately, it was shallow and easy to get out, and it was fright, not fatality. For commercial work, they can work late shifts, but not for other work. MARIN, for example, regularly works two shifts per day, but they cannot do that at ARHL.

CFD developers do not usually approach the towing tanks for verification of their results. There have been CFD workshops where well-defined test cases have been set for all to try. Even for new ship types, they would want to validate their results against data obtained at the largest Reynolds number possible. In CFD, the most uncertainty comes from the modelling. The towing tank can quantify the model uncertainty, but the uncertainty comes from scaling, so do we the testing at as large a scale as possible to maximise the Reynolds number. The trend in towing tanks in the design of experiments for validation of CFD requires huge resources.

The vote of thanks was proposed, and the "thank you" bottle of wine presented, by Prof. Martin Renilson, who had done the experimental work for his doctorate in the towing tank at the Acre Road Hydrodynamics Laboratory. Martin said that, while everyone believes the results of towing-tank tests (with the possible exception of the person conducting the tests), no-one believes the results of CFD (with the sole exception of the person doing the modelling)! The vote was carried with acclamation.

References

Grigson, C.W.B. (2000), A Planar Friction Algorithm and its use in Analysing Hull Resistance, *Trans. RINA,* 2000.

Katsui, T., Asai, H. Himeno, Y. and Tahara, Y.(2005), The Proposal of a New Friction Line, *Proc. Fifth Osaka Colloquium on Advanced Research on Ship Viscous Flow and Hull Form Design by EFD and CFD Approaches*, Osaka, Japan, pp. 76–83.

Dual Fuel Engines for LNG Carriers

Eric Clarke of MAN Diesel Australia gave a presentation on *51/60 Dual Fuel Engines: The New Prime Movers for LNG Carriers* to a joint meeting with the IMarEST attended by twenty-six on 1 October in the Harricks Auditorium at Engineers Australia, Chatswood.

Introduction

Eric began his presentation with observations about the development of the engine, which has been brought forward by the requirements for power and the limitation of emissions. The company has been working closely with the LNG marketplace, and the naval architects have been working closely with the development engineers. The new engine has been developed from the 48/60 engine as a basis (there are hundreds in operation), and they have expanded on that.

In Australia, MAN are installing two 12V51/60 engines at Owen Springs (40 km WSW of Alice Springs) for their power supply.

System Configuration

MAN Diesel's new 51/60 DF engine (bore 510 × stroke 600 mm) is a dual-fuel power unit capable of running on boil-off gas from the tanks of LNG carriers or on conventional liquid fuels as back-up. It has been developed to give LNG carrier operators a more-efficient alternative to propulsion systems based on steam turbines and offers a market-leading output of 1000 kW per cylinder.

The full 51/60 DF range comprises inline (L) versions with 6, 7, 8 and 9 cylinders and vee-configuration (V) versions with 12, 14, 16, and 18 cylinders. At 100% MCR, fuel consumption is 190 g/kW/h when running on diesel, and 7.64 kJ/kW/h when running on gas. NO_x emissions are 12.9 g/kW/h (2.0 g/m^3 at 15% O_2 content) on diesel and 1.3 g/kW/h (0.19 g/m^3 at 15% O_2 content) on gas,

demonstrating the clear advantage of gas. When running on gas, more than 99% is gas fuel, and less than 1% pilot fuel (MDO — marine diesel oil — either MDA or MDB).

Possible system configurations for LNG carriers include the following:

LNG carrier size dwt (kt)	DF engine configuration	Installed power MW @ 100% MCR
150–155	4×9L	36
155–165	2×12V + 2×8L	40
	2×14V + 2×6L	40
216 Qflex	3×12V + 1×6L	42
254	2×14V + 2×9L	46
267 Qmax	3×14V + 1×6L	48
	4×12V	48

Change-over of Operation Mode

Eric then showed a series of slides indicating details of the change-over from diesel to gas operation and vice-versa. With these engines, change-over of operation is possible with engine loads of anywhere between 15% and 110% of MCR, i.e. between 150 and 1100 kW/cylinder. MAN is working to increase the required minimum load, e.g. for harbour operations.

The change-over of fuels (either diesel to gas, or gas to diesel) typically takes 2 min, with one fuel being ramped up while the other is ramped down. However, in an emergency, the change-over from gas to diesel can be done in 0.3 s, with a further 1–2 s being taken for balancing the engine speed back to normal, but an emergency change from diesel to gas cannot be done this quickly.

Engine Design

Mechanical components in the engine design included:

- DF piston with 510 mm diameter;
- liner with 510 mm bore to fit the crankcase of the 48/60B engine;
- cylinder head with bore for the pilot fuel injector and optimised inlet ports;
- common-rail fuel injectors;
- fuel gas and common-rail double-wall piping; and
- rocker-arm casing.

The changes from 48/60B to the 51/60 DF engine included pilot-fuel injection by common rail, an electric common-rail pump, a pressure-relief valve, provision of a knocking sensor, an air/fuel ratio control flap, and electronically-controlled gas valve. Conversion of 48/60B engines to 51/60 DF can be done easily and, as a result, there is significant interest from power stations.

A cross-section diagram of the engine showed the double-wall gas pipe, the gas valve arrangement, rocker arms, charge-air manifold, gas flow control pipe, main fuel injection nozzle, pilot fuel injection nozzle, and the main fuel injection pump.

Fuels

As well as MDO, the engine can also run on heavy fuel oil (HFO), and this change-over is always possible. However, for long-term operation on HFO, a change of lubricating oil is necessary, from TBN5–14 to TBN40–50.

When changing from HFO to gas, deposits may be expected, and there is a risk of knocking in gas mode. It is therefore beneficial to run on MDO fuel to clean the combustion chamber for a short time interval before the change-over to gas mode.

Safety

Safety is paramount with this engine, especially at start-up. The cylinders need to be purged to ensure that there is clean air for starting. The engine itself is full of flame arresters, the crankcase is fully ventilated, and must always be purged for start-up.

Purity of the gas fuel is critical, and it must be treated to ensure purity. The gas-control valve is horizontal, so the chance of impurities getting stuck in the valve is very low; some other manufacturers have vertical valves, and so need a bleed-off point.

There is a 410 mm diameter pressure-relief valve at the charge-air manifold, which ensures the efficiency of pressure relief, according to the DF safety concept. There is also a 320 mm diameter pressure-relief valve at the exhaust-gas manifold to protect the turbine side of the turbocharger.

There are double-wall outlets on the engine; i.e. the pipework all has safety built in. The engine room is ventilated, and there is a purge fan for purging the exhaust stack. There are bursting discs so that the pipework is safe.

Testing

The engines have been, and continue to be, exhaustively tested. Total operation on MDO exceeds 730 h, 170 h on HFO, 970 h on LNG, and total 1870 h at MAN Diesel's Augsburg test facilities in Germany.

At the end of September 2007 the new engine received Type Approval from the classification societies American Bureau of Shipping, Bureau Veritas, Det Norske Veritas, Germanischer Lloyd, Lloyd's Register, Nippon Kaiji Kyokai, Registro Italiano Navale and the Russian Maritime Register of Shipping.

First Vessels

The first vessels to incorporate the new DF engines are being built by STX Shipbuilding Co. at Jinhae and Busan, South Korea. The vessels are 173 600 dwt LNG carriers and each will have installed 5×8L 51/60 DF engines for a total power of 40 MW in a diesel-electric drive arrangement.

Conclusion

MAN Diesel has developed a new-dual fuel engine which has received type approval from the major classification societies. The engine has a market-leading output of 1000 kW per cylinder, and about 10% of the NO_x emissions when running on gas as when running on diesel. This is ideal for LNG carriers, which can use the boil-off gas from the cargo as fuel.

Questions

Question time was lengthy and elicited some further interesting points.

The flexibility of couplings for double-wall piping depends on how the engine is designed. Bellows will be designed much more strongly, and relief valves will take account of this. You can have two sets of bellows, one inside the other.

Purity of the gas is critical, but the quality of LNG can vary significantly. The system needs to be set up for a particular grade. At Owen Springs for example, they receive three

grades of LNG, but the engine can run on only two of those. The system will therefore be set up for one grade which will be used most of the time. Humidity is another factor to be considered. In summary, the engine itself does not have to be tuned for the quality of gas, but the system to get fuel to the engine does. This is often about measuring and controlling the methane content.

It is possible to get pre-ignition, and some manufacturers inject the gas just prior to TDC, but this is less safe because the scavenge trunking is then full of explosive gas mixture.

When running on gas the exhaust valve material is the same, but there is less maintenance because there are not the same impurities as when running on HFO and there is less consumption of pistons and rings. Oils are also critical for low maintenance, and they are looking closely at the wear of parts. Exhaust temperatures are a bit lower with gas, and the mean effective pressure is also lower.

Safety of the systems is now mainly driven by the classification societies.

The fuel gas pressure used is standard, and for the pilot fuel about 6 bar (600 kPa) and for the gas about 6 bar as well. Because of this, there may need to be a compressor to deliver the gas to the engine, but it only needs to be small, it must be filtered, and vented to atmosphere (not inside the engine room).

On these engines, the finer the filtering system, the more control of the engine you have. The system is very highly tuned to the gas, but you can get 24 000 h from a set of filters; they are very simple, cartridge-type filters.

For the engines installed at Owen Springs, the gas is supplied at normal temperature and pressure, there is a huge filtering/ treatment station and then the pressure is adjusted for supply to the engine. On board LNG carriers, the advantage is that they use the boil-off gas from the cargo, and there is only a short run of piping from there to the engine room, and they need only to look at the temperature required. There is no holding tank required, and they can change back to MDO when discharging cargo.

The vote of thanks was proposed, and the "thank you" bottle of wine presented, by Graham Taylor, who said that use of LNG was happening more and more, with many people not realising its importance, and that it is also being used for cargo and ro-ro vessels as well as LNG carriers. Two more such vessels were ordered in Europe yesterday, to be built in India and fitted with MAN engines. The vote was carried with acclamation.

30 Years of the World Water Speed Record

Ken Warby and Rob McAuley made a presentation on *How Much do you Want it?: The World Water Speed Record* to a meeting attended by about fifty on 8 October in the AMP Theatrette at the Australian National Maritime Museum, Darling Harbour.

Introduction

The Guest-of-honour, Ken Warby, was welcomed by the Director of the Australian National Maritime Museum, Mary-Louise Williams. She said that today was a special day because, 30 years ago, on 8 October 1978, Ken Warby became the fastest man on water in *Spirit of Australia.* It is astonishing that this record still stands today, 30 years later.

To mark the occasion Ken Warby had, earlier in the day, presented to the museum the model of *Spirit of Australia* which had been tested in the wind tunnel at the University of New South Wales. The model was on display in the theatrette for all to see.

She then introduced Rob McAuley, a film maker who had made several films about the world water speed record.

Rob McAuley

Rob began by saying that it was a privilege and an honour to be asked to show his film and to introduce Ken Warby, an extreme human being, a close friend and mate. He got to know Ken when making a documentary on the water for the ABC in 1970, and one of the items in watersport which they were covering was offshore power-boat racing out of Port Hacking, for which Ken was the safety officer. They got on well, and Ken called him up after filming concluded and suggested getting together at The Stoned Crow wine bar, in Crows Nest. This they did, and Ken suggested that he bring his camera around to his place at the weekend, because he was going to start building a boat, and it was going to be the fastest in the world. This was in a wine bar, after a few, and so he didn't bother!

A month later, he bumped into Ken again, who suggested that he bring his camera around to his place at the weekend, because he was going to start putting the engine into the boat, and it was going to be the fastest in the world. Again, he didn't bother, much to his later chagrin!

Skip ahead eight years, and he had then been filming all the lead up, and waiting for the numbers to come out from the UIM officials after the record attempt, Ken said "Mac, I think we've done it!"

Ken said that he was going to take the WWSR, and he achieved his ambition. He is one of the nicest, clever men, bordering on genius. He moved to the USA after the record, and Bob has stayed with him in Cincinnati, and filmed the new boat, *Aussie Spirit*, taking shape.

This film documents the WWSR and some of the men who have made it their goal. Ladies and gentlemen, enjoy Ken Warby and some of his life.

How Bad do You Want it?

The film began with a close-up of the RMYC Challenge Cup, which was first presented to Sir Malcolm Campbell when he raised the WWSR to 203 km/h on Lake Maggiore in Switzerland. The title reflects the fact that contenders have a 50% chance of leaving the course alive, now 20% in the jet-engine era!

Ken talked (in the film) about his new boat, *Aussie Spirit*. They learned a lot from *Spirit of Australia*, and technologically, aerodynamically, and safety-wise, the new boat is superior to *Spirit of Australia*. He has brought the full crew in from Australia (with the exception of Dr Bob Apathy who, unfortunately, has died). The safety process has been developed by David Appleby, with checklists leading up to Ken signing for the boat before he steps in, and then signing it back to the maintenance crew afterwards.

Some of the more recent, notable WWSR records, and attempts on it, included:

- 1931 Garfield ("Gar") Wood in *Miss America IX* raised the record to 164 km/h.
- 1932 Henry Segrave lost his life trying for the record in *Miss England II*.
- 1938 Donald Campbell in *Bluebird K4* raised the record to 209 km/h and then, in 1939, to 228 km/h.
- 1950 Stan Sayres in *Slo-Mo-Shun IV* raised the record to 258 km/h and then, in 1952, to 287 km/h. This was the last of the internal combustion engine, propeller-driven craft to hold the WWSR (although there is still a record for propeller-driven craft).
- 1952 John Cobb tried for the record in the first of the jet-engined craft, *Crusader*, but she nose-dived and he lost his life.
- 1955 Donald Campbell in *Bluebird K7* pushed the record over 200 mph (322 km/h) for the first time, to 202 mph (325 km/h). Over the next nine years he pushed it to 444 km/h, but the craft flipped backwards when trying for 300 mph (483 km/h) on Lake Coniston, UK, and his body and the vessel were not recovered until 2001.
- 1967 Lee Taylor in *Hustler* pushed the record to 459 km/h. Eleven years later, *Hustler* disintegrated while attempting to raise the record, and Taylor lost his life.
- 1977 Ken Warby in *Spirit of Australia* pushed the record to 464 km/h and then, on 8 October 1978, over both 300 mph (483 km/h) and 500 km/h for the first time, to 511 km/h, where it now stands.
- 1989 Craig Arfons last tried for the record, but crashed and lost his life. There have been no attempts since.

Most of these included footage from the record attempts, with some spectacular crashes. Ken Warby is the only one of five contenders to survive in jet-powered craft!

[*Details of record holders can be seen at, for example, www.lesliefield.com/races/world_water_speed_record.htm; the list on Wikipedia is not complete (but the text provides an excellent summary of the major attempts), and the UIM site (www.uimpowerboating.com) only gives current records* — Ed.]

The film then showed photos of Ken trailing *Aussie Spirit* to Crescent City, Florida, for the Kilometre Day, where fast boats are timed both ways over a 1000 m course for an official result by the Offshore Powerboat Association. John Haggon took Ken along as "navigator", but Ken was shown fast asleep on the rear seat (because it was "too slow") while the vessel achieved an OPA class record of 198 km/h! Ken then did a demonstration run with *Aussie Spirit* at 320 km/h.

Ken talked about growing up in Newcastle in the early 1940s, with his heroes being the guys doing air, land and water speed records. He read about Donald Campbell going to build a jet-propelled boat, and so built his own model, put an engine in and it went like a rocket. He said "I'm going to do this!"

While in scouts, he noticed the power boats, and drew up plans for his own 3 m boat. His dad bought a 1934 Ford Prefect engine and they installed it, and it was a disaster. However, in 1965 he bought a power boat called *Monte Christo*, put in a V8 engine, and became unbeatable.

After Donald Campbell's first record, jet power became mandatory. Some years later, a friend of his called, and said that he had put in a sealed bid of $100 each on two J34 engines. The bids were successful, and they ended up with two jet engines. These went into *Spirit of Australia.* They blew the first one up one on Lake Munmorah during testing, and the second on Blowering Dam five days before a scheduled attempt on the WWSR. They hurriedly found another J34 engine in Sydney for $65, installed it in the vessel, and broke the world record!

A major obstacle for Ken was cash. The boat was completed for no more than $10 000, with the design evolving from boat-racing experience.

Ken had heard that Prof. Tom Fink at the University of New South Wales had been on Donald Campbell's *Bluebird K7* team, so he rang him and asked for assistance. Tom agreed, but asked him to bring his model along. "What model?" Ken asked. So he ended up making a model of *Spirit of Australia* at a scale of 1" = 1'–0" which was then tested by Lawry Doctors in the wind tunnel at UNSW under the direction of Prof. Fink. After testing the model of *Spirit of Australia* and comparing with the results from *Bluebird*, Prof. Fink asked Ken who had *really* designed *Spirit of Australia*, the results were so good. He found it hard to credit that it was all done by the seat of Ken's pants! The tests showed that *Bluebird* was likely to lift off at 400 km/h, while *Spirit* was likely to lift off at more like 720 km/h. They then went out and set the world record at 394 km/h in 1977. After reducing the drag of the rudder by cutting off the bottom, they pushed that up to 464 km/h with their $65 engine. Ken was subsequently named Australian Sportsman of the Year.

Ken obtained approval in 1978 to visit the RAAF Base at Wagga Wagga, where his $65 jet engine was removed from *Spirit of Australia*, found to be 30% rusted and corroded, was reconditioned by the apprentices, and reinstalled. On 8 October 1978, *Spirit of Australia* passed both ways over the measured distance on Blowering Dam, and set the record at 511 km/h, where it has remained ever since.

Ken has subsequently moved to the USA and lives in Cincinnati, where he set up a concrete mixing business. He has been playing with jet dragsters, jet trucks, jet funny cars, and with the design, construction and testing of *Aussie Spirit*.

Rob then introduced Ken Warby in person.

Ken Warby

Ken began his personal presentation by saying that the WWSR was thirty years ago, and he hadn't aged a bit! He thought it important to mark the occasion by being here — he is still able to celebrate, and to have a lot of fun in boating. He considers that he was lucky: he did a lot of hard work, but made a lot of good friends, and had a lot of fun along the way.

He designed and built *Aussie Spirit* with the intention of raising his own world record. There are a couple of other teams talking about doing it but, so far, all they have done is talk. He brought the vessel to Australia in 2003 for the 25th anniversary of the world record, and did some runs on the river at Taree, NSW. The Union Internationale Motonautique (UIM), which administers the WWSR, did not have any cockpit regulations at that stage. However, new cockpit

regulations have been introduced which makes *Aussie Spirit*'s cockpit illegal, and the vessel has subsequently been banned by the authorities from all water in Australia. He has therefore taken her back to the USA, where they are a bit more relaxed about the UIM rules. He has done exhibition runs, gradually working up to the 320 km/h which they achieved at Crescent City. He will now put the boat away, and wait to see if anyone breaks the record. With a 20% chance of reaching the end of the course alive, *How Bad do you Want it?* Ken did—as a kid, and all of his life. He knows the risks, and is happy with them.

The design of the air intakes and T-tail on the aft end were interesting. There are formulas for the area of the intakes and, if you get the area right, then you get a supercharging effect. Prof. Fink helped with the design of the intakes but advised that the T-tail should have a high aspect ratio. Ken disagreed, as he wanted to be able to trail the boat without having to assemble and disassemble the T-tail. In the end, he built the T-tail from the ribs from a Cessna's wingtips and a sheet of aluminium foil, with a maximum width of 8 ft (2.44 m), the maximum legal vehicle width at the time.

In addition, he installed a wedge under the vessel on the centreline aft. As a result, *Spirit of Australia* runs on three points; the two wing canards forward and the centreline wedge aft, the contact areas being about the size of dinner plates.

Following the WWSR, Ken took *Spirit of Australia* to the USA and three of them showed the USA what Australia's fastest boat in the world looked like. They had a 40 ft (12.19 m) motorhome, and a Chevy van towing *Spirit of Australia.* They would spend six days in a shopping mall, and the seventh day on the road, shifting to the next major city, and ended up doing a big circuit of the USA. They were in Newport for the America's Cup in 1982, and James Hardy took him for a sail in one of the lead-up races against *France III*. He offered for Ken to steer the yacht on the way home, so Ken asked "Where's the starter button?"

After moving to the USA permanently in 1982, Ken set up a concrete mini-mix business in Cincinnati, where he settled, as there were none in the USA at the time. He bought Hino trucks in town, and had the mixer units made in Melbourne and shipped over, and it turned out to be quite successful. For play, he became involved in jet-propelled drag racing. At one stage, he owned the world's most powerful truck, in which he had installed a jet engine from an F4 Phantom, putting out about 30 000 kW, and the truck could do the standing quarter-mile in 7 s!

One of the big names on the power boat race circuit is John Haggon, who has five race boats, a crew of 58 people, and 13 Kenworth trucks to tow the whole show! Ken himself now has five vintage boats, one of which has a blown 605 in^3 (9.91 L) Chevy engine, and he does the power-boat circuit in the USA with boats that they have never seen before—they just don't have lap-straker (clinker-built) boats!

So…he is still playing with boats and having fun, and it is good to come to the ANMM occasionally and pat the bow of *Spirit of Australia.*

Questions

Ken took some questions from the audience, and elaborated on some further points.

He had already mentioned cutting off the bottom of the rudder to increase speed in 1977. What happened was that they had set the record at 394 km/h, and were trying to get more speed. The rudder had been designed to have significant area for directional control, but it also has significant resistance, the moment from which helps to keep the nose of the boat down. At 483 km/h, the total resistance of the vessel is about 13.5 kN, while the total resistance of the rudder is about 7.0 kN. Ken asked Prof. Fink (his technical adviser) how he could increase the speed, Tom did some calculations on the back of an envelope in the caravan, and recommended that he cut 65 mm off the bottom of the rudder. Ken went out and cut off 75 mm with an oxy-acetylene torch (reducing the bow-down safety margin), and went out and raised the world record.

Setting the current world record was actually too easy; he had been aiming to beat the 300 mph (483 km/h) mark, but not 500 km/h, keeping that up his sleeve for when Australia went metric. He had gone down the first leg of the course at an average speed of 491 km/h. On the way back he maxed out at the end of the course at 555 km/h, for an average for the second leg of 529 km/h, and the world record (average both ways) of 511 km/h. He actually asked the UIM officials if he could withdraw the second leg and run it again at a lower speed, but they would not allow it!

Donald Campbell's *Bluebird K7* was located and lifted (in pieces) from Coniston Water in 2001. Bill Smith in Newcastle-upon-Tyne is rebuilding the boat. She had a steel skeleton, and the jet engine had magnesium in it which acted as a sacrificial anode, but they do have about 95% of the original fabric. The chassis is being powder coated, but they will have to build new sponsons, which had disintegrated. They have obtained a new jet engine for the vessel. When fully restored, they are planning to do a commemoration run down Coniston Water at 240 km/h, and Gina Campbell has asked Ken to pilot the vessel for the run. They plan to place the restored *Bluebird* in the museum at Coniston.

The vote of thanks to Ken was carried with acclamation.

Refreshments

Drinks and nibbles were then served in the lee of the Tasman Light. Ken and Bob talked to many of the interested people who plied them with further questions, or simply caught up and told tall tales and true.

Phil Helmore

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.

Photographs and figures should be sent as separate files (not embedded) with a minimum resolution of 150 dpi. A resolution of 200–300 dpi is preferred.

COMING EVENTS

NSW Section

The ninth SMIX (Sydney Marine Industry Christmas) Bash will be held on Thursday 4 December aboard the beautifully-restored *James Craig* alongside Wharf 7, Darling Harbour, from 1730 to 2130. This party for the whole marine industry is organised jointly by RINA (NSW Section) and IMarEST (Sydney Branch).

Tickets are available from Adrian Broadbent of Lloyd's Register Asia on (02) 9262 1424, fax 9290 1445. Cost is $35 per head and credit card payments are no longer acceptable; cash or cheque (payable to RINA NSW Section) only. There is a limit of 225 guests on *James Craig*, so it would be wise to book early.

The first technical meeting for 2009 will be combined with the Sydney Branch of IMarEST and held on Wednesday 4 February at Engineers Australia, 8 Thomas St, Chatswood, starting at 6:00 pm for 6:30 pm and finishing by 8:00 pm:

4 Feb 2009 Brian Russell, UK, *Fifty Years of Hovercraft Development*.

HPYD 2008

The third High Performance Yacht Design conference will be held on 2–4 December 2008 in the School of Engineering, The University of Auckland, 20 Symonds Street, Auckland City.

The program of events is as follows:

Monday 1December

- Evening icebreaker and registration at Bungalow 8, Auckland Viaduct

Tuesday 2 December

- Keynote address: Britton Ward, Farr Yacht Design
- Conference sessions 1–3
- Evening: design session by Paul Bieker on composite design, structures, International 14 design and efficient hull forms

Wednesday 3 December

- Conference sessions 4–6
- Event hosted by Intercad in conjunction with Emirates Team New Zealand: Match racing onboard SailNZ's America's Cup boats (delegates only) followed by BBQ (partners welcome)

Thursday 4 December:

- Conference sessions 7-10
- Conference dinner at Royal New Zealand Yacht Squadron, Westhaven Marina

Registration for the conference may be done online, and a list of abstracts of papers to be presented is shown on the conference website. Check out all the current information, including details of previous conferences, at www.hpyd.org.nz.

IHSMV 2009

The first International Conference on Innovation in High-speed Marine Vessels is being organised by the Royal Institution of Naval Architects in Association with Curtin University of Technology, Austal Ships and Formation Design Systems, and will be held at the Fremantle Sailing Club, Fremantle, on 28–29 January 2009.

Few sectors of the maritime industry have embraced innovation as readily and successfully as the high-speed marine vessels sector, in seeking to extend operating envelopes, reduce downtime and increase reliability, safety and comfort, and reduce costs. Advanced design, the use of new materials and more efficient production methods and other means have, and are, all being explored to achieve these aims for commercial, military and recreational vessels.

The first International Conference on Innovation in High Speed Marine Vessels will provide an opportunity for all those involved with this sector of the maritime industry to present and discuss recent and future developments in all these aspects of commercial, military and recreational high-speed vessels.

Technical papers will be presented containing new and original ideas, innovative applications and practical achievements in various aspects of high-speed marine vessels. The conference program is now available online at www.rina.org.uk/c2/uploads/hsmv2009brochure.pdf. Registration is also available online.

For further information, or to register for the conference, check the website www.rina.org.uk (click on Events/Events Programme/IHSMV), or contact conference@rina.org.uk, or fax +44-20-7259 5912.

Students at IHSMV 2009

The IHSMV 2009 conference will have a limited number of free places available for students who are not able to present a paper at the conference — first in best dressed, so be quick! Contact Ms Yuen Yee Pang at ypang@rina.org.uk, or fax +44-20-7259 5912.

STAB 2009 Conference

Those who attended the 7th International Conference on Stability of Ships and Ocean Vehicles (STAB 2000) in Launceston will recall not only the success of that conference but also the wide range of stability topics that it covered. Further successful STAB Conferences have subsequently been held in Madrid, Spain and Rio de Janeiro, Brazil.

The First Announcement and Call for Papers has been issued for the 10th in this series of STAB conferences, to be held in St Petersburg, Russia on 22–26 June 2009. St Petersburg in the northern summer has its own attractions but, with the dates being in the "white nights" period close to the summer solstice, the opportunity to take in those attractions outside of the conference will be maximised.

Topics to be covered in the conference include:

- Stability of floating platforms and offshore structures
- Ship dynamics in rough seas
- Non-linear dynamics
- Design for safety and risk-based design
- Operational safety
- Regulatory aspects and Goal-Based Standards
- Fishing vessel stability and safety
- Stability of naval vessels and high-speed craft
- Large passenger ship safety and safe return to port
- Stability of unconventional craft
- Sailing yacht stability
- Stability of offshore supply vessels

- Investigation of marine accidents
- Damage stability
- On-board control of ship stability

Specialist workshops will be held in conjunction with the conference covering topics such as:

- Application of GRID technologies for ship behaviour modelling
- Computational aspects in modelling ship dynamics
- Applied software for ship modelling and simulators
- Intelligence technologies in ship design

While the date for submission of abstracts has passed, anyone still proposing to submit a paper should contact the Chairman of the organising committee, Prof A. B. Degtyarev by email on deg@csa.ru or stab2009@csa.ru. Pending establishment of the conference web-site (http://stab2009.csa.ru), further information, such as copies of the Call for Papers, may be obtained from Rob Gehling (phone (02) 6279 5696, mobile (0411) 746 264, email rob.gehling@amsa.gov.au). Papers are required to be submitted by 31 December 2008.

Basic Dry Dock Course

Following on from the success of the course held in Melbourne in 2008, RINA has announced its intention to hold the Basic Dry Dock training course again in Australia in August 2009.

This unique four-and-a-half day course covers the fundamentals and calculations of dry docking. The course begins with the basics and safety concerns, and progresses through all phases of dry docking: preparation, docking, lay period, undocking, and ends with a discussion of accidents and incidents.

The course is presented through classroom lectures, student participation in projects and practical application exercises. The course addresses the deck-plate level of practical operation needed by the dock operator and the universally-accepted mathematical calculations required to carry out operations in accordance with established sound engineering practices.

The course is designed to be relevant to dockmasters, docking officers, engineers, naval architects, port engineers and others involved in the dry docking of ships and vessels.

The course topics and program may be downloaded from www.rina.org.uk/c2/uploads/topics and programme.pdf

To register your interest in the course visit www.rina.org.uk/drydockaustralia2009.

The Argentine Navy's sail training ship *Libertad* arriving in Sydney for a port visit on 16 September
(Photo John Jeremy)

RINA

The Royal Institution of Naval Architects

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GENERAL NEWS

Harbour Security a Priority for New Defence Research Facility

Safeguarding Australia's harbours and port facilities from terrorist threats will be the focus of new research by the Defence Science and Technology Organisation (DSTO), the Minister for Defence Science and Personnel, the Hon. Warren Snowdon MP, said in Sydney on 19 August.

Speaking at the opening of DSTO's new research facility at the Australian Technology Park in Redfern, NSW, Mr Snowdon said that advanced simulation laboratories and state-of-the-art equipment in the new facility would enable DSTO to assess security risks at our seaports, explore threat scenarios and develop measures to counteract them.

"The security of our ports is critical to the Australian economy," Mr Snowdon said.

"DSTO is using sophisticated visualisation software representing Sydney Harbour, Port Botany and the Port of Brisbane to scan for security weaknesses and improve situational awareness.

"This maritime security research program builds on DSTO's world-class capability in maritime operations analysis, mine-warfare and coastal-warfare systems."

The new facility will also assist Navy in its future maritime program involving the three planned air-warfare destroyers and two amphibious ships — the largest ships ever to be operated by the Australian Navy.

"The government is keen to ensure that DSTO facilities are fully geared to meet the operational needs of Defence, with access to modern technology and leading-edge capabilities," Mr Snowdon said.

"For 100 years now our defence scientists have proven that they can deliver innovative technology solutions for the ADF, including some world-leading developments in science."

Mr Snowdon mentioned the Jindalee Over-the-Horizon radar, Barra sonobuoy, Nulka anti-ship missile decoy, the Australian minesweeping system, the LADS laser hydrographic survey tool, the black-box flight recorder, aircraft fatigue testing and composite bonded repair technology as some of DSTO's most-famous inventions.

LHD Contract for Dockwise

In August, Dockwise Ltd. announced that its subsidiary, Dockwise Shipping, had entered into contracts with the Spanish naval shipyard, Navantia, for the transport of the two Canberra-class LHDs.

Navantia, located in Ferrol, Spain, is building the two LHDs for the RAN. The hull of each vessel and its outfitting will, to a large extent, be completed by the Spanish yard. The final construction, outfitting and commissioning will be performed in Melbourne. For this arrangement the transport to Melbourne on the deck of a semi-submersible transport vessel is the preferred option. To accommodate the 231 m long LHDs, Dockwise and Navantia have agreed the use of *Blue Marlin* for each of the two transports, expected to take place in 2012 and 2014.

LCS 2 Christened *Independence*

Austal USA's 127 m trimaran Littoral Combat Ship, *Independence* (LCS 2), was christened in front of over 1000 guests and dignitaries during an official ceremony held at its Mobile, Alabama, shipyard in October.

The General Dynamics LCS Team — within which Austal, is ship designer and builder — christened the state-of-the-art combat ship on 4 October on the waters of Mobile Bay, with Austal USA's recently-launched 113 m catamaran, built for Hawaii Superferry, alongside.

Speakers at the christening ceremony included Secretary of the US Navy, the Hon. Donald Winter, who commented on the importance of the vessel to the Navy's future defence efforts.

"USS *Independence* will play a pioneering role in our Nation's effort to protect our interests and to ensure the stability of the global economy," Secretary Winter said.

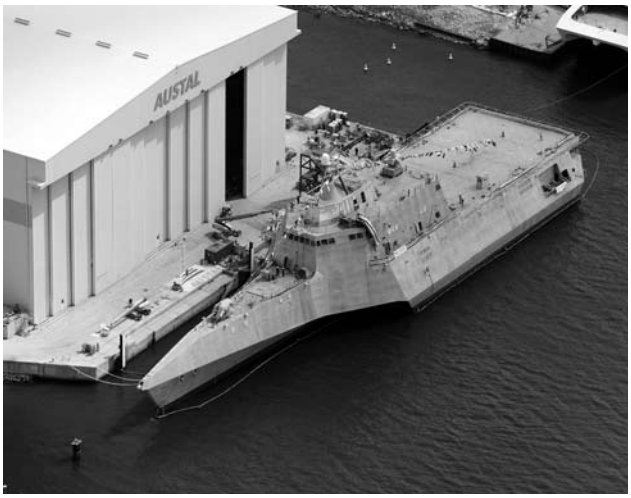
The ship sponsor was Doreen A. Scott, wife of the 10th Master Chief Petty Officer of the Navy, Terry D. Scott.

Principal speaker, Senator Jeff Sessions from Alabama, commented; "I'm proud of Austal and its workforce. In a few years it has grown from zero to over 1000 employees," Sessions said.

Referring to Austal USA's new modular manufacturing facility, which has begun construction, Senator Sessions commented; "With the new facility seven times the size of these two bays, thousands more will be employed,providing an efficient rate of production because 25 percent of our Navy ships will be Littoral Combat Ships."

Independence is the first ship built by Austal USA for the US Navy, and the Navy's first trimaran Littoral Combat Ship. It is the first naval warship constructed in Mobile, Alabama since World War II.

Since its keel laying in January 2006, *Independence* has steadily progressed within Austal USA's purpose-built construction facility in Mobile, Alabama, toward becoming a formidable warship. The christening ceremony offered the shipbuilder the opportunity to display the progress made thus far to over 1000 participants.



Independence alongside Austal's Alabama facility
(Photo courtesy Austal)

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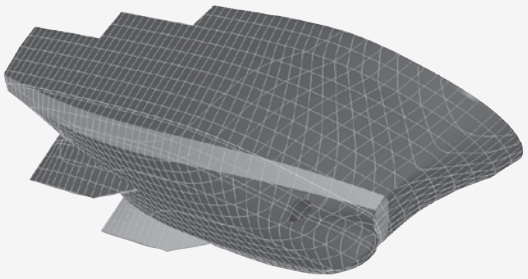

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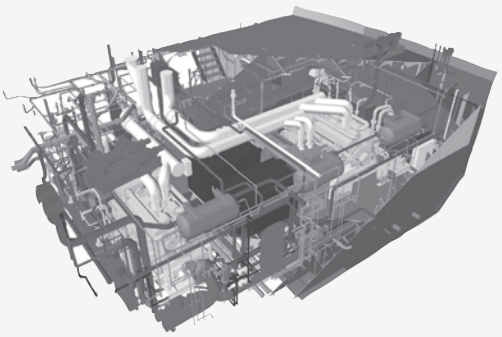

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The 127 m Austal trimaran seaframe is the platform for the LCS's mission and weapon systems. This seaframe provides superior seakeeping and aviation as a result of its long, slender central hull and smaller side hulls ("amahs"). The trimaran hullform provides a huge internal mission deck with a large payload-carrying capacity and superior seakeeping capability.

Located above the mission bay is the largest flight deck on a surface combatant, capable of conducting dual H-60 helicopter operations and accommodating the US Navy's largest helicopter, the H-53, a feature not available on similar-size naval warships. The vertical location of the flight deck on the trimaran hullform provides the highest flight deck elevation on a combatant ship other than a major amphibious vessel or aircraft carrier.

Carrier Contract for LSA

Liferaft Systems Australia (LSA) has secured a contract worth approximately $4.8 million to supply Marine Evacuation Systems to the UK Ministry of Defense for use on two new British aircraft carriers.

LSA European Manager, Mr Peter Rea, said it was the biggest single contract since the company was founded over 16 years ago. "LSA has been working on finalising this contract for about 18 months after we were initially approached by Aircraft Carrier Alliance, who had noticed the design and quality of our product" he said.

Under the contract, LSA will be providing 12 × 20 m long inflatable evacuation slides (deployed from approximately 12 m above sea level) and 60 × 100 person inflatable liferafts. The life saving equipment, designed and manufactured in Hobart, Australia, will be provided to Aircraft Carrier Alliance prior to the vessels being launched.

Mr Rea said that while LSA had previously provided Marine Evacuation Systems to the French, Dutch, UK and USA navies, this was the first contract which the company had received to supply their systems for installation on aircraft carriers.

The two new aircraft carriers, HMS *Queen Elizabeth* and HMS *Prince of Wales* have a flight deck area of nearly 13 000 m^2 and hangar space of 29 000 m^2. The aircraft carriers will be 280 m long and 70 m wide, with capacity to carry 40 aircraft and nearly 1500 crew.

Managing Director of Liferaft Systems Australia, Mr Mike Grainger, said LSA had a "...very full order book..." for the next two years. "Given our existing work load, our lead times for delivery from our production facility in Tasmania is approximately 12 months", he said. Peter Rea added "this is obviously a good position to be in, given the current economic problems being experienced around the world"

LSA, which exports 95% of its systems to customers around the world, has offices in UK and North America and provides service facilities in 22 countries. In addition to Marine Evacuation Systems, LSA has also developed other inflatable

Austal 2008 Advanced Manufacturer of the Year

Austal has been awarded the 2008 Advanced Manufacturer of the Year at the inaugural AMTIL Advanced Manufacturing Awards, held in Melbourne recently.

The Advanced Manufacturing Awards recognise Australian companies which incorporate leading-edge practices, technologies and organisational cultures to sustain global competitiveness in manufacturing industries.

Having demonstrated excellence in international trade and export, innovation and skills, training and staff development, AMTIL Chief Executive Officer, Shane Infanti, said Austal was a deserving winner of the prestigious award.

"Our judging panel was obviously impressed with Austal's business model and award application," Mr Infanti said.

"We were extremely pleased to see Austal's ongoing support of Australian manufacturing and their commitment to investment in technology, innovation and the skills development of their staff. Our belief is that these fundamental issues are keys to the future success of our manufacturing industry in this country," he said.

Currently celebrating its 20th year, Austal is the world's largest manufacturer of high-speed, high-performance aluminium vessels for commercial and defence applications, delivering more than 200 vessels to over 36 individual countries.

Over the past two years, Austal has introduced Advanced Shipbuilding (ASB) techniques into its four Australian shipyards, improving production efficiency, reducing energy consumption and creating an improved working environment for Austal's 1500-strong local workforce.

Austal also incorporates the latest in advanced manufacturing technology, such as its state-of-the-art routers which cut all the shipbuilder's aluminium plate and achieve a cutting distance of more than 20 km per week and 1000 t per year.

Shipbuilding at Austal in Western Australia
(Photo courtesy Austal Ships)

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Planning for Australia's Future Submarines

The Minister for Defence, the Hon. Joel Fitzgibbon MP, announced on 27 October that a major step forward has been taken in the planning for Australia's future submarines. The Minister made the announcement while inspecting the submarine support and training facilities at the Navy's Fleet Base West at HMAS *Stirling* in Western Australia.

"Submarines provide a vital military capability for Australia. A key Defence election commitment by this Government is focussed on carefully planning for Australia's next generation of submarines," Mr Fitzgibbon said.

"I am therefore pleased to announce that I have recently approved funding of $4.67 million for a program of studies in support of the acquisition of Australia's future submarines."

The studies will be managed by a Project Office operating under the joint supervision of the Chief of the Capability Development Group and the Chief Executive Officer for the Defence Materiel Organisation.

A Project Office of seventeen people is being established to manage the Future Submarine Project, designated SEA 1000. This Project Office will expand over the coming years.

"Through these studies, Defence will engage industry to assist development of the project acquisition strategy for Government consideration in the second half of 2009. Work on the concept design of the future submarine will commence in 2010, leading to further consideration by Government in 2011," Mr Fitzgibbon said.

"This is yet another demonstration that this Government is committed to ensuring that Australia's future Defence capabilities are carefully considered and well-planned."

The future submarines are expected to enter service around 2025 when the Collins class will begin to be withdrawn from service at the end of their planned lives.

Parliamentary Secretary on Submarines

Greg Combet, Parliamentary Secretary of Defence Procurement, addressed the Submarine Institute of Australia (SIA) on 6 November with a speech titled *The National Interest — Challenges of a Submarine Building Industry*.

"The Government is committed to retaining a viable submarine-warfare capability for Australia, and Defence will now conduct studies in preparation of a submission for consideration by Government in the second half of 2009," Mr Combet said.

"The construction of the next-generation submarines will be a nation-building program unrivalled in our history, and it would not be an exaggeration to compare it to the construction of the Snowy Mountains scheme."

"Submarines provide a vital military capability for Australia and we are committed to supporting Australian industry involvement."

Mr Combet also addressed the issue of skills required for the construction of the next-generation submarine. He said "without doubt, the workforce required for the future submarine will probably be the most advanced workforce the defence industry has ever required, if not also the largest."

Mr Combet said the Government recently announced a major step forward, with $4.67 million in funding being approved for a program of studies in support of the acquisition of Australia's future submarines.

"A Project Office of seventeen people is being established to manage the Future Submarine Project, designated SEA 1000 and this will expand over the coming years."

"Some funded studies are also proposed to gain an appreciation of how companies might approach specific design problems in order to encourage risk reduction."

"To support early decisions on critical design aspects, some DSTO and company technology studies are also proposed. These will cover areas such as battery technology and conceptual designs for weapons and payload handling and storage."

"This is yet another demonstration that this Government is committed to ensuring that Australia's future Defence capabilities are carefully considered and well-planned."

"The future submarines are expected to enter service around 2025 when the Collins class will begin to be withdrawn from service at the end of their planned lives".

The full text of Mr Combet's speech is available at www.defence.gov.au/minister/combet/media.cfm.

First Ferries Depart Austal Tasmania

In late August the first vessels to be completed at Austal's Tasmanian shipyard commenced their 14 day delivery voyage to Hong Kong via the east coast of Australia onboard liftship *Pantanal*.

The two 47.5 m high-speed passenger catamarans, built for New World First Ferry (Macau), were scheduled to enter service in October to meet the growing tourism demand generated from the dramatic increase in Macau's tourist arrivals since the development of its gaming and mega-resort industry.

Set to join five similar Austal passenger catamarans already in service in the New World First Ferry (NWFF) fleet, the latest ferries, named *New Ferry LXXXVII* and *New Ferry LXXXVIII* will operate at a service speed of 42 kn while carrying 418 passengers.

Austal was awarded the contract in February 2007 to build repeats of its proven design, which had been optimised to meet NWFF's requirements.

Focussing on small-to-medium-size construction, Austal's Tasmanian shipyard was able to facilitate the fast delivery of the small vessel order at a competitive cost while maintaining the highest international quality standards.

With construction currently underway on three 24 m catamaran police boats for the Queensland Police Service, and a workforce which has grown from 40 to more than 120 during the past 12 months, the inaugural delivery signals Austal Tasmania's position as an important member of Austal's global production capacity.

Located in Margate, south of Tasmanian capital Hobart, the modern shipbuilding facility was purchased by Austal in February 2007 and boasts a history of quality aluminium ship construction.

Both new vessels are be powered by four MTU 16V 4000 M70 engines, each producing 2320 kW and driving Rolls Royce/KaMeWa waterjets.

The two vessels are among 16 Austal passenger ferries currently on order for the China/Hong Kong region, nine of which have already been delivered. Upon completion of its latest order, Austal will have delivered 52 vessels to the region.

Loading one of the new ferries on board *Panatal*
(Photo courtesy Austal Ships)

Principal Particulars

Length OA	47.5 m
Length WL	43.9 m
Beam moulded	11.8 m
Hull depth mld	3.8 m
Maximum draft	1.6 m
Deadweight	70 t max.
Passengers	418
Crew	8
Fuel	20 000 L
Propulsion	
Engines	4 × MTU 16V 4000 M70 each 2320 kW at 2000 rpm
Gearboxes	4 × Reintjes VLJ 930
Waterjets	4 × Kamewa 63 SII
Service Speed	42.5 kn
Classification	DNV +1A1 HSLC Passenger R2 EO

New Chair for Air-warfare Destroyer Council

The Minister for Defence, the Hon. Joel Fitzgibbon MP, announced on 15 September that he had appointed Mr Michael Roche as the new Chair of the Air-warfare Destroyer Alliance Principals' Council.

The Council provides strategic oversight, governance and issue resolution for the Air-warfare Destroyer Alliance and the Alliance Project Board.

"Mr Michael Roche brings exceptional experience and insight to his new role. He has a deep understanding of issues surrounding delivery of complex major Defence projects, and this will be of particular value to his Principals' Council role," Mr Fitzgibbon said.

Mr Roche has a strong and diverse public-sector background. He is a former Under Secretary for Defence Materiel in the Department of Defence and, before that, Deputy CEO of the Australian Customs Service with responsibilities for Border Control, Intelligence, Information and Communications Technology and Internal Affairs.

"I have discussed the air-warfare destroyer project with Mr Roche, and made it clear that I expect him to closely monitor the progress of the project and the AWD Alliance," Mr Fitzgibbon said.

"It is one of the largest and most-complex defence-acquisition programs currently underway, and I expect Mr Roche to work closely with the other members of the Alliance Principals' Council to ensure that it is kept on track."

Australia's Hobart-class air-warfare destroyers are being delivered under alliance arrangements between the Defence Materiel Organisation, ASC AWD Shipbuilder Pty Ltd and Raytheon Australia Pty Ltd.

Membership of the Air-warfare Destroyer Alliance Principals Council is:

Mr Michael Roche (Chair), Dr Stephen Gumley (CEO Defence Materiel Organisation), Vice Admiral Matt Tripovich AM CSC RAN (Chief Capability Development Group), Mr John Prescott AC (Chairman ASC Pty Ltd), Mr Dan Smith (President Integrated Defense Systems, Raytheon Company).

Air-warfare Destroyer Program Update

The Air-warfare Destroyer (AWD) Program will deliver at least three ships to the RAN with the first due to be delivered in 2014. The delivery of these ships is the responsibility of the AWD Alliance, which consists of ASC Shipbuilding as the shipbuilder, Raytheon Australia as the combat system systems engineer, and DMO. The AWD platform design is being undertaken by Navantia of Spain.

While the platform design is being undertaken in Spain, there is a significant presence of naval architects in the AWD Alliance to help ensure that the program is executed successfully. Within the Alliance, naval architects are involved in many activities, including the following:

- Design review and acceptance activities, undertaken in accordance with the Navy Technical Regulatory Framework.
- Shipbuilder support activities related to weight control, module movement, launching, test and evaluation, etc.
- Support for design and build certification.
- Support for combat system integration into the platform design.

Naval architects also hold management positions throughout the AWD Alliance. It goes without saying that successful execution of the AWD program would not be possible without the significant contribution of naval architects throughout all levels of the AWD Alliance.

The AWD Program has recently reached the first-year anniversary of the signing of the contract for the design and build phase of the AWD Program.

After the Navantia design was selected as the Hobart-class AWD in June 2007, the Alliance was faced with creating one team from the three that had previously existed, as well as forming an Alliance management team. All of this had to be done in parallel with negotiating the Alliance and Platform System Design contracts.

The AWD Alliance will use a modular or block-based building strategy for constructing the AWDs. Blocks will be fabricated at various sites across Australia and outfitted as

extensively as possible. The blocks will be transported via ship or barge to the ASC facility in Osborne, South Australia, where the further outfitting and final assembly will occur. Average blocks will be approximately 15 m × 12 m × 9 m and weigh around 200 t.

A restricted RFT has been sent to selected tenderers, with preferred block contractors likely to be selected by late 2008. During this high-profile competitive procurement, the Alliance follows strict probity and commercial in confidence guidelines to ensure that one of the largest procurements of the project is managed equitably.

In July 2008 the Chief Naval Engineer, Commodore Peter Marshall, granted provisional Authorised Engineering Organisation (AEO) status to the AWD Alliance. The granting of AEO status provides affirmation that the Chief Naval Engineer is satisfied that the AWD Alliance is working to meet the requirements of the Navy Technical Regulatory System.

Significant progress has been made in placing contracts with suppliers of major components for the ships. The AWD Alliance recently selected Ultra Electronics as the preferred supplier for the AWD's undersea-warfare sonar system, and the Alliance also recently contracted BAE Systems, Inc. to supply the 5-in (127 mm) Mk 45 guns for the AWDs. Headquartered in the USA, BAE Systems, Inc. is a leader in the design, development, production and through-life support of naval guns, and is the only producer of the Mark 45 gun.

More RFTs covering areas including the under-sea warfare (USW) suite and above-water warfare (AWW) suite are currently being evaluated. Further RFTs for ship systems, support and communications information are in the process of release or evaluation. These combat-system products will make the ships the most advanced warships in the Australian navy.

Construction of the shipyard at Osborne where the AWDs will be assembled continues apace, with significant foundations laid for the common-user facility as well as steelwork erected for both the ASC administration building and the wharf-support building. Work has also begun on the ship lift, which will be the largest of its kind in Australia.

Regular updates on this important project will be included in future editions of *The ANA*.

Ruben Spyker

A fine photograph of the third of the Spanish F100-class ships at sea
(Photo courtesy AWD Alliance)

Austal USA Launches 113 m Advanced High-speed Catamaran

The second of two high-speed vehicle-passenger catamarans for Hawaii Superferry was launched at Austal USA in September. The achievement comes just months after Austal USA successfully launched its revolutionary 127 m Littoral Combat Ship (LCS) *Independence* — a state-of-the-art near-shore combat ship built for the US Navy.

With a service speed of 40 kn and the capacity to transport 866 passengers and 282 cars, the high-speed catamaran joins sister ship *Alakai* — which was delivered to Hawaii Superferry last year — as the largest aluminium catamaran ever built in the US.

While sharing a similar specification to her sister vessel, the 113 m high-speed ferry is fitted with a 20 m stern-quarter, bi-fold ramp for use in austere ports without shore-side loading facilities. The hydraulically-operated aluminium ramp has a clear width of 4.5 m and is designed for 42 t trucks.

Powered by four MTU 20V 8000 M70 engines, the vessel continues Austal's strong association with MTU 8000 Series engines, which are widely considered the industry benchmark for high-speed diesel engines in terms of power, reliable performance and fuel economy.

The MTU 8000 Series diesel engines offer the world's highest power-to-weight ratio in their power range and are established as the low-risk propulsion engine option for many of the world's leading navies and high-speed ferry operators, with more than 160 000 combined operating hours worldwide.

Delivering up to 9100 kW of continuous power, MTU's Series 8000 has consistently set the performance benchmarks for fuel efficiency, less than 190g/kWh, while achieving IMO MARPOL NOx emission certification.

Upon completion of the latest Hawaii Superferry, Austal will have installed a total of 24 MTU 8000 Series diesel engines, proven in operation on six Austal vessels over the past four years. Austal USA has also installed two 20V 8000 Series MTU diesel engines in *Independence*, which is being certified in accordance with the ABS Naval Vessel Rules.

Sea trials of the second Hawaii Superferry will be completed in November and December; however, the contractual delivery date is not until March of 2009.

Oceanic Yacht Design delivers 41 m Ferry for the Bahamas

The 41 m 400-passenger ferry *Bo Hengy 2* completed trials in Brisbane recently and has been accepted by her new owner, Bahamas Ferries.

The Oceanic Yacht Design vessel exceeded her speed and deadweight requirements in extensive trials on Brisbane's Moreton Bay. Oceanic Yacht Design CEO, Stuart Ballantyne, said that the fact the vessel achieved a relatively low power output for such speeds was particularly welcome in these times of high fuel costs.

The vessel features a semi-swath-styled hull which has been optimised over many years utilising extensive tank-testing data and full-scale trials on previously-successful 17 m and 20 m vessels. As part of the specification, the vessel had to operate in water depths of 2 m and be able

The second of two high-speed catamaran ferries built by Austal (USA) for Hawaii Superferry ready for launching with *Independence* (LCS 2) in the background
(Photo courtesy Austal Ships)

to accelerate from a standing start up to service speed with only one metre under-keel clearance — simulating shallow conditions in Bahamian waters.

During trials the vessel achieved a maximum speed of 28 kn at full displacement against a 25 kn contract speed. At this full-load condition the vessel is extremely efficient, with fuel consumption of approximately 300 L/h. A key feature of the semi-swath hull design is that the high speeds can be held in sea states in which planing hulls would be required to reduce speed to achieve a more comfortable ride. With generous tunnel and bow clearances, the all-aluminium quadruple-screw vessel exhibits excellent seakeeping and performance, particularly in rough sea conditions. The use of four engines gives the operator redundancy so that, even with one engine disabled, a service speed of 22 kn can still be achieved. This provides a huge advantage, as one engine can be serviced while in the vessel is in service with a minimum impact on transit times.

The engine room has been designed to be engineer friendly, and features staggered main engines to facilitate easy access around the engines for maintenance. All essential services and machinery systems are located forward of the engine room, and are easily accessed via raised walkways through the hull.

The aft main deck is intended to carry two vehicles as well as assorted luggage and hot/cold stores. The containerised luggage garages and cold store allow efficient and timely transfer of passenger baggage and goods in transit. Cargo access onto the vessel is achieved via self-contained carbon-fibre ramps.

The fully air-conditioned main-deck accommodation area is expansive with excellent vision from within. The spilt-level design incorporates a choice of seating arrangements, with and without tables, and has generous spacing between seats and isle ways and is also wheelchair friendly. A well-serviced kiosk is located at the aft end of the accommodation area.

Passenger seating in *Bo Hegny II*
(Photo courtesy Oceanic Yacht Design)

The upper deck incorporates external seating as well as a first-class internal accommodation area. First-class passengers have state-of-the-art internet and audio-visual services at their disposal, with power outlets and broadband internet fitted at each first-class seat.

The spacious bridge features a raised VIP lounge with executive chairs designed to allow for comfortable observation of the operation of the vessel and the panorama outside. An ergonomically-designed helm allows for easy control of the vessel in all weather conditions.

The vessel was built by Thornlands-based boatbuilder Aluminium Marine and is classed by Lloyd's Register with notation +100 A1 SSC, Passenger Catamaran, HSC G2.

The General Manager of Bahamas Ferries, Alan Bax, was happy with the performance of the craft which will now replace the smaller 175-passenger FBM ferry, *Bo Hengy,* which has served Harbour Islands for the last eight years.

General Particulars

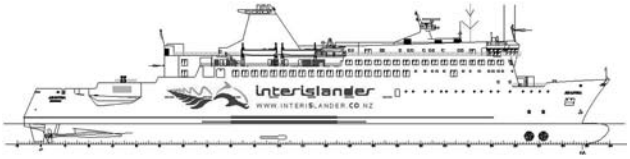
Length OA	41.0 m
Length WL	38.0 m
Beam	12.0 m
Depth	4.30 m
Engines	Cummins
	2 × QSK 19 (567kW each)
	2 × KTA 38M (891kW each)
Speed	28 kn (max)
	25 kn (cruise)
Fuel	8000 L
Fresh Water	3000 L
Passengers	400
Construction	Aluminium
Survey	Lloyds Register +100 A1 SSC,
	Passenger Catamaran, HSC G2
Builder	Aluminium Marine
Designer	Oceanic Yacht Design

New South Wales Industry News

LNA Completes Project on DEV *Arahura*

Lightning Naval Architecture recently completed an "extension of life" refit project on DEV *Arahura* for Toll NZ. *Arahura* was built in 1983 with diesel-electric propulsion (DEV), and operates as a passenger rail and ro-ro ferry across the Cook Strait between the capital Wellington on New Zealand's North Island and the scenic Marlborough Sounds in the South Island.

The project involved a major modification, design, stability calculations, and supervision of the modifications in Singapore. The brief was to increase the payload and ensure that the latest stability requirements were met. Lightning Naval Architecture undertook a comprehensive "Safety Analysis" report, completed in-depth and intricate modelling, and worked up a comprehensive design which was then completed under technical supervision from the LNA team.



Profile of Toll NZ's *Arahura* following modifications
(Image courtesy Lightning Naval Architecture)

The project involved removing superstructure and making modifications to improve cross-flooding arrangements, developing watertight subdivisions, relocating crew accommodation, creating new food and beverage outlets for passengers, and providing more space for trailers and camper-van capacity.

Jennifer Knox

37.5 m Catamaran Motor Yacht from Incat Crowther

Incat Crowther has been commissioned to develop a new high-speed catamaran motor yacht for an international businessman. The vessel will be capable of cruising at 25 kn and will have long range capabilities in excess of 3500 n miles.

The stylish new catamaran will be 37.5 m in length and, with a 10.30 m beam, will provide plenty of large open-deck space on a vessel which will be designed for long-range cruising. The vessel will be powered by a pair of MTU 12V4000 M71 main engines driving fixed-pitch propellers through reverse/reduction ZF gearboxes. The main running gear will be protected by an integrated skeg, providing protection from grounding and other potential hazards.

The interior of the vessel will be designed for entertaining and will feature an open-plan lounge and dining area, with large panoramic windows on the sides and looking aft. The main guest cabins are located forward and are accessed from a central entrance foyer complete with cloak room and guest bathroom facilities. Each guest cabin is fitted with two king-sized single beds which can be quickly re-arranged into a king-sized double bed. In addition, there are large wardrobes complete with baggage storage, large ensuite facilities and all cabins will feature the latest entertainment systems. A small gymnasium is located forward with direct access to the foredeck.

The mid deck will feature a full-width owner's cabin with ensuite, walk-in wardrobe, office, sitting room and direct access to a large private balcony. An extra guest cabin and captain's cabin are positioned aft of an open wheelhouse which has been specifically designed for superior sightseeing with large vertical windows and comfortable guest seating. A Portuguese-style foredeck has been incorporated into the design, complete with forward-facing lounges for a thrill ride or evening drinks as the sun sets over the horizon while sitting at anchor.

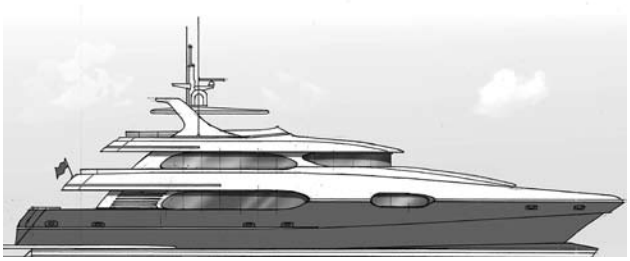
A large flybridge deck has been sparsely arranged with some seating, a BBQ area and lots of open space for relaxation.

The vessel will be built at the Western Australian shipyard of Sabre Catamarans, who have a strong history in the construction of high-speed aluminium catamarans. The vessel owner was led to Incat Crowther by "their superior experience in catamaran design and the recent success of MY *Seafaris*.

Incat Crowther has recently surpassed 300 successfully-built vessels operating around the world. Its latest deliveries include vessels for the Seychelles, Japan, New York and the wilderness regions of Tasmania and New Zealand. One of its next deliveries will be the world's fastest offshore crew boat for operation in the oil fields of the Gulf of Mexico.

Principal particulars of the new motor yacht are as follows:

Length OA	37.45 m
Length WL	35.53 m
Beam	10.30 m
Draft hull	1.50 m
Fuel	50 000 L
Fresh water	4000 L
Passengers	10 guests plus 6 crew
Deadweight	64.40 t
Main engines	2 × MTU 12V4000 M90 each 2040 kW
Propulsion	Propellers
Speed	25 kn cruising
Construction	Marine-grade aluminium
Survey	Lloyd's Register MCA LY2



Profile of Incat Crowther's 37.5 m Catamaran Motor Yacht
(Image courtesy Incat Crowther)

29 m Catamaran Ferry for Thailand from Incat Crowther

Incat Crowther have signed a contract for the delivery of a design and aluminium kit with Sea Crest Marine in Thailand. This new 29 m catamaran ferry is to be built for Lomprayah High Speed Ferries Company, and will run on their main route between Chumphon, Koh Tao, Koh Phangan and Koh Samui in the Gulf of Thailand.

The vessel will be a high-speed catamaran ferry capable of carrying 380 passengers at a service speed of 27 kn fully loaded. The main cabin contains seating for 210 passengers with further seating for 75 in the vessel's upper cabin. In addition, there are a further 80 exterior seats behind the upper cabin plus the sun deck. The aft deck has been arranged with three toilet spaces, a single storage space and a staircase.

A kiosk is located centrally on the main deck and will keep a low profile to maintain an open feeling within the cabin. Luggage storage areas have been integrated at the forward and aft ends of the main cabin. A large open aft deck has dual water-access points over the stern for swimming activities.

The main propulsion machinery will consist of twin Caterpillar C32 main engines, each producing 1044 kW brake power. These will be directly coupled to ZF3050 reverse/reduction gearboxes driving five-bladed fixed-pitch propellers.

The vessel will be built locally at theSea Crest Marine shipyard located in Samutprakarn on the outskirts of Bangkok. This vessel will be the third Incat Crowther aluminium kit to be built by Sea Crest Marine, and follows closely behind a sister vessel already under construction for Lomprayah.

Incat Crowther's aluminium kits provide complete aluminium flat-packs, containing all structural aluminium for the vessel's construction. All plate is pre-cut and retained within the plate by strategically-placed tags, allowing the plate to be transported in sheet form. All parts are individually numbered and include centerlines and waterlines for placement. All extrusions are also supplied, cut to the required lengths. These aluminium packs are particularly suited to new shipyards and those in developing nations.

Lomprayah operate coach and ferry connections between the centre of Bangkok and the Koh Samui group of islands situated in the Gulf of Thailand. These islands are a popular destination for international travellers, from backpackers to five-star types, and visitor numbers are steadily increasing every year. Lomprayah also provide daily scuba diving, snorkelling and sightseeing tours of the nearby Angthong National Marine Park, plus the unique Koh Nangyuan group of three sand-spit-connected Islands.

Principal particulars of the new vessel are as follows:

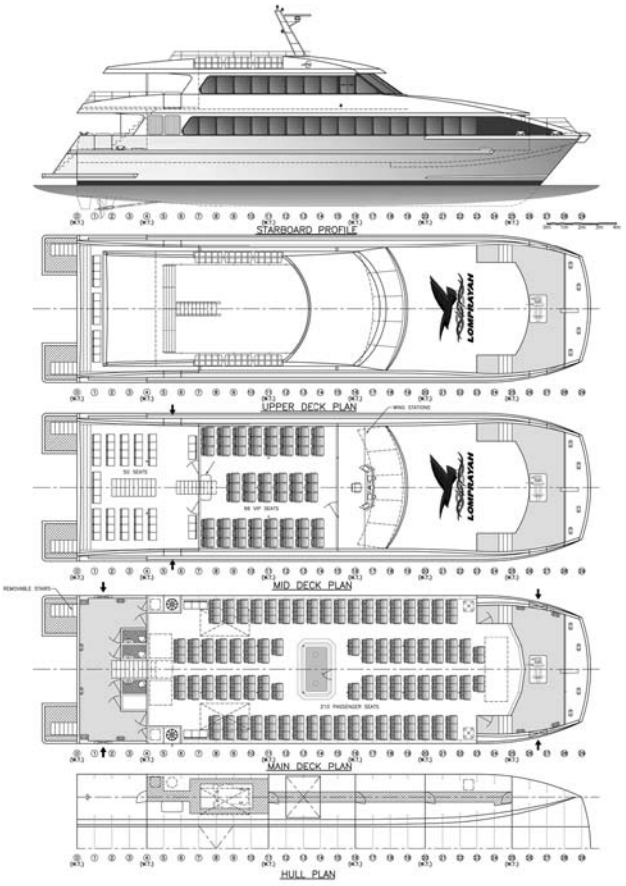
Length OA	29.00 m
Length WL	26.80 m
Beam	8.50 m
Draft hull	1.40 m
Passengers	380
Deadweight	45.90 t
Fuel	2 × 3000 L
Fresh water	1 × 2000 L
Main engines	2 × Caterpillar C32 each 1044 kW
Propulsion	Propellers
Service speed	27 kn
Construction	Marine-grade aluminium
Survey	Thai Marine and Harbour Department

32 m Catamaran Ferry for Japan from Incat Crowther

The latest Incat Crowther catamaran has been launched at the Tasmanian shipyard of Richardson Devine Marine. MV *Premium Dream* is destined to operate between a group of popular tourist islands on the southern tip of Japan. The new fast ferry is 32 m in length and carries approximately 250 passengers. It is now one of only a handful of high-speed ferries which have been successfully exported to Japan.

The main deck cabin features 165 seats, in a mix of configurations, as well as a space for one wheelchair. There is a large kiosk located aft for the sale of food, drinks and souvenirs. There is a toilet block located below the main deck in the port hull, while another toilet is located on the aft deck and sized for passengers with disabilities. There are two main passenger-loading positions, one amidships and one aft. The aft access has been specially designed to unload passengers onto a low floating pontoon via a ramped deck. The mid-deck loading door has a wide clearance to facilitate faster loading and unloading times.

The mid-deck cabin has been laid out for a higher level of comfort, featuring upgraded seating, private toilet facilities and a self-service kiosk. The space has been restricted to 40 passengers, maintaining a more-exclusive feel to the cabin.



General Arrangement of Incat Crowther's 29 m Catamaran Ferry for Lompraya
(Drawing courtesy Incat Crowther)

The forward end also houses the vessel's main helm, which features two command positions with the latest electronic navigation and communication devices. Direct access is available to the wing control stations which have been arranged with external crew access around the front of the wheelhouse.

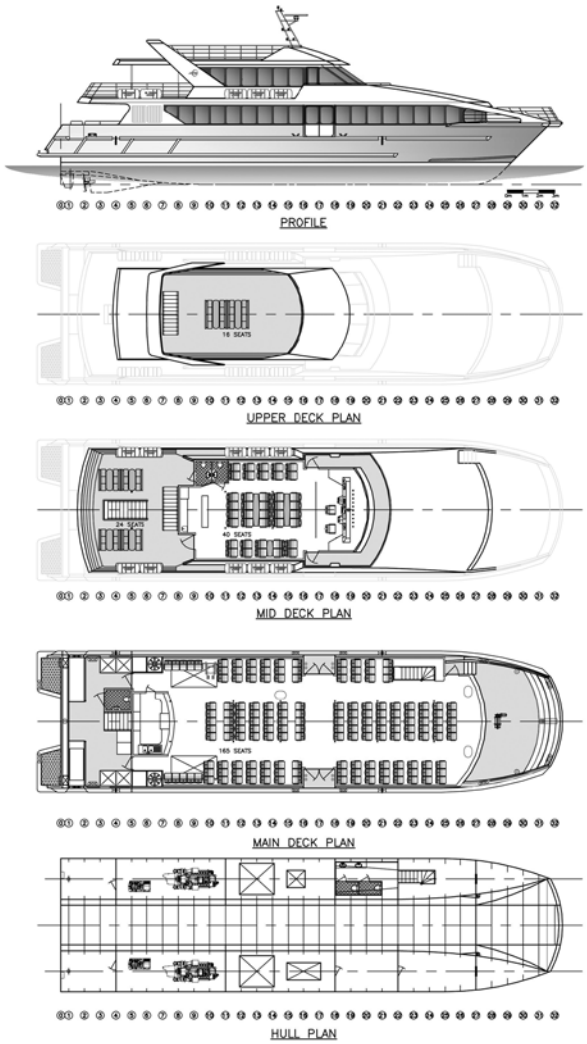
A central staircase leads to a flying bridge where there is further seating for 16 passengers, allowing guests to view the spectacular panoramic islands of the region.

The vessel is powered by two of Caterpillar's latest EPA Tier II-compliant C32 main engines, each producing 1044 kW brake power at 2300 rpm. These engines are directly coupled to Twin Disc MGX6620 reverse/reduction gearboxes driving fixed pitch Mikado five-bladed propellers. By using Incat Crowther's highly-developed propeller tunnels, the hull design has been augmented to provide a very fuel-efficient outcome, achieving a reputable 350 L/h at the vessel's cruising speed.

Ishigaki Dream Tours is located in the Ryukyu group of islands at the very southern tip of Japan, about 100 n miles east of Taiwan. The islands are a favorite getaway for Japanese tourists, with tropical temperatures year round. Based in the port of Ishigaki, Ishigaki Dream Tours operates a large fleet of ferries to a number of the surrounding islands which each offer a differing variety of fun and activities. Where their current fleet of vessels fails to maintain year-round operation, the new vessel will enable them to continue services throughout the year, due to the excellent seakeeping characteristics of the Incat Crowther hull form.

Principal particulars of *Premium Dream* are as follows:

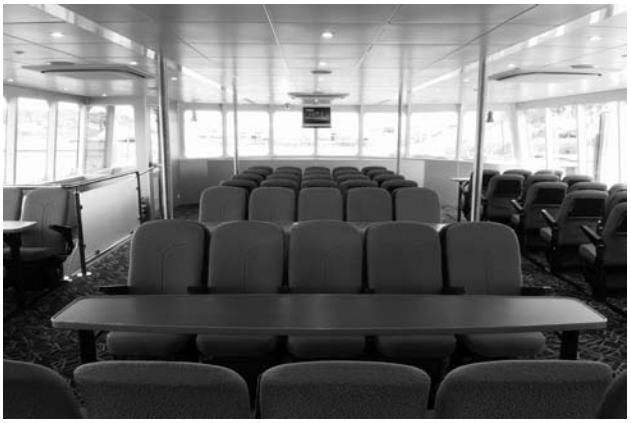
Length OA	32.00 m
Length WL	28.62 m
Beam OA	8.50 m
Draft (approx)	1.70 m
Passengers	
Main Deck	165 internal 1 wheelchair space
Mid Deck	40 internal
Mid and Upper	40 external
Total	246
Fuel	2 × 4000 L
Fresh water	1 × 2000 L
Deadweight	25.54 t
Main engines	2 × Caterpillar C32 each 1440 kW @ 2300 rpm
Gearboxes	2 × Twin Disc MGX 6620
Propulsion	2 × Mikado 5-bladed propellers
Speed	31 kn
Construction	Marine-grade aluminium
Survey	Japanese Government



General Arrangement of Incat Crowther's *Premium Dream*
(Drawing courtesy Incat Crowther)

Premium Dream on trials
(Photo courtesy Incat Crowther)

Mid-deck Seating and Helm Station on Incat Crowther's *Premium Dream*
(Photo courtesy Incat Crowther)



Main-deck Seating on Incat Crowther's *Premium Dream*
(Photo courtesy Incat Crowther)

37m Catamaran Ferry for Tanzania from Incat Crowther

Incat Crowther has been selected to design a 37 m catamaran ferry for the Tanzanian ferry operator, Coastal Fast Ferries. The vessel will be built at the Tasmanian yard of Richardson Devine Marine.

The vessel will be a 37 m catamaran ferry capable of carrying 400 passengers at a service speed of 22 kn fully loaded. The main cabin contains seating for 198 passengers with further seating for 154 in the vessel's upper cabin. In addition, there is a further 68 exterior seats behind the upper cabin and on the wheelhouse deck. The aft deck has been arranged with four toilet spaces, a luggage room and a staircase. The vessel provides excellent viewing positions, allowing passengers to take in the scenery between Dar es Salaam and the island of Zanzibar off the east coast of Tanzania.

Powered by twin Cummins KTA38M2 diesels, each producing 783 kW brake power, the vessel will have a maximum speed of 24 kn at half load.

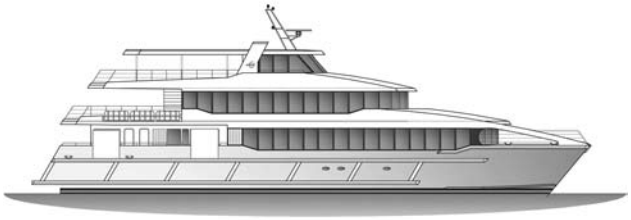
The design is similar to the recently-launched 37 m catamaran ferry, MV *Eagle*, now operating on Tasmania's west coast. The client required the assurance that a proven design provides when moving forward with this acquisition, and Incat Crowther's reference list, which now extends to some 300 vessels, provided this level of confidence.

Coastal Fast Ferries currently operate a fleet of three Incat Crowther passenger ferries operating from Dar es Salaam, Tanzania's largest city. Zanzibar is a major tourist destination in the region with many international seaside resorts.

Principal particulars of the new vessel are as follows:

Length OA	36.60 m
Length WL	32.47 m
Beam	9.50 m
Draft hull	2.20 m
Passengers	400
Deadweight	45.50 t
Fuel	2 × 6000 L
Fresh water	1 × 1500 L
Main engines	2 × Cummins KTA38M2 each 783 kW
Service speed	20 kn
Propulsion	Propellers
Construction	Marine-grade aluminium
Survey	USL Code Class 1C by MAST

Ben Hercus



Profile of Incat Crowther's 37 m catamaran ferry for Tanzania
(Drawing courtesy Incat Crowther)

Cruising

After the winter quiet, with only *Pacific Dawn* working out of Sydney, the summer season kicked off in October with additional visits to Sydney by *Sun Princess* and *Rhapsody of the Seas*. November moves into a higher gear, with visits by these vessels plus *Amsterdam, Volendam, Millennium,* and *Seven Seas Mariner*. Vessels berthing regularly at the Overseas Passenger Terminal at Circular Quay is a sure sign that the summer cruise season is under way.

Phil Helmore

CLASSIFICATION SOCIETY NEWS

Meeting of LR's Australian Technical Committee

The Australian Technical Committee of Lloyd's Register met on 25 September to consider proposed changes to Lloyd's Rules for Ships and Lloyd's Rules for Special Service Craft. Comments from the Australian Technical Committee will be considered, along with comments from other LR Technical Committees around the world, by Lloyd's Technical Committee in London in November, and the changes will be promulgated in 2009.

Phil Helmore

EDUCATION NEWS

Curtin University

Curtin University continues to run the short course, Design for Small Craft, with 22 students attending this semester including several from the marine industry. The course is taught by Shaun Ritson and Ken McAlpine from the Fremantle consultancy MMD Naval Architects.

Curtin University's inaugural Innovator-in-Residence, past RINA president Nigel Gee, started his four-month term in October. His activities at Curtin include preparing a report on how to improve the process of bringing marine innovation into the market place. This will incorporate issues such as collaboration between industry, government and universities, and the education and training implications which follow. Under the Memorandum of Understanding between Curtin University and the Australian Maritime College (AMC), Nigel visited the AMC for three days in October, acting as a moderator for their naval architecture final-year thesis presentations and attending their Industry Liaison Committee.

Kim Klaka

Australian Maritime College

AMC Hydrodynamic Facilities Reaffirm International Reputation

The Australian Maritime College's international reputation has just been bolstered, thanks to its hydrodynamics test facilities.

Head of the Australian Maritime Hydrodynamics Research Centre, Professor Neil Bose, said the AMC had been granted membership of the Advisory Council of the International Towing Tank Conference (ITTC) at its gathering in Fukuoka, Japan, in September. Prof. Bose now sits on the council with more than 30 other organisations, representing the world's leading specialists in maritime hydrodynamics.

The full recognition by the ITTC of AMC's contribution to hydrodynamics came mainly as a result of commercial work undertaken. "Since our facilities were upgraded over the last five years and the towing tank was extended to 100 m, it means we have a substantial test capability. But what really makes us eligible for ITTC Advisory Council membership is the fact that we do over half a million dollars worth of commercial work for industrial clients each year and a similar value for government research labs. On top of that we have our research programs," Prof. Bose said

"Membership is important because it means you are one of the group of recognised tanks doing commercial work in the world." But importance also stemmed from the research undertaken by ITTC technical committees, he said.

AMC was successful in gaining two technical committee appointments, meaning that it is now heavily represented on the international body. While AMC's towing tank manager, Gregor Macfarlane, stepped down from his three-year appointment to the Resistance committee, Prof. Martin Renilson was appointed Chair of the Stability in Waves committee, and Dr Giles Thomas was appointed the Secretary of the High-speed Craft committee.

Prof. Bose said the committees would now undertake research in their respective areas before reporting back to the next ITTC to be held in Rio de Janeiro in September 2011.

Ocean Vehicle Design Presentations

In their final year of study, BEng Naval Architecture students undertake a design project in the unit Ocean Vehicle Design, working in teams to a specification supplied by an industry 'client'. In September five teams presented their designs to an audience of staff, students and industry experts. The designs and their industry 'clients' were:

- 80 m Ro-Pax Catamaran — Austal Ships
- Ship Docking Module — MMD
- Landing Craft — BAE Systems
- Scientific Research/Patrol Vessel — BMT
- Harbour Dinner Cruising Catamaran — Incat Crowther

The marking panel comprised Ms Belinda Tayler and Mr Edward Dawson from BMT, Mr Karl Slater from BAE Systems and Mr Sam Abbott from Austal Ships. In the evening a dinner was held at Me Wah Restaurant, hosted by Professor Tom Hardy, for staff, students and the industry panel.

Giles Thomas

Final Year Engineering Student Research Thesis Presentations

Fourth-year engineering students presented their research thesis findings on Friday 24 October. There was a vast range of topics covered, as can be seen in the list of students and thesis titles below. Thirty-five students from Bachelor of Engineering courses in Naval Architecture, Ocean Engineering, and Marine and Offshore Systems made their final presentations. The students were judged by:

Dr Francis Valentinis, Defence Science and Technology Organization (DSTO)

Mr David Simcoe, Defence Materiel Organization (DMO)

Mr Wayne Murray, Austal Ships

Mr Gordon MacDonald, BMT Defence Services Australia

Dr Yuriy Drobyshevski, Intec Engineering

Mr Peter Hayes, Directorate of Navy Platform Systems (DNPS)

Mr Rob Tulk, One2Three Naval Architects

Dr Nigel Gee, BMT Nigel Gee & Associates (on secondment to Curtin University of Technology)

The presentations were followed by a very lively dinner attended by all final-year BE students, AMC maritime engineering staff and moderators. The accompanying photograph shows all final year engineering students in the class of 2008.

A list of the students and their projects and supervisors is included at the end of this report.

The final year engineering students 2008
(Photo courtesy AMC)

Industry Liaison Committee Meeting

The Bachelor of Engineering degree course teams for all three disciplines (Naval Architecture, Ocean Engineering, and Marine and Offshore Systems) attended a joint Industry Liaison Committee (ILC) meeting at AMC on 23 October. The primary aim of the committee was to conduct a thorough review of the course content for each degree. The industry representatives, all of whom provided excellent input throughout the meeting, included:

Mr Peter Hayes (Department of Defence, ACT)

Mr Wayne Murray (Austal Ships, WA)

Mr Gordon MacDonald (BMT Defence Services-Australia, Vic)

Mr Rob Tulk (One2Three Naval Architects, NSW)

Mr Hayden Marcollo (AMOG Consulting, Vic)

Dr Yuriy Drobyshevski (Intec Engineering, WA)

Dr Francis Valentinis (Defence Science and Technology Organization, Vic)

Mr David Simcoe,(Defence Materiel Organization, ACT)

Mr Christopher Bonay (Worley Parsons, Vic)

Mr Nimal Ranasingha (Office of the Chief Investigator, Transport and Marine Safety Investigations, Vic)

Dr Nigel Gee (BMT Nigel Gee & Associates, currently 'Innovator in Residence' at Curtin University of Technology, WA)

The AMC would like to express its appreciation to all ILC participants for their valued contributions.

***Bluefin* Trips**

Voyages on the AMC's FTV *Bluefin* give naval architecture students valuable experience at sea. This year, two week-long voyages were organised, for both second- and third-year students, by Paul Furness and Giles Thomas. This gave students a unique opportunity to put theory into practice and learn about life on board a vessel.

The students conducted a series of activities whilst on board including speed and manoeuvring trials, structural investigations, design exercises, hydrostatic analysis, seakeeping measurements and fishing activities.

AMC's research ship *Bluefin*
(Photo courtesy AMC)

The following is an account of the third-year student trip by student Tristan Jennings

I'm sitting in the bridge of the AMC's fisheries research vessel *Bluefin*, watching the wake recede into the horizon as we power back west along the NE coast to Beauty Point. I'm here as part of our Applied Ship Design subject, with the intention of gaining a practical knowledge of the working environment of the vessels we are designing.

I'm not really sure where to start — there are so many experiences to be had on this vessel and in this environment. I've had a fantastic time.

The voyage out of the Tamar River was by far the most infamous of the trip, causing almost all of the students and staff (bar crew) to feel queasy, and all students, bar four of us, to spray-paint the aft deck. The combination of a very large head, sea causing large pitching accelerations and the first day at sea caught most of us out. However, this had advantages — we were able to experience at first hand the benefits of spending time at the centre of gravity of the vessel

Lively weather in *Bluefin*
(Photos courtesy AMC)

(stern deck, just aft of the bulkhead), and it gave us good material for a motion sickness incidence survey!

Most of us felt a lot better when the heading changed to a beam sea, heading to Flinders Island — the pitching motion is actually the killer on this vessel, and the rolling wasn't too bad. At one stage a wave crashed over the stern deck and heeled the vessel to around 25 degrees — Sam went flying across deck, his acceleration being stopped by Nic and the column he was holding onto.

This was our first night of anchor watches, with two at a time taking a two- or three-hour watch on the bridge, making sure the anchor didn't drag. Chuck and I received several distress calls for the same vessel, and we dutifully woke Chris (the Master) thinking we'd be off to rescue somebody, only for him to point out that the call came from the northern hemisphere — a bit too far away!

On Day Two most of us felt much happier and we started running manoeuvring trials in groups — turning circle, zigzag and spiral manoeuvres and speed trials. These tests are carried out on vessels to analyse responsiveness. Our results were written up and we presented them at night to the group. Lecturers Paul Furness and Giles Thomas were impressed with the quality of plots produced.

Wednesday was mainly spent trawling. The first trawl was in relatively shallow water, around 30 m depth, and brought up stingrays, flathead, 'DH' sharks, various poisonous fish, spider crabs and lots of bait fish. This was great as it gave us an understanding of the aft deck design and some of

AMC third-year students enjoying steady ground on Babel Island
(Photo courtesy AMC)

the hazards aboard. The second trawl was in much deeper water, around 70 metres, and brought up a similar catch plus a sawfish.

At several times when at anchor, students started fishing; at one stage Giles came on deck to prepare his secret burley to create a 'feeding frenzy', which sounded impressive — until I asked him why he said it would create this frenzy and he replied 'because it said so on the packet.' Sadly it didn't work as promised!

We did manage on several nights to catch fish — flathead, squid and a particular DH shark which stupidly kept taking our bait. I was lucky on the aft deck with my video camera — Tim's squid decided to use its last reserves shooting ink at me, narrowly missing me from around 4 m away.

Some of us were lucky enough to have a turn at steering *Bluefin* — it's a lot harder than it sounds. The rudder takes time to turn and the vessel then takes time to respond — a straight path is almost impossible with the waves changing the heading. Paul offered me a pint if I could make my path indistinguishable from the autopilot — I'm proud to say that's another pint Paul owes me!

Wednesday night's dinner was especially memorable — our Maths Lecturer, Irene Penesis, and the ship's cook, Eric, collaborated on a Greek feast — the lamb and baklava will not be forgotten! 'Zorba the Greek' blaring out of the aft deck must have confused the closest fishing vessels; luckily we kept Irene from breaking any plates.

We've had dolphins playing in the bow and stern waves, seals and albatrosses; we've even picked up a bird on our journey, a tiny thing we've christened Nigel. We're not sure what kind of bird Nigel is, or even what sex he is, but I found him wandering around the aft deck after my watch at midnight on Wednesday, and filmed him attempting to take off along the aft deck. Eric the cook tells us that Nigel is probably seasick, having landed on *Bluefin* and being unused to the ground beneath him moving! He's still here, having spent two nights on the aft deck in between some crates.

On Thursday we took our first steps on dry land since Monday morning, when we landed on Babel Island (on the east side of Flinders Island). It's an amazing place, outlandish and very steep in places. With our intrepid leader Giles calling the shots, we climbed up the face (which must seem vertical to WA people) and finally found the summit — we've never been on land that seemed to pitch and roll before! We ended up looking forward to getting back to *Bluefin* where the deck no longer seemed to move so much.

Throughout the voyage we've been completing hydrostatics for the current load condition, and taking notes on structure and equipment — the stairwells on *Bluefin* will likely end up in every project in Applied Ship Design!

This morning has seen us complete a fire drill on board — I was asked to be the Mole, and pretend to be unconscious in the linen cupboard. It was quite an experience, being found by a couple of Darth Vader wannabes in breathing apparatus and being manhandled down the aft stairs on a stretcher.

There is just too much to talk about on *Bluefin*. It's easy to draw the layout of a vessel and label the drawing, but getting your head around the way that everything will work is very difficult; seeing everything in operation and seeing what works and what doesn't is a huge advantage. The crew have been extremely helpful, going out of their way to help and anwser questions we have. The knowledge these guys share between them is invaluable.

Congratulations to Irene for dealing with seasickness, fishing, and the company of 19 males for five days. A huge thanks to our lecturers Paul and Giles, and crewmembers Chris, John, Peter, Eric and Ash for looking after us, joking with us and putting up with us. I think we've all had a great time and learnt a lot about the things that can't be conveyed in a book.

A peaceful sunset on *Bluefin*
(Photo courtesy AMC)

AMC Receives tribute from Defence Science and Technology Organisation

A long-standing AMC research collaborator has paid tribute to the relationship with a special presentation to college staff.

Terry Turner, of the Defence Science and Technology Organisation, gave staff at the National Centre for Maritime Engineering and Hydrodynamics a plaque to commemorate the 500th test model, which arrived at AMC in July (see *The ANA* August 2008, Page 40). The model of a generic frigate, made by local model maker, Stuart Phillips, was part of an ongoing DSTO/AMC project. The project is one of many undertaken by the two organisations since they began collaborating around 20 years ago.

Presenting the plaque to AMC's towing tank and model test basin manager, Gregor Macfarlane, Mr Turner said that the relationship had been fruitful for DSTO and the presentation was a simple gesture of gratitude.

"This is in appreciation of all the work these guys have done in support of DSTO over the years, and to congratulate them on the 500th model milestone as well," Mr Turner said.

Mr Turner said that the naval architecture area which he works for within DSTO currently had four projects underway with AMC. Beyond that, his organisation has a strong interest in fostering talent with the recruitment of several naval architecture graduates over the last few years and the sponsorship of several final-year naval architecture students each year.

A regular visitor to the testing facilities from his Melbourne base with DSTO's Maritime Platform Division, Mr Turner said talks were underway with AMC on developing another three short- and long-term projects.

The 500th model at the centre of the presentation is the subject of a two-year collaborative research project into the motions, and loads on the vessel.

AMC's Gregor Macfarlane said at the time that it was the perfect combination of players to bring number 500 into being.

"It's a very complex model and it's been built by Stuart Phillips, who has constructed the majority of our most-challenging hydrodynamic test models over the past two decades. It is also satisfying in that this model is for one of our major research collaborators in the Maritime Platforms Division of DSTO, with whom we have had a good relationship with for many years."

UTAS Rising Star Awards

Two AMC lecturers will soon have more time to pursue their research goals, after they were named winners of 2008 UTAS Rising Star Awards. Dr Chris Bolch, of the National Centre for Marine Conservation and Resource Sustainability, and Dr Giles Thomas, of the National Centre for Maritime Engineering and Hydrodynamics, were among 15 recipients named this year.

According to Dr Thomas, the awards were devised to give staff much-needed time to turn their minds to research. Awarded around $70,000 over three years, he intends to use the money to alleviate his teaching load so that he can dedicate time to high speed ferry research.

"The idea of the scheme is to help people within the university to improve their research input funding and output," Dr Thomas said.

"I plan to do some residencies. One is in Perth in 2009, and that will be looking at improving the way that we do our full-scale measurements on the boats. The others are in Hobart in 2010 and 2011 to work with the guys at Incat more closely on instrumentation and data analysis."

Jacob Gerke wins Cummins Award

Oil rigs in the Gulf of Mexico are a long way from Tasmania's north east, but that's the journey Cummins Excellence in Maritime Engineering Award winner, Jacob Gerke, is about to make.

Jacob, a third year Marine and Offshore Systems student at the Australian Maritime College's National Centre for Maritime Engineering and Hydrodynamics, was named winner of the award at a special ceremony on Thursday 16 October.

It was a great way for Jacob to finish the second semester before heading into exams. The award will see him tour Cummins' US facilities, a major shipyard, and fly to the Gulf of Mexico to visit an oil platform.

Jacob was thrilled to win, saying the benefits which the award would have on his career were enormous.

"The things I see and the contacts I make will be invaluable to my career," he said.

The award will make for a busy 2009 for Jacob. While in his last year at AMC he will juggle the study tour of the US with the work-experience component of his course at Clough Engineering in Perth.

Cummins South Pacific business manager, Troy Lawson, said that despite a tough selection process, Jacob had eventually been a clear choice.

"The award is not just about academic achievement. We look for people who display strong leadership and innovation as well and, through the application and interview process, we found all those things in Jacob," he said.

Mr Lawson said that the award was not intended as a Cummins recruitment tool, rather a way to encourage student interest in the range of career options available. He said that as a result of a partnership between AMC and Cummins, the award would be an ongoing event and he encouraged students to start thinking about entering next year.

Marine Surveying Courses Announced

The AMC has announced new courses in the specialised field of marine surveying. Starting from October 2008 the AMC will offer diplomas in Yacht and Small Craft Surveying and Marine Industry Surveying. The courses have been designed in collaboration with the International Institute of Marine Surveying and the University of Portsmouth, in the UK.

The distance-learning courses give students the opportunity to study a range of concise, relevant units and the pathway can lead into a BSc (Hons) and MSc course in Maritime Studies. Compulsory core units for both courses include the Marine Environment and the Marine Surveyor, Survey Practice for the Marine Surveyor, and Mechanics, Materials and Structures.

Students can choose four from a possible 17 Yacht and Small Craft specialist units, including Wood Vessels, Steel Vessels, Yacht and Small Craft Systems, Rigging and Sails, Sea Trials and Valuations.

Marine Industry Surveying students can choose four from a a possible 13 specialist units, including Marine Engineering Surveys, Marine Incident Investigation, Classification Surveying, Superintending for Dry Docking ,and Shipboard Maintenance.

Courses last for approximately 12 months from 1 October with the mailing of the first core module.

More information can be found at: http://www.amc.edu.au/seafaring?mode=ports.shipping.

Annual UNSW Naval Architecture Student Visit to AMC

On 9–10 October AMC again hosted the third-year naval architecture students from the University of NSW for a series of laboratory sessions in the Towing Tank, Cavitation Tunnel, Model Test Basin and Ship Handling Simulator. The UNSW students were accompanied by Dr Mac Chowdhury, UNSW Senior Lecturer.

Gregor Macfarlane

List of AMC Final-year BEng Student Research Theses 2008

Modelling of underwater vehicle appendages, Cameron Whitten, Supervisor: D. Ranmuthugala

Control system for walking-legged submersible dredger/ miner, Neil Stockton, Supervisor: N. Bose

Oil rig fluid-structure interactions, Lee Matthew, Supervisor: N. Lawrence

Investigation into turbulence model of hull forms, Adam Lewis, Supervisor: P. Sahoo

A gas processing and offloading catamaran, Alexandra Ford, Supervisor: G. Thomas

Ethanol use in a diesel engine, Ahmed Iruhas, Supervisor: L. Goldsworthy

Optimising the GreenLiner electrical propulsion including energy capture en route, Ismail Ibrahim, Supervisor: A. Belle

Investigation into the Toisa Proteus active/passive heave compensation system, Oliver Bevan, Supervisor: I. Penesis

Computer-controlled sailing simulation, Robert Maher, Supervisor: C. Chin/J. Binns

Investigation into environmentally-sustainable maritime transport, Francis Ally, Supervisor: A. Pal

Hydrodynamic properties of a suction can oscillating at the free surface, Chris Plummer, Supervisors: G. Macfarlane/ Y. Drobyshevski

Reconfigurable hull form, Andrew Gazal, Supervisor: M. Renilson

Investigation into game fishing boat resistance, Nicholas Martin, Supervisor: C. Chin/G. Thomas

CFD modelling of roll tanks BMT project, Darren Callopy, Supervisor: D. Ranmuthugala

CFD modelling of hydrofoil-assisted catamarans, Ravee Manoharan, Supervisor: P. Sahoo

An investigation into the prediction of vessel wave wake for a monohull, catamaran and trimaran, Daniel Mace, Supervisor: G. Macfarlane

Modelling of a flow regime past submarine appendages, Sam Ackermann, Supervisor: D. Ranmuthugala

Combustion properties of poppy-seed biodiesel, Abdulla Lugumaan, Supervisor: L. Goldsworthy

Hydrodynamic energy audit of fishing vessels, Daniel O`Doherty, Supervisor: C. Chin/G. Thomas

Hydrodynamics of Concave Hull Forms, Bianca Burns, Supervisor: P. Sahoo

Progressive flooding of a self-installing platform, Alan Fleming, Supervisor: I. Penesis

Re-evaluation of resistance data of high-speed craft, S. Dileepan, Supervisor: P. Sahoo

Landing craft safety/stability in shallow water, Adam Rolls, Supervisor: M. Renilson

Vibratory analysis of a hydro-elastic frigate model, Daniel Kiel, Supervisor: G. Thomas

Asset monitoring and prognostic technologies, Naser Al Hadabi and Waleed Al-Saidi, Supervisor: A. Pal

Manoeuvring, sway and yaw, Jared Lee Mouldey, Supervisor: M. Renilson/J. Duffy

Heat exchanger design program, Sam Newman, Supervisor: N. Lawrence

Development of exergetic methods to determine actually extractable work for process optimisation, Kain Burch, Supervisor: A. Belle

Modelling of underwater vehicles, Phil Murdoch, Supervisor: D. Ranmuthugala

Comparison of energy use of AUVs: propeller driven and electric glider, Daniel Hamilton, Supervisor: N. Bose

LPG use in a diesel engine, Mohamed Nishan, Supervisor: L. Goldsworthy

Slamming of high-speed catamarans, Kim Chamberlin, Supervisor: G. Thomas

A gas processing and offloading catamaran, Landon Kibby, Supervisor: G. Thomas

Underwater turbine, Barney Mithaih, Supervisor: N. Lawrence

Asset monitoring and prognostic technologies, Mohamed Naseer, Supervisor: A. Pal

Cummins Helps Drive for Engineers

Cummins has signed a sponsorship agreement with the Australian Maritime College (AMC) aimed at encouraging more students to take up an engineering career in the marine industry.

The three-year sponsorship deal includes the Cummins Excellence in Maritime Engineering Award which will be awarded in October this year to a high-achieving third-year AMC student who shows leadership potential, creativity and innovation.

The award will feature an overseas study tour to Cummins' state-of-the-art technical facilities and factories in either the US or the UK. The tour will also include visits to major shipyards to give the students exposure to the marine industry outside Australia and assist with their future studies and career path.

"Cummins is proud to be associated with one of the world's leading maritime education and training institutions," said Troy Lawson, Cummins South Pacific's marine business manager.

"Our sponsorship emphasises the importance of partnerships between industry and tertiary institutions to overcome the major skills shortages we are facing in Australia."

Cummins is offering the award to all third-year AMC students undertaking a Bachelor of Engineering in either naval architecture, ocean engineering or marine and offshore systems.

The Australian Maritime College, a specialist institute of the University of Tasmania, currently uses a purpose-built Cummins MerCruiser Diesel QSB 305 marine engine as part of its research into alternate fuels, engine combustion and marine diesel engine exhaust emissions.

Cummins South Pacific's marine business manager, Troy Lawson, (right) signs the sponsorship agreement with Professor Tom Hardy, Acting President of the AMC
(Photo courtesy Cummins)

University of New South Wales

Presentation of Engineering Scholarships

Two scholarships in naval architecture were presented at the Engineering Awards night earlier in the year. They were:

- the Civilian Defence Scholarship in Engineering to naval architecture student Claire Johnson for Years 2, 3 and 4; and
- the Austal–UNSW Endowment Scholarship to naval architecture student Anne Simpson for Years 3 and 4.

Claire Johnson (L) and Anne Simpson with their scholarship awards
(Photo courtesy UNSW Faculty of Engineering)

Thesis Conference

At the School's annual undergraduate thesis conference on 25 and 26 September the following presentations by naval architecture student projects were made:

Toby Austin-Fraser — *Twelve-Foot Skiff Hullform Resistance Investigation*

Ryan Ayres — *Hydrodynamic Modifications to Foils for High-Speed Craft*

Andrew Baglin — *Development of a Yacht Race Simulator*

Hamish Bush — *High Performance Yacht Sails*

Nichola Buchanan — *The Use of GPS for Sea Trials*

Rebecca Dunn — *Free-Wheeling vs Locked Propellers*

Nicholas Kitching — *CFD Analysis of Ship Squat*

Greg Laanemaa — *Design of a Rudder for a Racing Yacht*

Henry Morgan — *Determination of the Aerodynamic Effects on a Foilborne Hydrofoil Ferry*

Brocque Preece — *CFD Study of the Near-surface Effects of a Submerged Vehicle*

RINA–Austal Ships Award

RINA and Austal Ships jointly offered an award of $500 and a certificate for the best presentation at the conference by a student member on a naval architectural project. Assessment was made on the basis of marks awarded by School staff, with marks being standardised to remove the effects of marker variability. The award went jointly to Toby Austin-Fraser for his presentation on *Twelve-Foot Skiff Hullform Resistance Investigation* and Andrew Baglin for his presentation on *Development of a Yacht Race Simulator*. The award was announced by Mr Phil Helmore at the thesis conference dinner at the Tea Rooms in the Queen Victoria Building in the city on the evening of 26 September, and the award presented by the Acting Head of School, A.Prof. Philip Mathew. The cheques have subsequently arrived and were presented by Phil Helmore. Congratulations, Toby and Andrew!

Also at the thesis conference dinner, the School's 181 final-year students made their annual award for Lecturer of the Year, inaugurated in 1995. This year the Lecturer of the Year award went to Mr Zoran Vulovic.

Toby Austin Fraser (L), Andrew Baglin (R) with A/Prof. Philip Mathew and their RINA–Austal Ships Awards
(Photo courtesy Zhong Chai)

Toby Austin Fraser and Andrew Baglin being presented with their RINA–Austal Ships Award cheques by Phil Helmore
(Photo courtesy Greg Laanemaa)

The naval architects' table at the thesis conference dinner
(Photo courtesy Ivana Senicic)

Graduation

At the graduation ceremony on 30 September, the following graduated with degrees in naval architecture:

Trevor Allan	Honours Class 2, Division 2
Joshua Bolin	Honours Class 2, Division 1
Rowan Curtis	Honours Class 1

They are now employed as follows:

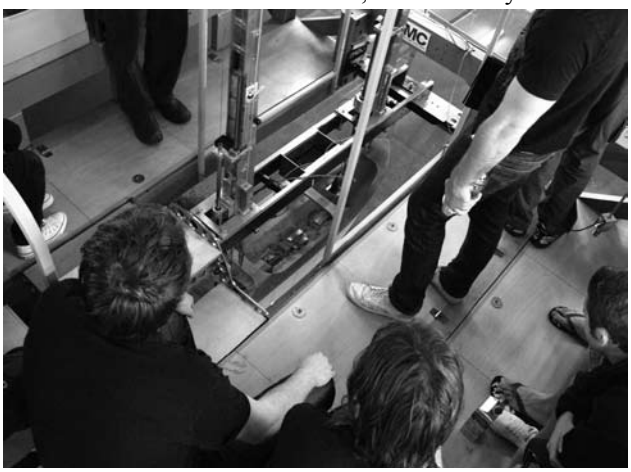
Trevor Allan	ASC, Adelaide
Joshua Bolin	Peter Lowe Design, Sydney
Rowan Curtis	Centre for Maritime Engineering, DMO, Sydney

Congratulations, all!

Joshua Bolin (R) with Naval Architecture Plan Coordinator Phil Helmore at the UNSW Graduation Ceremony on 30 September
(Photo courtesy Joshua Bolin)

Visit to AMC

On 9 and 10 October the Year 3 students studying Ship Hydrodynamics visited the Australian Maritime College accompanied by Dr Mac Chowdhury. The visit was organised by Mr Gregor Macfarlane, and UNSW is grateful for AMC's hospitality. The group sat in on a lecture on cavitation by A/Prof. Paul Brandner, which they enjoyed, and then were shown over the new cavitation tunnel before adjourning to The Royal Oak for a counter meal. Next day they were introduced to the shiphandling sumilator by Capt. Ian Rodriques, to research activities and opportunities at AMC by Prof. Neil Bose and Dr Jonathan Binns before embarking on a program of resistance and seakeeping tests in the towing tank under the guidance of Manager, Dr Gregor Macfarlane and Technical Officer, Mr Kirk Meyer.



UNSW students connecting the model to the carriage
(Photo courtesy Chia How Khee)

The students all came away with a better understanding of ship model testing and how it is done in practice. It certainly helped to have naval architects talk about the various aspects of testing and research, and their explanations of the processes brought out the realities and practicalities which you don't get in the theory.

UNSW students undertaking seakeeping tests in the towing tank with Matthew Fox and Liam Finegan (R) checking operations
(Photo courtesy Anne Simpson)

Visit to Austal Tasmania

The students and Dr Chowdhury took the opportunity, while in Tasmania, to visit Hobart, where they were shown over the Austal Ships facility at Margate by Production manager, Mr Jake Crawford. Austal had four vessels at various stages of construction; two 38 m catamaran patrol vessels, and two smaller catamarans, and it was instructive to be able to see, at first hand, the progress from one vessel to the next, and the details of construction. The theory is interesting, but seeing construction under way brings it alive!

Austal's Jake Crawford showing UNSW students their 37.5 m catamaran under construction
(Photo courtesy Chia How Khee)

Post-graduate and Other News

Visitors to UNSW

Dr Sandy Day, Manager of the Acre Road Hydrodynamics Laboratory at the Universities of Glasgow and Strathclyde visited UNSW from 22 to 26 September. Sandy had been in Fukuoka, Japan, for the meeting of the International Towing Tank Conference, and took the opportunity to come on to Sydney for further collaboration with Em/Prof.

Austal's Crandall slipway for launching vessels at Margate
(Photo courtesy Anne Simpson)

Lawry Doctors on their work on unsteady resistance of a rowing shell, with the ARHL providing the results of tests for comparison with the results of Lawry's program *Hydros*. While at UNSW, Sandy made a presentation to RINA and IMarEST on *Current and Future Trends in Tank Testing in Naval Architecture and Ocean Engineering* on 24 September.

Prof. Martin Renilson, Principal of Renilson Marine Consulting and Professor of Hydrodynamics at the Australian Maritime College, was also in Sydney for the meetings of the Australian Division of RINA and the Australian Technical Committee of Lloyd's Register. Having done the tank testing for his doctorate in the towing tank at the Acre Road Hydrodynamics Laboratory, he took the time to visit UNSW and attend Sandy Day's presentation.

Graduation

At the graduation ceremony on 30 September, Rozetta Payne was awarded her Doctor of Philosophy (PhD) degree for her dissertation on *Design in the Face of Uncertainty with Application to Composite Yachts.*

Rozetta Payne (R) with PhD supervisor Don Kelly at the UNSW Graduation Ceremony on 30 September
(Photo courtesy Wendy Payne)

Warwick Hood and Phil Helmore at Rozetta Payne's graduation
(Photo courtesy Wendy Payne)

UNSW Maintains *Times* HER Ranking

UNSW remains one of the top 50 universities in the world, according to the 2008 *Times* Higher Education Review rankings, released in early October. While slipping slightly, from 44th position in 2007 to 45th this year, UNSW moved up one place, to 5th, among the Go8. Another five members of the Go8 were also ranked in the top 50, but most suffered a significant drop. The exception was ANU, which maintained its place at 16th, the top ranking for an Australian university.

The rankings according to discipline show Engineering and IT at UNSW at 27th in the world, and first in Australia.

Another ranking, based on employer satisfaction with the quality of graduates, sees UNSW with a world ranking of 17th, the second highest for an Australian university (just pipped by the University of Melbourne).

"It's great to see us maintaining our position in the top 50. The results for engineering and social sciences are particularly good and the employer ranking is outstanding", said Vice-Chancellor Fred Hilmer.

Leading US universities Harvard and Yale topped the rankings at first and second, with Britain's Cambridge third and Oxford fourth. Universities were judged on factors including research, staff-student ratios and the proportion of overseas staff and students.

The rankings, produced by careers and education group QS and featuring 33 countries, were based on a survey of 6 354 academics and the views of 2 339 employers.
Phil Helmore

New Defence Research Alliance with University Of Tasmania

It was announced on 13 November that the Defence Science and Technology Organisation (DSTO) and the University of Tasmania (UTas) have signed a new research alliance to undertake further studies in maritime engineering and hydrodynamics.

The alliance, involving DSTO and the Launceston-based Australian Maritime College (AMC), which was integrated within UTas last January, will continue with important research in hydrodynamics (the physics of fluids in motion).

The Minister for Defence Science and Personnel, The Hon. Warren Snowdon MP, said that this research partnership has already made a significant difference to the defence of Australia.

"DSTO and AMC have worked together successfully for the past 20 years to develop a world-class hydrodynamics research capability," Mr Snowdon said.

"This capability has been applied to a number of important projects including the Navy's Collins-class submarine, Landing Helicopter Dock amphibious ships (LHD), Anzac frigates and other Defence ships.

"This valued partnership will continue to provide the Australian Defence Force and the Defence Materiel Organisation with informed advice on these and other maritime programs such as the next generation submarine project."

The member for Bass, Jodie Campbell, said "the AMC takes a lead role in developing skills and knowledge in the science of hydrodynamics, and it is wonderful to see its facilities used by naval architects and ocean engineers.

"The DSTO–AMC research alliance has already resulted in the design and commissioning of specialised equipment worth $5.2 million for the Australian Maritime Hydrodynamics Research Centre at the College to further hydrodynamic research.

"The alliance also augurs well for further collaboration between the University of Tasmania and other defence work being carried out in Tasmania, such as the nutrition and human performance research at DSTO facilities in Scottsdale," said Ms Campbell.

New Laws for NSCV from October 2008

The National Standard for Commercial Vessels (NSCV) reached a major milestone in October when it officially formed part of the Uniform Shipping Laws (USL) Code.

The Combined USL/NSCV 2008* brings into force the construction and equipment sections of the NSCV approved before 2008. CEO of the National Marine Safety Committee (NMSC), Maurene Horder, said this means that some NSCV requirements will apply to new vessels** throughout Australia from 1 October 2008, with only minor variations in some States. "The Australian maritime industry can now start to benefit from the ease of applying nationally-legislated standards," Ms Horder said.

The first raft of standards to be introduced into legislation nationally includes:

- Structural Fire Protection Measures (NSCV C4, replacing USL Code Section 5F)
- Engineering (NSCV C5, replacing USL Code Section 9)
- Category F1 and F2 Fast Craft (NSCV F1, new requirements)

In most jurisdictions, the following NSCV sections will also apply to new vessels from October:

- Safety Equipment (NSCV C7A, replacing or as an alternative to USL Code Section 10)
- Fire Appliances (NSCV C4, replacing or as an alternative to USL Code Section 11)

Tyco Fire and Security (Australia and New Zealand)'s Director for Engineering, Roger Thomas is among the many industry representatives who welcome the move. He said that the nationally-legislated fire-protection standard is able to provide cost-effective fire protection, and "should provide clarity to regulators as the goal of the fire protection is now clear".

Robert Tulk, Senior Naval Architect for One 2three Naval Architects, also welcomes a more-national legislative approach. He said that the national introduction of the fast craft standard's new code is important, especially as shipbuilders are often not located in the same state as the vessel's final operation.

The combined USL/NSCV 2008 is on the NMSC website www.nmsc.gov.au, together with explanatory material to assist users.

For more information: go to www.nmsc.gov.au/legislated_standards_2008.html

*Amendments to the USL Code, which bring into effect the Combined USL/NSCV 2008, were published in the Commonwealth Government Gazette on 11 June 2008.

** 'New vessels' include new vessel constructions, vessels subject to initial survey, and existing vessels upgraded after October 2008. Some jurisdictions have alternative equipment requirements. Check with your marine safety agency as to the applicable equipment standard.

NMSC Media Release, 1 September 2008

Training in Application of the NSCV

The National Marine Safety Committee (NMSC) is coordinating a national education program to explore the practical aspects of the implementation of Sections of the National Standard for Commercial Vessels (NSCV) which took effect on 1 October 2008.

More than 50 participants attended a workshop held on 29 May in conjunction with the Marine Safety Conference in Adelaide. The workshop delivered an introduction to the performance-based nature of the new requirements. Senior technical staff from the NMSC secretariat and jurisdictions worked through the application of Part B — General Requirements of the NSCV and Part C, Section 4 — Fire Safety to actual vessels and installations.

NMSC will conduct further workshops on a range of NSCV Sections in 2008 and 2009 and a list of dates and venues around Australia will be circulated shortly.

Lloyd's Rules for Marine Agencies

The National Marine Safety Committee and Lloyd's Register signed a ground-breaking agreement in April which supports the recently-published National Standard for Commercial Vessels (NSCV) Part C Section 3 — Construction, under which the use of Lloyd's Rules is recognised as a deemed-to-satisfy solution. Under the agreement, marine agencies will receive copies of the main Lloyd's Rules and Regulations, Special Service Craft (SSC) Rules, Inland Waterways Rules and Timber Yacht Rules as well as training in the use of the rules. The secretariat will also be able to supply copies of the software associated with the SSC Rules and Lloyd's Rulefinder at a discounted price to marine agencies.

The first two training sessions were scheduled for Queensland in September and involved a three-day course on the SSC Rules for those involved with plan approval. Further courses will be tailored to the needs of those associated with vessel inspection surveys.

These courses will form part of a larger training program on different Sections of the NSCV, to be implemented around Australia over the next two years.

An interpretation service will also be established to provide formal national interpretations of Lloyd's Rules as they apply under NSCV Part C Section 3.

Safety Lines, July 2008

Maurene Horder Resigns as CEO of NMSC

After serving nine years as Chief Executive Officer of the National Marine Safety Committee (NMSC), Maurene Horder has resigned to pursue other interests. What started as an 18-month appointment for Maurene in 1999 turned into many years in the challenging role to assist the NMSC in achieving national marine safety reform and standards development.

NMSC's Independent Chairman, Neil Aplin, said that, while the NMSC Members were extremely disappointed that Maurene was leaving the organisation, he noted that she had achieved a great deal and was leaving at a time when the bulk of standards were either complete or well advanced.

"Quite simply, there are many initiatives that have been realised largely as a result of Maurene's perseverance and guidance," he said. He cited the examples of the expansion of the national marine safety research base, elevation of recreational boating safety education, and the intense consultation process needed to achieve workable national safety standards for the maritime industry. "However, as the NMSC moves into a new era, it is fitting that Maurene has chosen this time to look towards a new challenge. The NMSC and staff are left with a solid foundation for the next phase in the important national reform process," Neil said.

Maurene thanked her colleagues within NMSC and the industry for their support and friendship over her time as CEO. She said "It has been a privilege working in the marine sector and I am grateful for the support and co-operation I have received from the many stakeholders who have participated in the work of the NMSC". She said she was pleased to see the great progress being made around Australia in marine safety reform.

Fellow staff and industry colleagues alike will miss Maurene's leadership, expertise and humour. Maurene officially left her role in early October.

NMSC Media Release, 11 September 2008

New Standard for Stability and Buoyancy after Flooding

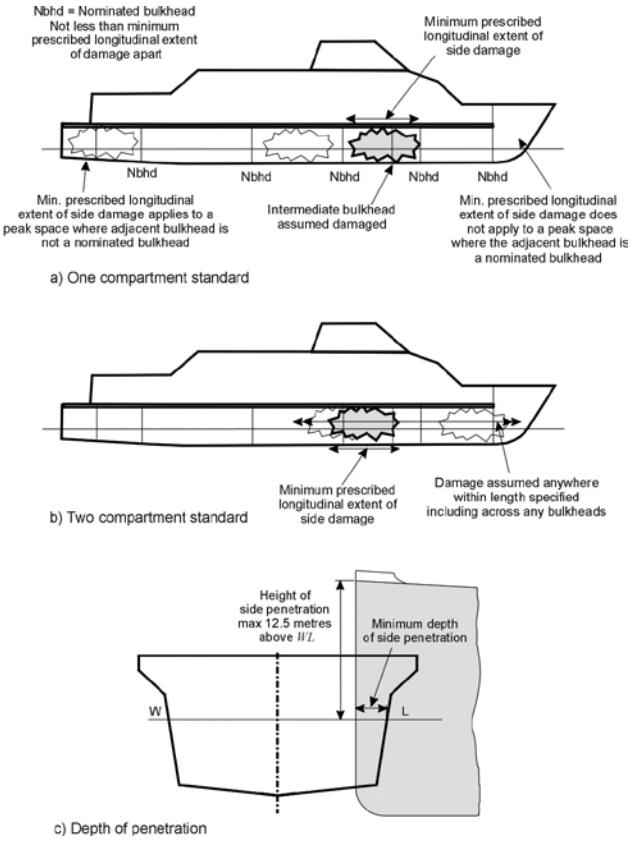
The National Marine Safety Committee (NMSC) is releasing for public comment a new draft safety standard to reduce the effects of flooding on commercial vessels. The National Standard for Commercial Vessels (NSCV) C6B — Stability and Buoyancy after Flooding replaces and consolidates the relevant parts of USL Code, Sections 5, 7, 8, 10 and 18, thus responding to newer technologies and removing the piecemeal nature of the current requirements.

NMSC's Acting CEO, John Henry, said that the draft takes account of developments in relevant international standards which have occurred in the last 20 years and considers the approaches taken for domestic vessels overseas. "Most vessels are already required to be provided with buoyancy or bulkheads which help to keep the vessel afloat in the event of an incident, but the draft standard addresses specific safety requirements, such as reducing the risk of water entering the vessel due to swamping by waves or a breach of the hull caused by grounding — or even the risk of water entering the vehicle deck in a closed ro-ro space," Mr Henry said.

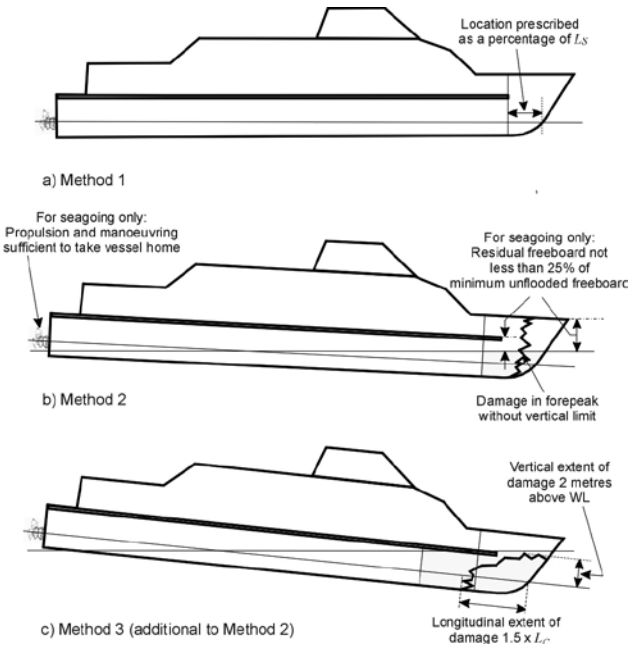
"Making all commercial vessels unsinkable would be the ultimate solution, but this is too expensive and/or impractical for all but the smallest of craft," he said. "So, the standard has to find the right balance between a vessel's capacity to withstand flooding and its commercial viability — taking into account factors such as the number of passengers and its area of operation".

In summary, the draft proposes requirements to:

- minimise the likelihood of sudden or progressive capsize or foundering and prevent excessive angles of heel or trim; and
- provide a more performance-based approach and a consistent benchmark for determining initial and ongoing compliance.



Prescribed side damage in the new NSCV proposal
(Diagram courtesy NMSC)



Location of collision bulkhead in the new NSCV proposal
(Diagram courtesy NMSC)

The draft standard for NSCV Part C Section 6B — Buoyancy and Stability after Flooding, and its accompanying Regulatory Impact Statement, can be downloaded directly from the NMSC website at www.nmsc.gov.au/yoursay_2.html. Alternatively, to obtain a hard copy, phone (02) 9247 2124. For further information, contact Communications Officer, Rosemary Pryor, on (02) 9247 2124.

Comments are expected to close in late December 2008, so get your copy today, and comment away!

NMSC Media Release, 31 October 2008

Towards a Single National Maritime Jurisdiction

At their meeting on 25 July as the Australian Transport Council (ATC) and Federal and State Ministers agreed to recommend to the Council of Australian Governments (COAG) meeting in October that, subject to the outcomes of regulatory impact assessments, COAG endorse in-principle the establishment of a single national system for maritime safety regulation administered by the Australian Maritime Safety Authority (AMSA).

Ministers agreed that, subject to the outcome of the regulatory impact assessment, they would support a national approach to maritime safety regulation and were inclined towards broadening the application of the *Commonwealth Navigation Act 1912* to apply to all commercial vessels. This will involve AMSA becoming responsible for regulating vessel design, construction, and equipment, vessel operation (e.g. safety management systems) and crew certification and manning.

In considering the arrangements which would underpin a national system, Ministers agreed to explore the option of existing State and Northern Territory maritime agencies being the delivery agents for regulatory services under individual agreements with AMSA.

Ministers agreed that a first step in the process to establish a single national system would involve the preparation of a Regulatory Impact Statement for consideration by ATC at its November meeting.

Subsequent to the July decision, a Regulatory Impact Statement (RIS) was prepared and circulated to industry, in part through RINA Sections, seeking input to a more comprehensive RIS. AMSA conducted a series of 13 information sessions in state capitals and major centres in order to ensure that those involved are as full-informed and have an opportunity to comment to the extent possible within the above time frame.

In considering the RIS at its September meeting, RINA's Australian Division Council agreed to submit a short response giving in-principle support to the RIS while advising that RINA members had been invited to make their own direct responses.

As a further step in communicating progress on the feasibility of this important project, the ACT Section of RINA has arranged for Mr Bob McKay of the Single Maritime Jurisdiction Task Force to provide a presentation to its technical meeting in Canberra on 16 December. Details of the meeting will be circulated by email to ACT Section members, but anyone interested from further afield should contact Glen Seeley, Secretary of the ACT Section by email on glen.seeley@amsa.gov.au or rob.gehling@amsa.gov.au.

Have your say

on the draft National Standard for Commercial Vessels (NSCV) Part C, Subsection 6B — Buoyancy and Stability after Flooding

You are invited to comment on the new draft national standard designed to reduce the effects of flooding on commercial vessels.

NSCV C6B – Buoyancy and Stability after Flooding replaces and consolidates the relevant parts of USL Code Sections 5,7,8,10 and 18, thus responding to newer technologies and removing the piecemeal nature of the current requirements.

Specifically, the draft proposes requirements to:

- minimise the likelihood of sudden or progressive capsize or foundering
- prevent excessive angles of heel or trim; and
- provide a more performance-based approach

Document: To obtain a copy of the draft NSCV C6B – Buoyancy and Stability after Flooding and its accompanying Regulatory Impact Statement (RIS), please contact the NMSC Secretariat on 02 9247 2124 or visit www.nmsc.gov.au and click on 'Have your say'.

Closing date: The public comment period closes on Friday 19 December 2008.

MV *Doulos* Visits Australia

Stuart Cannon

MV *Doulos*, which is listed in the Guinness Book of Records as 'the world's oldest active ocean-going passenger ship', has visited a number of Australia ports during the last few months. She arrived in Brisbane on 1 August and left Fremantle on 27 October and this visit was the last Australia will see of this grand ship.

Built as SS *Medina* back in 1914, only two years after the famous *Titanic* incident, she set to her task of transporting onions from New York to Galveston, Texas. This role did not last long and she undertook a variety of subsequent roles including being a commodore's ship during the First World War and as a supply ship during the Second World War. At the end of the wars she was laid up and expected to be broken up. In 1948 she was purchased by an Italian company and was converted to become the austere emigrant ship SS *Roma*. During this conversion much of the exterior of the ship changed. This included major changes to her deck spaces, a new squat funnel and a new raked bow. These modifications took her gross tonnage to 6549 with a length of 130 m. For the next four years she transported many passengers to countries such as Australia. However at 36 years old she was starting to look a little bleak. Eventually she was sold off at auction in April 1952. Sold to the only bidder, she was again rescued from the breaker's yard by the company known today as Costa Cruises. Her new owners were to put her to use in the South American/Caribbean liner service. Prior to her re-introduction to service, she undertook a major refit which included the installation of a double-acting six-cylinder diesel engine built by Fiat. This new engine was able to develop 3130 kW and enabled the newly-named MV *Franca C* to achieve 15 kn. In 1959 she was again given a new role, this time as a world-wide cruise ship.

MV *Doulos* in Geelong
(Photo Helena Cannon)

MV *Doulos* engine control room
(Photo Helena Cannon)

The extensive refit transformed this little ship into the world's only all-first-class cruise ship. In this role she traveled extensively around the world. At the grand age of 56 she was again treated to a major refit which saw her old diesel engine being replaced with a new four-stroke, 18-cylinder diesel engine which could develop 6040 kW. Her interiors were also upgraded to reflect the modern requirements of the day. It was not until seven years later, when MV *Franca C* was 63 years old, that Costa Cruises decide to sell her. This time the future must have looked bleak for this old ship. During the last voyage a group of representatives from a Christian Charity Organisation were on board and they were looking for a second ship for their operations. *Franca C*, if available at the right price, was deemed a possible solution. Thus, at the end of 1977 a formal agreement was signed and *Franca C* was again saved from the breaker's yard.

Once again she underwent an extensive refit, this time downgrading the luxurious accommodation spaces, removing the casino and some cabins and replacing them with classrooms, offices, conference facilities and a bookstore. *Franca C* was renamed *Doulos* — from the Greek word meaning "servant" — which clearly indicated her new role. *Doulos* now travels the world, bringing the gift of literature to places where it is required. Onboard are some 500 000 books including a total of 6000 titles. Her crew, all of whom are volunteers, pay their own way to keep the ship in good order and ensure that the work of spreading literature is completed. All this work is managed by OM — Operation Mobilization — and, since 1977, *Doulos* has made 580 visits to 293 cities in 103 countries. However, the life of this ship will soon come to an end. The new SOLAS regulations that are due to come into effect in October 2010 will require a massive investment and the current owners have decided that further modernisation will not improve or increase her capacity. It is envisaged that, at 96 years old, this ship will finally retire from service.

Further information about the work of MV *Doulos* can be found at www.mvdoulos.org/ and an extensive detail of her history at www.ssmaritime.net.

General Particulars

Length	130.35 m
Breadth	16.60 m
Design draught	5.54 m
Gross tonnage	6818 GRT
Crew	414
Cargo (books)	1037 m^3
Engine	Fiat GMT C421855 V-18 4 stroke 5958 kW

l'Hydroptère Aiming for Absolute Sailing Speed Record

Martin Grimm

Speed sailing enthusiasts, particularly those with a passion for hydrofoil sailing should keep an eye out for news on the official website of the *l'Hydroptere* team: www.hydroptere.com.

The following is an edited extract from the website reporting on their latest good news:

Already holders of the absolute speed record over one nautical mile and of the 500 m record in Category D (with sail area greater than 27.88 m^2) since April 2007, Alain Thébault and his team with *l'Hydroptere* have just improved their performances and established two new records (ratified by the World Sailing Speed Record Council):

- an average of 43.09 kn over one nautical mile.
- an average of 46.15 kn over 500 metres.

Accomplished off Napoleon Beach at Port-Saint-Louis-du-Rhône, France, with a northwest wind blowing at 28 knots and a small swell of 0.6 metres, in the presence of Christophe Simian, WSSRC Commissioner, these performances show *l'Hydroptère's* increase in power since being reconfigured specifically to make attempts at speed-sailing records.

Alain Thébault and his crew, comprising Jean-Mathieu Bourgeon, François Brillant, François Cazala, Damien Colegrave, Jérémie Lagarrigue, Adrien Lombard, Sébastien Stéphant and Jacques Vincent, are satisfied with this training[!] session. They are taking the time to fine-tune *l'Hydroptère*, whose performance improves with each outing. "We have had good weather conditions to improve our own records but, unfortunately, they have not been sufficient to take on the absolute speed record over 500 metres. What is more, the swell has forced us to rein in the boat", concluded Alain Thébault on return from these record runs.

With these two new records under their belt, the Hydroptère Team is, step by step, drawing closer to their goal: to break the absolute speed record over 500 m.

Already, in a recent sailing run on 4 October 2008, *l'Hydroptere*, achieved a top speed of 52.86 knots for a short period. However, such instantaneous high speeds do not qualify the craft for a record, as speed-sailing record measurements are based on the average speed over a distance of at least 500 m.

Also reported on the comprehensive *l'Hydroptere* website is news that Alain Thébault's second book, *Le Mur du Vent* is available for sale from 23 October 2008. In this new book, the designer and pilot of the hydrofoil trimaran shares the full story of this extraordinary project in images.

More than 200 illustrations recount the journey of Alain Thébault, a tenacious and passionate man who dreamt of "making a boat fly" one day. The author shares his experiences, the long road to make his dream come true and the story of a project over 20 years.

Accompanied from the start of the project by some of the greatest marine photographers, Alain Thébault has, through this collection of photos, brought to light the poetry of his-fibre carbon bird. "Writing this book, and finding these photos once again, was like clambering into an attic and finding a hoard of lost memories. I wanted to open the trap door and hear the creaking hinges of memories, poke my head in to discover what lies behind these photos, under the dust of audacity and humility". *Le Mur du Vent* is published by Éditions La Martinière.

Kitesurfers take out Absolute World Speed Sailing Records

For *l'Hydroptere* to gain the outright speed record over 500 m, it is now competing against sailing craft at the complete opposite end of the size spectrum…

The Lüderitz Speed Challenge, held in Namibia during September–October this year at an ideal speed-sailing site, saw several kitesurfers break the outright speed-sailing record. At the same time, average speeds of over 50 kn on a 500 m course have been exceeded for the first time, not only by one participant, but by three. These speeds are yet to be ratified by the World Speed Sailing Record Council (WSSRC). Sebastien Cattelan of France was the first to achieve a speed in excess of 50 kn with a run at 50.52 kn. He held this record for only 24 hours before compatriot Alexandre Caizergues exceeded this with a maximum of 50.57 kn as well as achieving two other runs of over 50 kn.

American Rob Douglas set a new world record in the first few days of the Lüderitz Speed Challenge at 49.84 kn before topping this with a speed of 50.54 kn, placing him second overall in the event which closed on 9 October. After the end of officially-recorded sailing runs on the last day, Sebastien Cattelan and Rolf van der Vlugt from the Netherlands stayed out to see what could be done as the wind picked up further in the late afternoon. On GPS they reportedly both significantly exceeded the current records, with Cattelan achieving over 60 kn peak speed, and 54 kn average over a 250 m distance.

This is the second year in which the event has been held, and it is planned that a similar event will be staged again at Lüderitz next year.

More details of the 2008 event, including results and photos are available at www.luderitz-speed.com.

Prior to these new records being set by kitesurfers, the absolute sailing speed record had been held for a number of years by windsurfers.

While the records at the event are yet to all be ratified by the WSSRC, On 4 October, John Reed, Secretary of the WSSR Council announced the ratification of an initial new outright world speed sailing record by a kitesurfer as follows:

Record	Amundson Custom Kite Board, 7m Crossbow Kite
Name	Robert Douglas USA
Dates	19 September 2008
Start time	15:16:32.65
Finish time	15:16:52.15
Elapsed time	19.5 sec
Distance	501 m
Current	0.1 kn (speeds are corected for current)
Wind	40/45kn SSW
Average speed	49.84 kn

BOOK REVIEW

Beneath the Dardanelles: The Australian Submarine at Gallipoli

by Vecihi and Hatice H. Başarin

The amazing achievement of HMAS *AE2* during the Gallipoli campaign is finally brought to public attention through a recently-published book *Beneath the Dardanelles: The Australian Submarine at Gallipoli.*

AE2 achieved the impossible by going through the Dardanelles on 25 April 1915, when the whole Allied armada had failed to do so earlier.

While the landing campaign which began at the same time on the Gallipoli Peninsula has found its rightful place in the Australian psyche, the remarkable role played by HMAS *AE2* on her mission, albeit short-lived, to support the land campaign was largely untold.

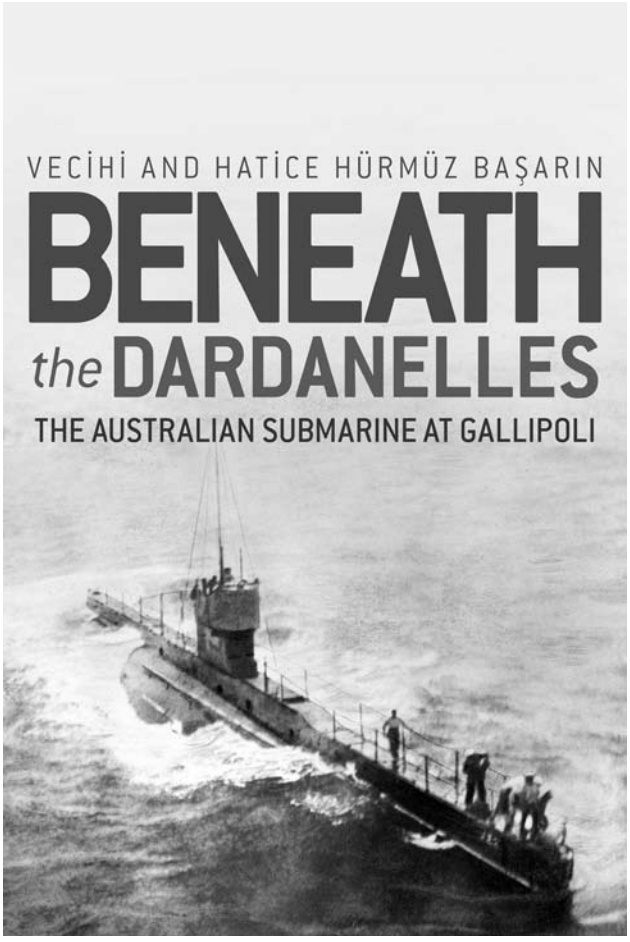
This book tells the story of *AE2*'s five day adventure in the Dardanelles and the Sea of Marmara before she was caught by the Turkish torpedo boat *Sultanhisar*. Captain Henry Stoker scuttled *AE2* after his vessel was holed, and the crew of *AE2* surrendered to *Sultanhisar's* Captain Ali Riza.

Beneath the Dardanelles presents both the Australian and Turkish perspectives, and it features extracts from the memoirs of the two captains. As events unfold from both sides of the conflict, the story becomes richer and a higher degree of understanding of the events is reached. Rarely in military books are two sides of a battle presented so evenly.

A brief history of submarines, a concise context of the Gallipoli campaign, and the findings of the recent survey of *AE2* by the AE2 Commemorative Foundation are also covered in the book.

Beneath the Dardanelles was co-authored by Vecihi (John) Başarin and his wife Hatice H. Başarin. It comes with a foreword by Admiral Peter Briggs AO CSC (RAN Rtd), Chair of the AE2 Commemorative Foundation, as well as a message by Selçuk Kolay OAM, who found the wreck of AE2 at the bottom of the sea in 1998 after an arduous search.

AE2's destiny, as one of the largest relics of the Gallipoli campaign both for Australia and Turkey, is yet to be clarified. Given the many enthusiastic supporters of its preservation for future generations, hopefully as a symbol of peace and mutual support, it is likely to occupy media headlines for a while to come.



Beneath the Dardanelles: The Australian Submarine at Gallipoli is published by Allen & Unwin and has a recommended retail price of $24.95. A signed copy can be requested from the authors at basarin@optusnet.com.au

INDUSTRY NEWS

Wärtsilä Acquires Singaporean Company CWA

In September Wärtsilä agreed to acquire a leading naval architecture and ship design company, Conan Wu & Associates Pte Ltd (CWA), headquartered in Singapore. The deal also includes partnership agreements regarding CWA's business in Malaysia, China and Hong Kong.

The price of the deal is €23 millions, to be paid in cash, and an additional amount to be paid based on the performance of the business in years 2008–2010.

In 2007, the turnover generated by CWA's businesses was €10.7 million and the profitability was on a very good level. CWA has 66 employees in Singapore.

"This deal is a clear demonstration of Wärtsilä's commitment to becoming the leading provider of ship design services in the areas, which we specialise in, including offshore and special vessels as well as selected merchant vessels. CWA has a strong market position and the company's outstanding know-how is a welcome addition to Wärtsilä's offering. By incorporating CWA into our existing ship design business, we expect to further strengthen the competitiveness of CWA's offering to its customers, and thus CWA's business prospects," says Jaakko Eskola, Group Vice-President, Wärtsilä Ship Power.

The acquisition of CWA is a further major step in Wärtsilä's strategy of strengthening its position as a total solutions provider, and of being the most valued partner for its customers.

Expansion in ship design is an important move for Wärtsilä, as it brings the company closer to its maritime-industry customers. Wärtsilä intends to offer the best and most-efficient total solutions, regardless of equipment used.

The total marine solutions provided by Wärtsilä are uniquely competitive in their ability to integrate and optimise the various operating processes of the entire vessel. This new and innovative way of combining ship design know-how with equipment solutions and services will lead to significant customer benefits, e.g. in terms of improved efficiency and reduced emissions.

"The acquisition of CWA expands the geographical scope of Wärtsilä's ship-design services. It also excellently complements and broadens Wärtsilä's ship-design competence to cover a larger range of vessel types, including smaller, less-complicated and more standardised vessels," says Arne Birkeland, Vice President, Wärtsilä Ship Design.

During recent years, Wärtsilä has developed and expanded its offering within ship design, first by establishing a conceptual design unit in 2004. This was followed by the acquisition of the German ship design company SCHIFFKO in 2006. In July 2008, Wärtsilä acquired the global ship design group Vik-Sandvik of Norway. Today, Wärtsilä's ship design activities include operations in more than 10 countries and more than 500 employees.

CWA is a leading player in this field, specialising in naval architecture and ship-design services to shipbuilders and shipowners. The company's core competence is in the design of offshore vessels and tugs, as well as barges and smaller merchant vessels. CWA has a strong market position in South and South-east Asia. As a part of Wärtsilä, CWA has excellent growth potential throughout the region, including China, India and Vietnam.

"Being a part of Wärtsilä will allow CWA to realise its huge potential, both in Asia as well as in other markets. This deal is a great opportunity to further develop our know-how and our business on a global scale," says Dato Conan Wu, Chairman, CWA Pte Ltd.

CWA will be integrated into Wärtsilä Ship Design within the company's Ship Power business. All personnel in Singapore — including the former owners Dato Conan Wu and Mr Mok Kim Terng as well as the rest of the management of CWA — will continue in Wärtsilä's service.

Conan Wu is a graduate in naval architecture from the University of New South Wales. This photo, taken in April 1966, shows him with Head of Naval Architecture Department, the late John Tuft (left) and John Jeremy (Photo courtesy John Jeremy)

Wärtsilä Wins Major Ship-design Orders from China, India and Germany

Wärtsilä has received major orders for its recently-established Wärtsilä Ship Design unit. The orders were received from customers in China, India and Germany. The Ship Design unit was set up following the acquisitions of the ship design companies Vik-Sandvik and Schiffko. The most-recent acquisition, the Singaporean-based Conan Wu & Associates will also be part of the Ship Design unit.

The orders call for Wärtsilä to design a deepwater engineering survey vessel, a multi-purpose support vessel, a diving support vessel, and an emergency towing vessel. Each of these contracts comes as a result of successful bids to design sophisticated tonnage.

In commenting on the new orders, Arne Birkeland, Vice-President, Ship Design, Ship Power, Wärtsilä Corporation, noted: "The design contracts we have signed with these Chinese, Indian and German shipowners are an indication that there is a readiness to take on high-value sophisticated new tonnage. We are able to offer our customers a design which leads to better overall efficiency, improved environmental performance and reduced life-cycle costs. This has been made possible by optimizing the design to accommodate the vessel's various operating processes".

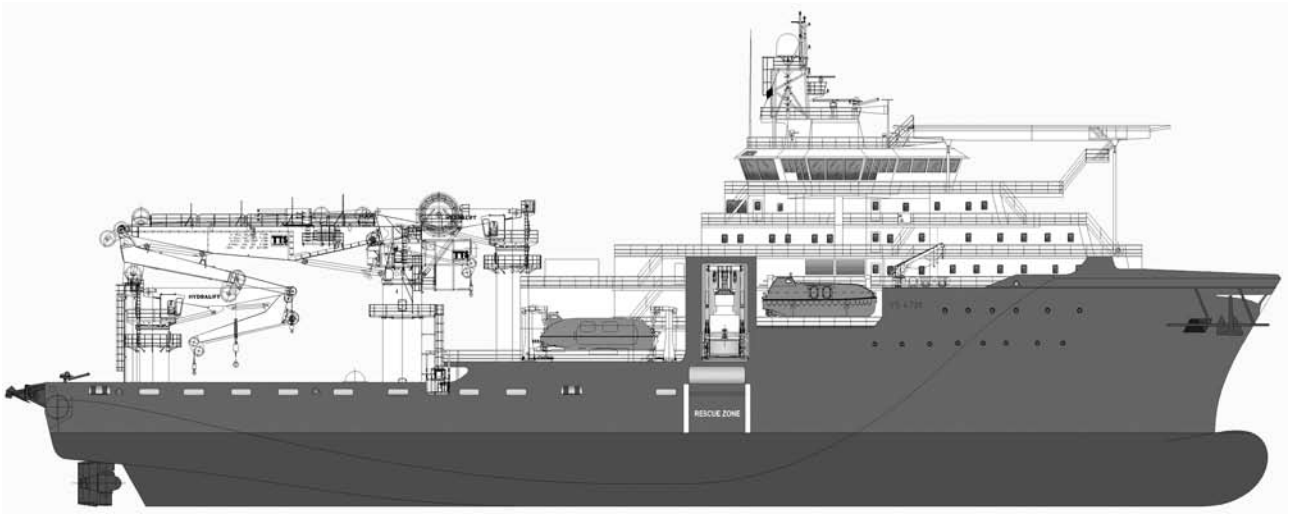
Jaakko Eskola, Group Vice-President, Ship Power, Wärtsilä Corporation, said: "From a strategic point of view, being able to offer ship-design services is a very important step for Wärtsilä, since it brings us even closer to our shipowner and shipyard customers. We can now enter dialogue with them at an earlier stage, when the key specifications of the vessel are being decided. This puts us in a position to offer even more competitive solutions."

Further, Mr Jaakko Eskola said: "The role of ship design is becoming increasingly important in the value chain, due to higher integration and more-sophisticated systems onboard most vessels and increasingly stringent environmental regulations. In addition, the ship design is more and more linked to system providers, shipyards and integrators. Ship production is moving away from traditional shipbuilding countries in the west to emerging markets where there is a need for ship-design skills. We can now build upon our existing strengths and strategies and, through Wärtsilä Ship Design, further develop our overall capabilities to include design."

The New Wärtsilä Ship Design Orders

The deepwater engineering survey vessel design is for China Oilfield Services Ltd, and represents a 4300 dwt vessel capable of drilling operations in deep water for geotechnical surveys and geophysical surveys. To date, most of China's oil exploration has been in relatively shallow waters, but there is now a need to probe deeper.

The Chinese state-owned Shanghai Salvage Company has ordered its multi-purpose support vessel design from Wärtsilä in order to carry out year-round tasks along the coastline of China. The key requirement is for multi-purpose flexibility, since the vessel will be required to carry out a multitude of different operations including salvage, offshore engineering services, diving and ROV operations, fire-fighting, anchor handling, ship supply, environmental



The 123-m multi-purpose support vessel for China's state-owned Shanghai Salvage Company
(Image courtesy Wärtsilä)

protection, and route clearing.

The 4500 dwt diving support vessel design has been ordered by India's Oil and Natural Gas Corporation Limited, and will provide a stable platform for saturation and air-diving operations. In addition to diving operations and construction work, the vessel is to provide field support and will, therefore, be fitted with sophisticated fire-fighting and oil-recovery equipment.

In Europe, Wärtsilä has completed an emergency towing vessel design for the German company ARGE Küstenschutz. Because the vessel is intended for North Sea operation, the main criteria in producing this ultra-modern design have been manoeuvrability and the capability of maintaining position effectively in harsh weather conditions.

New concepts

In addition to the new orders, the Wärtsilä Ship Design unit has also completed designs for a new anchor-handling vessel, a platform supply vessel, and a bulk carrier, all of which afford fuel consumption reductions of as much as 25 percent. This has been made possible by optimising the design to accommodate the vessel's various operating processes.

Wärtsilä to Power 12 of the World's Largest Ore Carriers

Wärtsilä engines will power the world's largest ore carriers, twelve of which have been contracted by a Brazilian shipowner. This is the biggest order for Wärtsilä RT-flex82T low-speed engines, which is one of four new engine types introduced by Wärtsilä.

The RT-flex common-rail technology brings direct benefits to shipowners in terms of great flexibility in engine setting for lower fuel consumption, lower minimum running speeds, smokeless operation at all running speeds, and better control of other exhaust emissions. The RT-flex common-rail technology will also play a key role in meeting the need for tighter emissions control under the forthcoming IMO regulations.

The ore carriers will be built by Rongsheng Shipbuilding & Heavy Industries of China. Each vessel will have a 7-cylinder Wärtsilä RT-flex82T low-speed engine with a contracted maximum continuous power of 29 400 kW at 76 rpm. The first of the ships is due for delivery in early 2011 and the twelve ships are expected to be completed in 2012.

The twelve engines will be built by Hefei RongAn Power Machinery Co Ltd of Hefei, Anhui, China under licence from Wärtsilä.

Both Rongsheng Shipbuilding & Heavy Industries and Hefei RongAn Power Machinery Co Ltd are members of Jiangsu Rongsheng Heavy Industries Group Co Ltd (RSHI). The licence agreement between Wärtsilä and RSHI for the manufacture of Wärtsilä low-speed engines was announced in March this year.

The Wärtsilä RT-flex82T engine is one of four new engine types introduced by Wärtsilä, all of 820 mm cylinder bore. It combines the benefits of both the electronically-controlled RT-flex common-rail system and up-to-date parameters to deliver optimum propulsion plants for ships such as these very large ore carriers.

The bulk carriers, each having capacity of 400 000 dwt, will be the largest dry-bulk cargo carriers ever built, and will be employed on a shuttle service carrying iron ore to East Asia. The ships will contribute to reducing the cost of long-haul maritime transportation of the iron ore to steelmakers.

Wärtsilä Propulsion Packages for Wilson Bulk Carriers

Wilson Shipowning AS, one of Europe's leading short-sea bulk-carrier operators, has ordered Wärtsilä propulsion packages for a series of eight 4500 dwt general-cargo bulk carriers. The vessels will be built by Shandong Baibuting Shipbuilding Co Ltd, in Qingdao, China.

This significant order follows a supply agreement from last year with Wilson for the provision of complete propulsion systems for a series of eight 8000 dwt bulk carriers currently under construction at China's Yichang Shipyard.

All 16 vessels, to be operated by Wilson EuroCarriers, will be delivered within similar time frames, between December 2009 and February 2012, with Wärtsilä rolling out the packages for installation between September 2009 and April 2011.

"The Wilson Group, with whom we have enjoyed a long-standing relationship lasting more than 30 years, is an important customer for Wärtsilä," says Johannes Martinsen,

Sales Manager, Wärtsilä Ship Power, Norway. "If we count all the engine brands which fall under the Wärtsilä umbrella, we have 34 engine installations operating in Wilson vessels."

"To reduce NOx emissions, Shandong Baibuting Shipbuilding will also arrange space for the future installation of Wärtsilä Selective Catalytic Reactor (SCR) units, Martinsen adds. This is due to the fact that some of these vessels will sail along the Norwegian coast, where ship owners have to pay a 'NOx tax' if the vessel is calling at more than two ports per trip. The current tax rate is NOK 15 per kg of NOx. If they install equipment, such as the SCR units and sign up to the Norwegian government's NOx fund agreement, then the tax is reduced to about NOK 4 per kg of NOx."

For each of the eight 4500 dwt general cargo bulk carriers, Wärtsilä will deliver the complete power train, comprising a 6-cylinder in-line Wärtsilä 26 medium-speed diesel engine rated at 2040 kW, a Wärtsilä gearbox, shafting, seals and bearings, and a propeller. Wärtsilä's Lipstronic remote-control units will also be integrated into the assembly.

The series of eight 8000 dwt bulk carriers being built by Yichang will each be powered by a single 8-cylinder in-line Wärtsilä 32 engine, rated at 3680 kW, connected via Wärtsilä reduction gearing to a Wärtsilä propeller. The shafts, seals and bearings and Lipstronic remote control are also supplied by Wärtsilä under the terms of the contract. These vessels will also be equipped with SCR units supplied by Wärtsilä.

Wärtsilä wins Ship Design and Propulsion Package Orders for three Sealion Vessels

Wärtsilä received a propulsion package order from Sealion Shipping, the UK-based operator and manager of the Toisa fleet, in September. The units are to be installed in a series of three multi-purpose subsea and ROV offshore support vessels (OSV), to be built at the ABG Shipyard in India.

The OSVs will be of Vik-Sandvik design and, for each vessel, Wärtsilä will supply a propulsion package which includes a diesel-electric propulsion system based on four 6-cylinder in-line Wärtsilä 26 main generating sets. As part of the approximately €30 million contract, Wärtsilä will also supply six thrusters and a complete automation and electrical-distribution package based on its low-loss concept, to each of these DP2-class vessels.

Toisa currently operates seven multi-purpose OSV within its modern fleet of 24 various OSVs. In addition, the company has a further twelve vessels under construction, which will enter service in the near future.

Sealion has 60 Wärtsilä engines in operation

Sealion Shipping, the manager of Toisa fleet, trading in the North Sea, the Gulf of Mexico, offshore Brazil and in South-east Asian waters, is a valued customer of Wärtsilä, with more than 60 Wärtsilä medium-speed engines in operation.

Vik-Sandvik was acquired by Wärtsilä in July 2008. This acquisition was a major step in Wärtsilä's strategy to strengthen its position as a total solutions provider.

Wärtsilä to Supply Energy-efficient Systems to Aker Yards for Five Vessels

Wärtsilä has signed major contracts with Aker Yards AS Søviknes and Aker Yards AS Trading — the recently established project development arms of the Aker Yards Group — for the supply of propulsion equipment for five offshore vessel projects being built in Norway, India and Brazil. The orders cover the supply of a total of 15 Wärtsilä engines, as well as power generation, automation, and other ancillary equipment.

For the platform supply vessel (PSV) being built at the Aker Yards facility in Söviknes, Norway, Wärtsilä will supply three 6-cylinder Wärtsilä 34DF engines. This is the first marine application order for this successful multi-fuel engine which is able to run on either marine diesel oil, heavy fuel oil or natural gas.

Based on the well-proven Wärtsilä 32 engine, and incorporating the operational experience gained from the Wärtsilä 32DF dual-fuel engine, the Wärtsilä 34DF has a 30% higher output than its predecessor. It also incorporates a number of new features including double-wall gas piping, built-in lubricating-oil system components, and a UNIC engine-control system. In all, it represents a more energy efficient propulsion solution for the offshore market.

Wärtsilä will supply to Aker Yards AS Søviknes three 6-cylinder in-line Wärtsilä 34DF dual-fuel engines, each rated at 2610 kW. These will be installed in a LNG-fuelled platform supply vessel being built at the Aker Yards' facility at Søviknes, in Norway.

Wärtsilä will also supply this vessel with the complete power-management system, the main generator sets, frequency converters, propulsion motors, and low loss concept (LLC) transformers. LLC has been developed to negate the need for large transformers and their associated components and utilities in the propulsion line. The concept, which has already been successfully applied in the offshore and passenger-ship segments, has been proven to save fuel and installation costs, to reduce the amount of space required for component installation, and to deliver greater redundancy in an electrical propulsion system.

Under a contract from Aker Yards AS Trading, Wärtsilä will supply equipment for two anchor-handling tug supply vessels (AHTS) that Brazil's Aker Promar Shipyard will build. Each of the AHTS vessels will be fitted with a hybrid propulsion system consisting of two 7680 kW Wärtsilä 16V32 prime movers, reduction gearboxes with single input/single output, shafting and two controllable-pitch propellers.

Wärtsilä will also provide thrust to the vessels by way of two electrically-driven side thrusters, each with 1200 kW output and a single 1500 kW retractable azimuth thruster. One 1200 kW thruster and a single 1500 kW retractable azimuth thruster will be delivered for aft installation.

Wärtsilä will also supply four Wärtsilä 9L20 diesel-generating sets to each of two platform supply vessels being built at the Cochin Shipyard in India. The ships will be deployed in Asian waters after their delivery to Norwegian ship owner Sigba.

MEMBERSHIP

The Australian Division Council

A meeting of the Council of the Australian Division of RINA was held on Wednesday 24 September 2008 with the President, Dr Stuart Cannon, in the chair. Many matters were discussed and some of these matters, included:

The Basic Dry Dock Training Course

This course, conducted in Melbourne by RINA HQ, was well supported with some applicants disappointed that they were unable to be accommodated. Due to the support encountered, it is hoped the course will be offered, in Australia, on an annual basis.

The South Australia and Northern Territory Section

Following the establishment of the Section, increased interest in its activities were reported due partly to newly-recruited staff of the Defence Materiel Organisation.

Commission of Inquiry into the Loss of HMAS *Sydney II*

Assistance to the Commission by RINA through collaboration with the Defence Science and Technology Organisation has been provided with the Commissioner, Mr Terence Cole QC RFD, expressing, to the President, his gratitude for the assistance.

Standards Australia Projects

A letter from Standards Australia setting out the status of ongoing projects was discussed including that of CS-001 Small Pleasure Boats and seeking a nomination from RINA to its committee. The President undertook to discuss this matter further with the National Marine Safety Committee before replying to Standards Australia.

National Uniform System for Vessel Safety

A Regulation Impact Statement on *National Approach to Marine Safety Reform* was discussed in detail, and Council expressed in-principle support for the initiative as having the potential to provide substantial improvement to the uniformity of maritime safety implementation across Australia in relation to commercial vessels.

The next meeting of the Council of the Australian Division will be held on Thursday, 4 December 2008.

Keith Adams
Secretary

NSW Member Database Update

The Secretary of the NSW Section has a new email address, rinansw@gmail.com. This will avoid having to change email addresses every time the secretariat changes hands, and might well be emulated by other sections.

The NSW Section is in the process of updating the database, and especially email contacts. So, if you are resident in NSW and the proud possessor of an email address but have not received any emails from the Secretary for more than a month (or ever!), then please advise the Secretary of your preferred email address.

Phil Helmore

Watched over by a NSW Police helicopter, USS *John S. McCain* arrives in Sydney Harbour on 20 August to commemorate the anniversary of the visit of the Great White Fleet one-hundred years ago. USS *John S. McCain* was escorted during her visit to Sydney and Melbourne by HMA Ships *Darwin* and *Sirius*.
The final commemorative visit, to Albany, was conducted by USS *Shoup* in company with the Australian ships
(Photo John Jeremy)

NAVAL ARCHITECTS ON THE MOVE

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

Tristan Andrewartha has moved on from the Maritime Platforms Division of the Defence Science and Technology Organisation and has taken up a position as a naval architect with Knud E. Hansen in Copenhagen, Denmark.

Anderson Chaplow has moved on within Lloyd's Register Asia from Koje, Korea, and has taken up a position as a Surveyor-in-Training in the Auckland, New Zealand, office.

Keir Malpas has moved on from Australia Pacific Projects Corporation and has taken up a position as a project manager in the construction industry in Canberra.

Robert McConachie has moved on from Centre for Maritime Engineering of the Defence Materiel Organisation and is now on an extended tour of Europe.

Steve McCoombe moved on from Michael Rikard-Bell and Associates many moons ago, and has taken up a position as a naval architect with Marine Safety Victoria in Melbourne.

Bruce McNeice has moved on within Defence from his position as Australian Naval Liaison Officer in Bath, UK, and has returned to take up the position of Acting Assistant Director Total Ship Survivability in the Directorate of Navy Platform Systems in Canberra. This position looks after the development of requirements for ship survivability issues, such as vulnerability, separation and redundancy, shock, signatures, fire fighting, CBRND, damage control, lifesaving, etc.

RADM Trevor Ruting has retired from his position as Head of Maritime Systems, Defence Materiel Organisation, Canberra. However, he hasn't hung up his marlinespike for the last time just yet; he is on the Advisory Board for Defence South Australia, and continues in the Naval Reserves.

Glen Seeley moved on from Incat Designs many moons ago, and has taken up a position as a Project Engineer with the Australian Maritime Safety Authority in Canberra.

David Steed has moved on from the Defence Science and Technology Laboratory in the UK (where he had been since graduating from the University of Southampton in 2005), and has taken up a position as a naval architect with Austal Ships in Fremantle.

Matt Stevens has moved on from One2three Naval Architects and has taken up a position as a naval architect with the Centre for Maritime Engineering of the Defence Materiel Organisation in Sydney. He has also recently joined the NSW Section Committee of RINA.

Carl Vlazny has moved on from the NSW Maritime Authority and has taken up a position as a naval architect with Austal Image in Fremantle.

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.

Phil Helmore

Polly Woodside afloat in the Yarra River while restoration work is carried out on her dock. Sadly, *Polly Woodside* is even more firmly trapped in her present location surrounded by high-rise buildings, with another low-level bridge being built over the river (right) (Photo John Jeremy)

FROM THE ARCHIVES

EARLY STEEL SHIPBUILDING IN SOUTH AUSTRALIA

Neil Cormack

From the very early days after the foundation of the State of South Australia the building of metal vessels had been well established. The vessels were, in the main, paddle steamers and barges, built to ply the River Murray trade. They were built of iron, i.e. iron angle-bar frames, with iron-plated topsides riveted to the frames — and as iron 'did not like' the river water, the bottoms of these vessels were usually of red-gum planking, typically 3 inches (76 mm) thick.

In South Australia there were many building sites, including Goolwa, Mannum and Morgan.

The first such vessel 'built' in Port Adelaide was the cargo ship-cum-tug *Nelcebee***,** built of iron in 1883. She was actually built in Great Britain, on the upper reaches of the Clyde, at Rutherglen. Fred M. Walker's book *The Song of the Clyde* [1] lists the Thomas B. Seath and Co. shipyard in Rutherglen [2]. *Nelcebee*, as built, was not riveted, but put together by service bolts and nuts, then dismantled and sent to Port Adelaide where she was assembled by the firm of T. Cruickshank. No register names the builders and it is only supposition that Thomas B. Seath was involved.

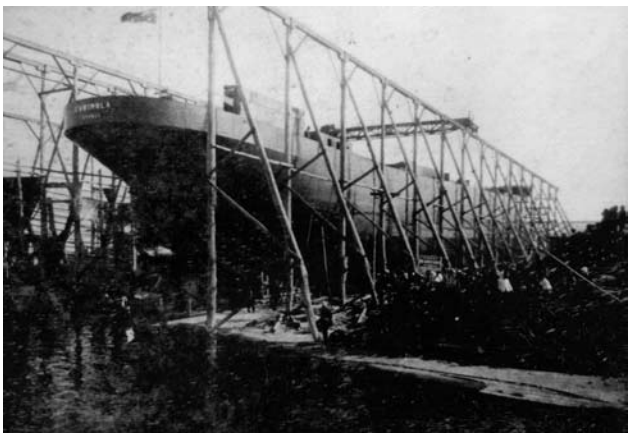
In 1916 the Australian Federal Government, then under Prime Minister William (Billy) Morris Hughes, passed a bill authorising the foundation of the Commonwealth Shipping Board. Thus was the beginning of the Australian Government-owned Commonwealth line of steamers.

The first of these were the D- and E-classes of single-screw, coal-burning steamers. The Balmain company of Poole & Steele were contracted to build three D-class ships, and the South Australian Government allocated the company a site just to the south of the Adelaide Electric Company power-house on the eastern bank of the Port River Estuary. This was on a wide stretch of the river, and it would appear from the photographs that drags were not used to "bring the ships up" at the launching, the yard relying solely on the attending tugboats.

The general manager of the yard was Mr Arthur Poole; the senior loftsman and shipwright foreman was Mr Robert (Bob) Lambie, who the company had brought out from Scotland. He was indeed a master tradesman [3]. All the other tradesmen came from near and far — shipwrights from Port Adelaide — from the Adelaide Steamship Company, the South Australian Harbours Board, A. J. McFarlane and Sons, to name a few. Others came from the River Murray ports — Goolwa, Mannum, Morgan and Echuca.

The D-class and E-class ships were built on the Isherwood system of construction, i.e. transverse deep web frames on approximately 12 feet (3.6 m) centres, with longitudinal bulb-angle bar frames on approximately 2 feet to 2 feet 6 inch (0.6–0.75 m) centres.

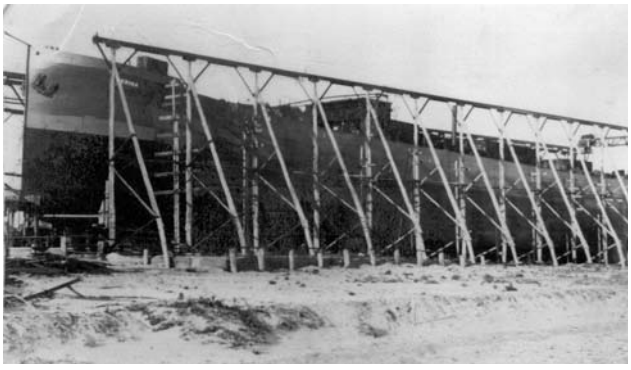
In the Osborne Yard, all the 'in' plates were lifted off the mould loft floor, the 'outer' plates were lifted off the ship by templates made by the shipwrights. The first vessel built was *Eurimbla***,** and therein hangs a tale. Plating proceeded with little trouble until the first 'outer' turn of the bilge plate. A template was made and taken to the plate shop where everything from the template, size, rivet holes, etc. was transferred to the selected stock plate. Then, in due course, it was offered up to its position on the ship. It was with some consternation that it was realised that in the rolling process the stretching of the plate had not been considered — at the bottom edge of the plate the rivet holes lined up perfectly — but it was not so at the top edge. At this time Mr Arthur Poole was watching the procedure, and made the comment "Just look at those holes, they are absolutely bloody awful". One of the shipwrights turned and retorted "There is nothing wrong with those holes, Mr Poole, they are perfect, they are just not behind one another"". Mr Poole, or Young Poole, as he was affectionately known, took it in good humour. Needless to say that never occurred again.



Eurimbla ready for launching
(Photo courtesy Neil McCormack)

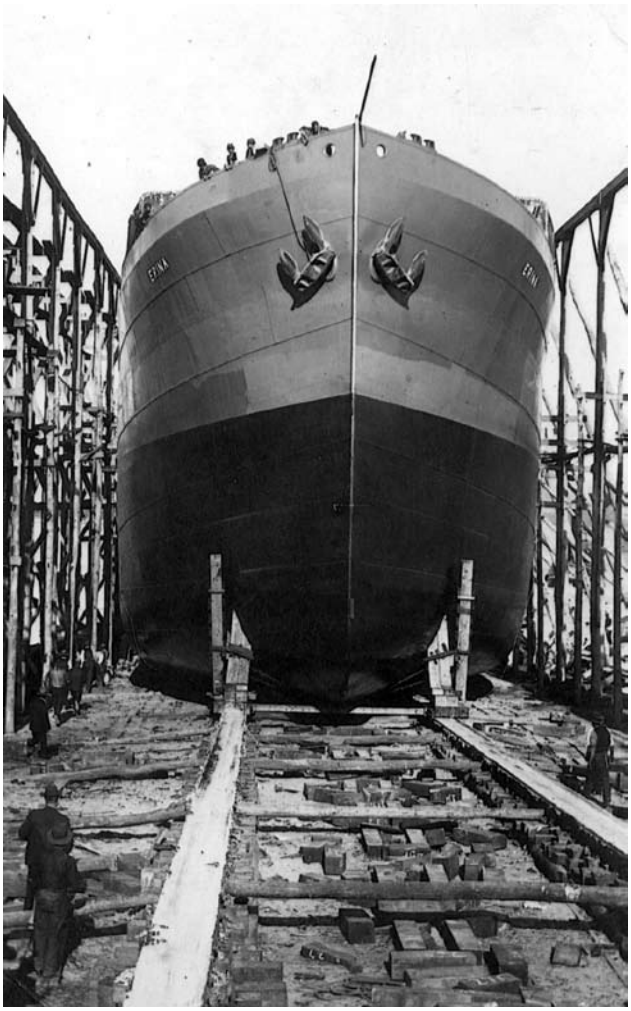
Three ships were built. *Eurimbla* was followed by *Euwarra***,** and the final one was launched as *Erina***.** The shipwrights had contracted to launch this last ship. It was a bit of tragedy for them, for she stuck half-way down the ways and missed the tide for that day. She entered the water the next day with tug assistance.

Before *Erina* was commissioned her name was changed to *Eugowra***.**



Erina on the stocks
(Photo courtesy Neil Cormack)

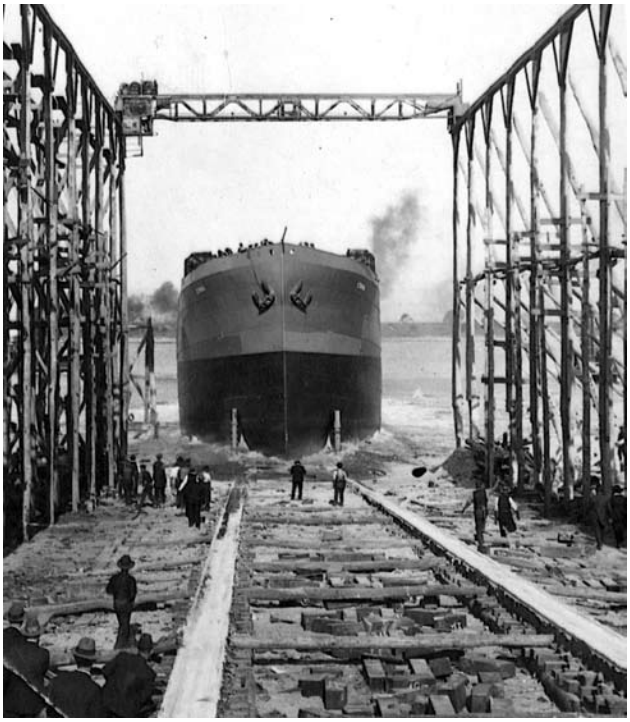
The launching of *Erina* in March 1923. The gentleman in the Homburg hat and high collar is Mr Arthur Poole
(Photo courtesy Neil Cormack)



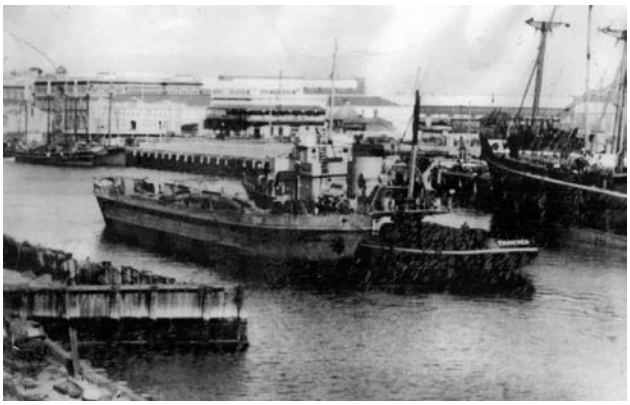
Erina stuck on the slipway
(Photo courtesy Neil Cormack)

The yard then built No. 6 bucket dredger, which received the name *Morwong*, and three hopper barges — all for the South Australian Harbours Board. The hopper barges were designed by Mr Bob Lambie. They were followed by a tin-mining dredger for Malaya.

Evidently the order for the vessels for the Harbours Board was the semblance of an effort by the South Australian Government to maintain the yard in operation. The government then called tenders for the construction of 40/40 ton Gondola bogie wagons for the South Australian Railways. The yard was successful and obtained the contract but, unfortunately, it appears that it was 'outside the line of country' for the costing clerks, and so the Poole



Erina entering the water the following day.
Note the smoke from the assisting tug
(Photo courtesy Neil Cormack)



One of Mr Lambie's hopper barges in the charge of the tug *Tancred*
(Photo courtesy Neil Cormack)

& Steele Company in South Australia was 'forced to the wall' leaving just the headquarters of the company in Balmain, NSW.

These Commonwealth Line ships plied the coast for a while. Then there were another lot of politicians in office — and the entire fleet was sold. *Eurimbla, Euwarra* and *Eugowra w*ere sold to the Broken Hill Pty, and renamed *Iron Master, Iron Knob* and *Iron Warrior* and as such saw service for many years.

1. Fred Walker, FRINA is the author of those excellent articles *Pioneers of Ship Design and Construction* in each issue of *RINA Affairs*.

2. Walker, Fred, *Song of the Clyde*, John Donald Publishers, Edinburgh, 1984 and 2001, p. 199.

3. After Poole & Steele's Osborne Yard closed, Bob Lambie pined away from the trade for some years but ,when the BHP Shipyard started up at Whyalla at the beginning of the Second World War, BHP immediately sought his whereabouts and appointed him as the senior loftsman.

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