THE AUSTRALIAN NAVAL ARCHITECT

Volume 17 Number 2
May 2013

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THE AUSTRALIAN NAVAL ARCHITECT

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(Australian Division)

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Cover Photo:

Kat Express 2, a 112 m wave-piercing catamaran recently delivered by Incat Tasmania to Mols Linien of Denmark
(Photo courtesy Incat Tasmania)

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From the Division President

For those of you who were unable to attend the Division AGM in Fremantle on 20 March, I presented the following report on our 2012 activities:

"The last twelve months have been busy ones for the Australian Division, since I took over the position as Division President from Prof. Martin Renilson in March last year. The Division Council met in June, September December, and earlier today. The key outcomes from each Division Council meeting are reported in *The Australian Naval Architect*. I wish to acknowledge the support that I have received from all of our Council members around the country and, particularly, Vice President Dr Tony Armstrong, Treasurer Craig Boulton and Secretary Rob Gehling. Each of our state and territory sections has a member on Council and I particularly value the work that these people do and encourage them to strengthen the links between Section and Division wherever possible.

"We now have about 730 members in Australia and our Sections are well established in all states and territories; all of them have held varied, interesting and informative technical programs throughout the year — I encourage them all to continue this good work and my thanks go out to all section committees and office bearers. I also encourage all sections to report on these technical meetings in *The ANA* and to encourage their speakers to consider presenting formal papers which can be put forward for consideration for the Walter Atkinson Award.

"Early in the year the Division completed the periodic updating its By-Laws, a mundane but necessary task.

"Noting the increasing importance of the offshore petroleum and energy industries to our profession in Australia, the Division Council took the opportunity to appoint Vesna Moretti from that sector to the vacancy on Council created by Sam Abbott's overseas posting.

"*The Australian Naval Architect* continues to go from strength to strength under the stewardship of John Jeremy and Phil Helmore — thanks once again to them and to all of the contributors and advertisers who, together, make *The ANA* the excellent showcase of our profession that it has become since its humble beginnings back in 1997.

"As usual, throughout the year, a number of our members have performed outstanding services to the profession and to the community, ranging from active engagement in RINA technical committees, to work at the IMO and with national and state bodies, membership of standards committees and working groups, and participation in accident and other inquiries. Thank you all for your valuable and mostly unsung work in these vital areas.

"There have been ups and downs in the education field. On the positive side, the articulation of the AMC degree courses with universities in Western Australia and South Australia; on the negative side, the cessation of the teaching of naval architecture at TAFE NSW—let us hope this is only a temporary setback.

"The year has seen some significant events, including the arrival of the LHD *Canberra* and the launching of her sister, the keel laying of the AWD *Hobart*, the keel laying and launching of the ACV *Cape St George*, all due in no small part to Australian naval architects. In the commercial sphere, the pages of *The ANA* continue to show the wide variety of vessels which are designed by our world-capable consultants and built both here and around the world, many of them project managed by our members.

"The year ahead will see the bedding down of the newly-introduced National System for Domestic Commercial Safety, the centenary International Fleet Review of the Royal Australian Navy, the Pacific 2013 International Maritime Conference and the release of the next Defence White Paper. Another busy year!"

Every time I open *The ANA* I am pleased to see the interesting and often thought-provoking Letters to the Editor which are received from our UNSW students. It is good to see young minds thinking laterally, because they are the future of our profession. I would be even more pleased to see this correspondence picked up and responded to by some of our more experienced members, an invaluable meeting of the minds. Perhaps this would encourage some similar correspondence from our AMC and other students too?

I would also remind you all that the closing date for nominations for the Walter Atkinson Award, 15 July 2013, is fast approaching, and I ask you all to consider papers presented in the last eighteen months and forward nominations through your Sections or directly to our Secretary, Rob Gehling, at rina.austdiv@optusnet.com.au.

As always, I am available for discussion and comment on any topic of relevance to Australian naval architects — you can contact me at email jimb@austal.com or by telephone (0418) 918 050.

Jim Black

Jim Black
President, Australian Division

Editorial

The new Defence White Paper, released by the Government on 3 May, presents a pragmatic appraisal of future naval programs. Whilst there will be disappointments for some — no fourth air-warfare destroyer, for example — the most notable inclusion in the paper is the recognition that there is a need for Defence plans to be structured to minimise

the troughs between projects which result in the loss of hard-won skills within industry. It states "A highly-skilled and capable Australian defence industry is necessary for Defence to achieve its strategic objectives. Large-scale and complex projects, such as the future submarine program, require access to significant Australian skills and capabilities for design, construction and sustainment activities. It is critical to the success of these projects, and therefore to the achievement of Defence objectives, that careful planning to ensure the availability of the required skills and expertise along with building strong partnerships with industry, be progressed as a matter of priority."

The driver of this commitment is, of course, the future submarine program. The decision that the new RAN submarines will be an evolved Collins-class design or a totally-new design demands that industry skills be given a priority as, perhaps, never before.

Released on the same day and, significantly, accepted by Government, the *Future Submarine Industry Skills Plan* is a comprehensive assessment of the demand for specialised skills in the naval shipbuilding industry for decades to come. In its first of eleven recommendations, the plan says: "Without adversely impacting the Australian Defence Force's capability, planning of the whole scheme of naval shipbuilding programs should be optimised to provide industry more-predictable, better-sequenced and long term work: the necessary foundations for innovation, business investment, productivity and performance improvement."

Industry has been saying this to government for decades, emphasising the role of industry as the fourth arm of Defence, but governments have shied away from commitment, preferring to rely on the ability to purchase from overseas if the industry cannot sustain itself. The commitment to the future submarine changes the imperatives. A continuing 'stop-start' naval construction program would not only be expensive and wasteful of the skills developed for current programs, but could render the future submarine program, as currently conceived, unachievable.

Of course, making the commitment is one thing, following through and implementing the intention is another. Balancing the Navy's needs, living within available finance and maintaining competition, yet encouraging centres of excellence in a small market whilst also providing a reasonably smooth workload, is the big challenge.

The 2013 Defence White Paper has appeared only months before an election. Some suggest that it may be short lived if the government changes in September. Defence policy has been substantially bipartisan in Australia for many years. Hopefully, the commitment to sustaining the Australian naval shipbuilding industry will be carried forward by a new government. A protracted hiatus whilst policies are sent back to the drawing board would lose valuable time.

John Jeremy

LETTERS TO THE EDITOR

Dear Sir,

I would like to draw the attention of all Section Chairs, Secretaries and committee to the important role they play in the Walter Atkinson Award — the prize for the best paper presented to a RINA forum in Australia — and I ask that the matter be put on the agenda for your next committee meeting.

The Walter Atkinson Award was established in 1971 and its aim is to raise the standard of technical papers presented to the naval architecture community in Australia. Nominations are made by section committees (and also by the organising committees of RINA-supported conferences held in Australia). Each section is invited to nominate up to two papers. A nomination must be of a written paper, first presented either at a RINA Section meeting or RINA-supported conference in Australia, or first published in a RINA-supported publication in Australia.

All authors are eligible — Australian or overseas, members or non-members. Papers by multiple authors are eligible. Nominations will be received for papers published in the period 1 January 2012 — 30 June 2013. Nominations close on 15 July 2013 but can be submitted by section committees at any time before then.

Please alert recent and forthcoming speakers at your Section to their eligibility for this award and, in particular, please encourage them to include a written paper with their presentation. The paper can be written after the presentation if necessary, it just has to be published (i.e. available) before the closing date.

If you would like a paper to be considered, please let the Secretary of the Australian Division (Rob Gehling) know. For further information you can contact him at rina.austdiv@optusnet.com.au

A comprehensive explanation of the Walter Atkinson Award can be found on the RINA website at www.rina.org.uk/prizes_and_awards.html. Some key points are given below:

Award Value

The Award comprises three components:

- An engraved trophy or medal.
- A framed certificate for each author.
- free entry to the event at which the award is to be presented.

The Award will be presented by the President of the Australian Division (or their nominee).

Selection Criteria

A maximum of 10 points are allocated to each of:

- Is there a stated or implied purpose?
- How important is the paper to Australia?
- Does the paper have any new ideas to impart?
- How easy is the paper to understand?
- How rigorous is the paper?

Kim Klaka
Chair, Walter Atkinson Award Sub-committee

Dear Sir,

I am writing to discuss the use of liquefied natural gas (LNG) as a fuel for ships. Produced by cooling natural gas to –160˚C, LNG is a colourless, non-corrosive, non-toxic

substance composed primarily of methane. Lighter than water, LNG floats if spilled, only flammable when mixed with air and is five to fifteen percent natural gas. LNG burns cleaner than diesel and reduces sulphur oxide, nitrogen oxide, and carbon dioxide emissions, which will allow marine vessels to more-easily meet upcoming regulations. These benefits make LNG look like a promising fuel for future ships. This is supported by the fact that Australia is currently the world's fourth-largest LNG exporter and is looking to expand this market. Transporting LNG is a challenge due to its supercooled state, so a new type of tanker has emerged, featuring a double hull and insulation to maintain the low temperature and minimise evaporation. Furthermore, using LNG as a fuel in ships will affect the field of naval architecture. Regulations for LNG engines must be implemented, and naval architects must factor this option into the design process.

With favourable qualities and plentiful local sources, LNG could become the preferred fuel choice. However, there is currently no supply chain, as LNG suppliers have yet to be convinced that the market will grow. Buyers want lower prices and desirable locations, but these only occur once the market has been established. The question is whether the LNG market will be able to take off and, if it does, what will kick-start the industry? In order for LNG to be successful, its price must be able to compete with heavy fuel oil and marine gas oil. If stricter fuel standards are instigated, then LNG may become more profitable. However, steps must still be taken to expand distribution and make it accessible.

I am curious as to whether the LNG market will expand and become a standard fuel option, especially with the vast supplies available in Australia. I look forward to following its progress and how it impacts the field of naval architecture.

Lisa Bergeron
UNSW Student

Dear Sir,

Universities are meant not only to enlighten students on equations and theories, but also to give real life experience and knowledge in a field of study. In a small discipline such as naval architecture, it could be beneficial to start assembling and funding clubs which give students more hands-on experience at a young age. One club in particular is called Solar Splash. Solar Splash is an international intercollegiate solar- and electric-boat regatta. The competition is a multidisciplinary engineering competition but it allows students to participate from any major. Students from universities across the globe design and build their own boats and propulsion systems in order to compete in courses testing manoeuvrability, speed and endurance. The boats are also judged on their workmanship and their ability to physically build the boat. Solar Splash also teaches other disciplines, not taught at university, such as marketing and fundraising, which are essential to recruit new members and fund the club.

This competition allows students to learn the ship design process at an early age so that they will be more prepared when they work full time. It also allows students to see what part of naval architecture they would like to pursue after graduation. The great thing about this competition is that it is open to any school which can fund a team. Therefore, students that attend a university without a naval architecture program can become involved and learn what a job in the ship design or building industry can offer them. This inter-disciplinary competition even promotes cooperation and understanding between engineering disciplines, as they must work as a team and compromise in order to deliver the best vessel to the racecourse.

At my home University of Rochester in the United States, I have seen many mechanical and electrical engineers who have competed in this competition as undergraduates continue to pursue graduate degrees in naval architecture or to find jobs in the ship design or building industry. Their eventual career directions would not have been possible without the University of Rochester's Solar Splash club. There is no doubt in my mind that I will be joining this club next year to continue with the naval architecture classes which I have taken while in Australia. I believe Australian Universities would benefit greatly from promoting events such as this in order to engage and promote the ship industry at a wider university level.

Kelly Rousmaniere
UNSW Student

Dear Sir,

A synopsis at this late development stage of the current America's Cup class, the AC72, has revealed that the 34th America's Cup will be decided by which syndicate best implements the hydrofoiling design solution to the AC72 rule.

Initially intended as a planing high-performance catamaran with hard wing sails, a loophole in the design rules (first exploited by the New Zealand syndicate, Emirates Team New Zealand) has seen the utilisation of hydrofoils to vastly increase reaching and downwind performance.

The rules discouraged stable hydrofoiling by not permitted the use of controlling surfaces on the main foils and rudder T-foils. However, it is believed that design teams have worked around this by positioning the centre of gravity of the vessel forward of the main hydrofoils which, in conjunction with T-foils on the rudders which generate down force, results in a stable hydrofoiling platform akin to how an aircraft achieves stable flight.

However, the design of the hydrofoils must also be balanced with upwind performance. Even though these yachts are capable of up to 20 kn of boat speed upwind, this is still not fast enough to induce foiling. Thus, they must also function in their traditional role of minimising leeway upwind.

The Swedish syndicate, Artemis, were the only team to not directly develop a hydrofoiling design on their first iteration of the AC72 rule. Their solution was to articulate the foils in the transverse direction to balance the lift required and leeway according the wind conditions and point of sail, while never achieving true hydrofoiling. In their brief two-boat testing with the defender, Oracle Team USA, it has been proven for the AC72 rule that being able to foil downwind and on a reach will be critical to winning races come September 2013. Artemis have now changed design path and are scrambling to make sure their second AC72 has hydrofoiling capabilities.

Andy Green
UNSW Student

NEWS FROM THE SECTIONS

Tasmania

Technical Meetings

The first RINA/IMarEST Technical meeting for 2013 was held on 14 March. RADM Bob Love RN (Rtd) gave a presentation entitled *Building a Nation's Flagships: The new Queen Elizabeth Class Aircraft Carriers.*

Bob Love is currently the Deputy CEO of Babcock in Australia. His talk described the design, project management and building of the Royal Navy's new Queen Elizabeth class aircraft carriers. In Bob's words:

"The UK's Strategic Defence Review of 1998 stated a clear need for expeditionary air power, deployed by sea. Thus was born the Queen Elizabeth Aircraft Carrier Programme. These ships will be the largest the Royal Navy has ever built and operated. The huge scale of the enterprise required a mobilisation and level of cooperation in the ship building industry not seen before. The programme has been dogged by political controversy, significant change and unrelenting scrutiny, but has come through relatively unscathed with an admiration for the high-performing consortium of designers and builders — The Aircraft Carrier Alliance."

The scale of the project as described by Bob was absolutely amazing. From the 70 t side lifts capable of lifting two F-35B aircraft, to the $7 billion worth of contracts and the 1000 t overhead crane used to construct the ships, each and every component had figures attached to them dwarfing other areas of the maritime industry. Drawing from this experience, Bob discussed some lessons learned in terms of alliance building, design and construction programs, and long-term incentive contracts. For example, because that design typically could have a five-year cycle, whereas building could have a ten-year cycle, maintaining design capability means producing twice as many designs as actually get built or moving designers to another industry.

The second technical meeting for 2013 was held on 11 April. Bo Matschke gave a presentation entitled *Submarines: Usage, Upgrades and Maintenance*. Submarines can be used for a variety of specialist tasks, ranging from intelligence gathering and deployment of special forces, to tracking other vessels. Bo Matschke is well qualified to talk about these unique vessels. Born in Stockholm, Sweden, Bo's involvement with submarines began in 1990 when he commenced employment with Kockums in Sweden and was involved with the design of eight Swedish submarines. His association with the Australian Collins-class submarines began in 1993 during the construction program. Bo has lived permanently in Australia since 2000 and became heavily involved with Collins-class submarine maintenance. Initially he worked at ASC as Engineering Services Manager, then Mechanical Systems Manager, before leaving ASC recently to work in his family business.

Bo started with a quick history of submarines dating back to 1766. However, truly subsurface operating submarines did not come into service until the end of the Second World War with the advent of the snorkel; first designed by Germany with the XXI design, but not in service until after the war. This history that highlighted the seemingly-simple concept of the submarine rapidly becomes a highly-complex engineering task when useful tasks are attempted.

Bo discussed the complexity of the submarine system as compared with other naval vessels, for example in comparison to a typical frigate. Where a frigate will require in the order of 600 suppliers, the submarine may require around 1600; where the frigate consumes 1.2 million man hours, the submarine is likely to need 2.5 million man hours in construction. Bo finished by discussing a few options for the future, including "off-the-shelf" designs, development designs, and completely new designs.

Jonathan Binns

New South Wales

John Doherty 55-year Membership

Prior to the technical presentation on 6 March 2013, the Chief Executive, Trevor Blakeley, presented John Doherty with a certificate for 55 years as a member of the Royal Institution of Naval Architects. John and Jim Eken founded the Sydney-based consultancy, Eken and Doherty and then, when Jim Eken retired, ran the company M.J. Doherty and Co. A number of former employees were present to congratulate John on his achievement.

Noel Riley 50-year Membership

At the Annual General Meeting in London on 24 April, at RINA HQ in London the President, Peter French, presented Noel Riley with a certificate for 50 years as a member of the Royal Institution of Naval Architects. Noel served his apprenticeship as a shipwright at Cockatoo Docks and Engineering Co. in Sydney, graduated with honours from the naval architecture diploma program at Sydney Technical College, taught the naval architecture diploma course at Whyalla Technical College, and subsequently worked for the Australian Shipbuilding Board, was one of the partners in Boulton, Riley and Hercus, formed his own consultancy, Commercial Marine Design (which he still runs part-time), and taught courses (especially the ship design project) in the naval architecture degree program at the University of New South Wales.

The Path to Chartered Status

The Chief Executive of RINA, Trevor Blakeley, made a presentation to those interested on *The Path to Chartered (CEng) Status* prior to the March technical meeting and the AGM of the NSW Section on the evening of 6 March in the Harricks Auditorium at Engineers Australia, Chatswood.

Annual General Meeting

The NSW Section held its fifteenth AGM on the evening of 6 March, following the March technical presentation and the Australian Division AGM in the Harricks Auditorium at Engineers Australia, Chatswood, attended by 16 with Alan Taylor in the chair. Alan welcomed the Chief Executive of RINA, Trevor Blakeley, to the meeting.

Alan, in his first Chair's Report, touched on some of the highlights of 2012.

Nine joint technical meetings had been held with the IMarEST (Sydney Branch), with attendances varying between between 39 (for Andrew Baglin's presentation on

Racing for the America's Cup) and 14 (for John Jeremy's presentation on *The Age of the Armoured Battleship*), with an average of 22. Meetings are actively promoted and notices are included in Engineers Australia publications, but reliance is also placed on members spreading the word to encourage members and others to attend. The majority of the presentations are now recorded and can be viewed on the Engineers Australia website.

SMIX Bash 2012 was the first one attended by Alan, and he considered it an outstanding success. He thanked the members of the SMIX Bash Organising Committee, Chris Hughes, Adrian Broadbent, Graham Taylor, Craig Boulton, Len Michaels and Bill Bixley, for their extraordinary efforts in making the Bash happen.

The event has become established as the Christmas party for the marine industry, with a number of visitors coming from interstate and international. Our ability to continue to run SMIX Bash is entirely due to the generosity of our sponsors. We are grateful to those who continue to support the event despite the continuing impact of the Global Financial Crisis. The proceeds of the silent auction of the model of *Endeavour*, made by Bill Bollard, raised $1000 which has been donated to the Sydney Heritage Fleet to assist their restoration program.

During the year, Craig Hughes had recently relocated to Perth and had resigned from the Committee. At the same time the Committee was strengthened by the addition of Rob Tulk of One2Three Naval Architects. Other committee members have agreed to continue their membership for a further year, although some of the positions have changed. As a result, the committee for 2013 is as follows:

Chair and AD Council Member	Alan Taylor
Deputy Chair	Valerio Corniani
Treasurer	Adrian Broadbent
Secretary	Anne Simpson
Assistant Secretary	Nathan Gale
Website and TM Program Coordinator	Phil Helmore
Auditor	Rozetta Payne
Member	Craig Boulton
	Graham Taylor
	Rob Tulk

The NSW Section is represented on the Australian Division Council by Craig Boulton (Treasurer) and Adrian Broadbent (NSW Nominee).

In closing, Alan expressed his appreciation to all Committee members for their support during the year as their efforts make everything happen; without them it could not be done.

The Treasurer's Report was presented by Adrian Broadbent.

The NSW Section finances are separated into Section and Social accounts. As at 31 December 2012 (the close of our financial year), we had a zero balance in the Section account. The Australian Division partly reimburses us for the Section's share of the monthly technical meeting costs, including the video recordings. The remainder of the costs are funded from our Social account to bring the Section Account to zero at the end of the year.

The Social account allows us to plan for SMIX Bash 2013 and to support the NSW members, mainly for additional catering at technical meetings, and presentation of "thank you" bottles of wine to presenters at our technical meetings. In addition we offered three prizes of $100 each to the best academic performance by students in Years 1, 2 and 3 of the naval architecture degree program at UNSW. We intend to offer the prizes again in 2013.

Following the AGM, the Chief Executive of RINA, Trevor Blakeley, enjoyed dinner at the Shanghai Stories Chinese restaurant in Chatswood with the entire NSW Section Committee.

Phil Helmore

Trevor Blakeley (second from left) with NSW Section Committee (clockwise) Nathan Gale, Valerio Corniani, Adrian Broadbent, Rob Tulk, Rozetta Payne, Alan Taylor, Anne Simpson, Graham Taylor and Phil Helmore
(Photo courtesy Shanghai Stories restaurant)

Chief Executive Visits Sydney Companies

The Chief Executive of RINA, Trevor Blakeley, accompanied by the Chair of the NSW Section, Alan Taylor, visited a number of companies in the Sydney basin to talk to the naval architects about membership of RINA, general news relating to RINA, the new headquarters building in London, internationalism, and chartered (CEng) status. Discussions also included renewal of membership for lapsed members, and the placement of students for industrial training during university vacations.

Companies visited included Det Norske Veritas at North Sydney and Burness Corlett Three Quays at North Ryde on 7 March, and Incat Crowther at Belrose on 8 March.

Alan Taylor

Chief Executive Visits UNSW

The Chief Executive of RINA, Trevor Blakeley, visited the University of New South Wales on 8 March and made a presentation to the naval architecture students and staff on RINA, what it is, what it does, and the benefits of becoming a member and achieving chartered status.

Following the presentation, Trevor enjoyed lunch at the UNSW Restaurant with Lawry Doctors, Mac Chowdhury, and Phil Helmore.

Committee Meetings

The NSW Section Committee met on 13 February and, other than routine matters, discussed:

- SMIX Bash: Letters of appreciation to sponsors have been drafted and will be sent shortly.
- TM Program 2013: Four of the five presentations to be organised by RINA this year have been arranged; one to come for September and ideas were canvassed, to be followed up.

- Visit of RINA Chief Executive to NSW Section: Arrangements finalised for CE's visit to the Section.

The NSW Section Committee also met on 25 March and, other than routine matters, discussed:

- SMIX Bash: Accounts have been finalised, leaving a small surplus to be shared with IMarEST.
- TM Program 2013: Two presentations have been secured for September; one to be postponed to the AGM in 2014.

The next meeting of the NSW Section Committee is scheduled for 13 May.

Maintaining the LHDs in Class

Adrian Broadbent, Lead Specialist, Naval Business, with Lloyd's Register Asia, gave a presentation on *Maintaining the LHDs in Class* to a joint meeting with the IMarEST attended by 56 on 6 March in the Harricks Auditorium at Engineers Australia, Chatswood.

This was the highest attendance of the 61 technical meetings held since Engineers Australia moved from North Sydney to Chatswood in June 2006 (the next highest being 46 at Steve Quigley and Rob Tulk's presentation on *Design and Construction of Cutting-edge Vessels* in August 2007), and the eighth-highest of the 129 technical meetings held since the formation of the NSW Section in October 1998 (the record attendance of 68 being held by Grahame Parker's presentation on *Design and Construction of Sydney's SuperCats* in February 2001.

Introduction

Adrian began his presentation by saying that his was *not* a show by a one-man band, but that he had been working closely with CAPT Peter Mingay, Director of the LHD Ship Systems Program Office (SSPO) and Mr Dean Cos, Classification Manager for the LHDs, and introduced them both.

CAPT Peter Mingay said that his SSPO was based in Canberra, and that they expected to be operating the first LHD, HMAS *Canberra,* by this time next year. Lloyd's Register (LR) has gone into the planning for class for the LHDs but, as yet, no decision has been made on which classification society would provide class for these vessels.

The Navy Capability Committee in 2009 advised that ship capability was based on four pillars of sustainment:

- a continuous extended maintenance program, where the maintenance tasks which were outside the capability of ship's staff would be performed by external suppliers;
- incremental component replacement to address obsolescence caused by having commercial-off-the-shelf (COTS) equipment;
- maintenance in class offers the Royal Australian Navy (RAN) third-party external assurance of the safety of the ship and equipment (this is especially relevant for the LHDs because they have a large component of COTS equipment); and
- use of integrated teams to enable the growth of Navy expertise.

Mr Dean Cos said that his unit is part of the LHD SSPO and is responsible for the maintenance of the LHDs in class. The decision was taken eighteen months ago, and it was decided to prepare for class, and LR was engaged to provide advice. The LHDs are largely commercial vessels, with lots of COTS components. The Rizzo report of July 2011 made 24 recommendations, and Recommendation 15 was that Navy needed third-party assurance of the safety of the ship and equipment (a classification society was not stated, but could certainly provide this service). Chief of Navy's signal of 27 September 2011 appointed the flag administrator and directed that the LHDs would enter and be kept in class.

The LHDs

Adrian then showed a slide of the launching of HMAS *Canberra* by Navantia at Ferrol in northern Spain on 17 February 2011.

These vessels are a major change for the RAN, involving new technology: gas turbines driving electric generators, high-voltage power generation (which gives rise to safety issues), electric-pod propulsion on a ship this size; all of these are drivers for a new way of doing things. On the LHDs, the landing craft are docked inside the vessel. The RAN recently acquired HMAS *Choules* to provide an introduction to this type of vessel and learn how to operate them. These vessels operate four helicopters (compared to the FFGs which operate one); four is more complex, and air-traffic control issues are new to the RAN. There are new technology and operational issues. The RAN will need support from lots of others.

Principal particulars of the vessels are

Length OA		230.8 m
Breadth		32.0 m
Depth	(flight deck)	27.5 m
Draft	(transit)	6.8 m
	(docked down)	10.0 m
Displacement		27 831 t
Power	(diesel)	2×7500 kW
	(gas turbine)	1×22 500 kW
Crew		358
Embarked personnel		1046
Aircraft	(flight deck)	6 landing spots
	(hangar)	16–24 aircraft
Light vehicle garage		1889 m^2
Heavy vehicle garage		1410 m^2
Dock capacity		4×24 m landing craft

How to Achieve 40-year Life?

The RAN wants to achieve a 40-year life of the LHDs. How can they achieve this goal? LR has proposed a three-pronged approach:

- Provide certification of original equipment to a known standard, e.g. for life-saving, fire protection and control, etc.
- Ensure that maintenance is completed to retain the certification basis (maintenance was not kept up on the LPAs and HMAS *Tobruk*).
- This can be done through the use of the Naval Ship Code (a naval version of SOLAS) and an independent classification society.

Some relevant quotes are as follows:

> "The Chief of Navy should develop, and direct compliance with, a policy on the use of Classification

Societies, or other expert third-party surveyors, to establish independent quality assurance for all Navy vessels, during design, construction and operation"

Rizzo Report, July 2011, Recommendation No. 15

"Navy, in collaboration with DMO, should introduce a cultural change program that promotes technical integrity as a key enabler of operations."

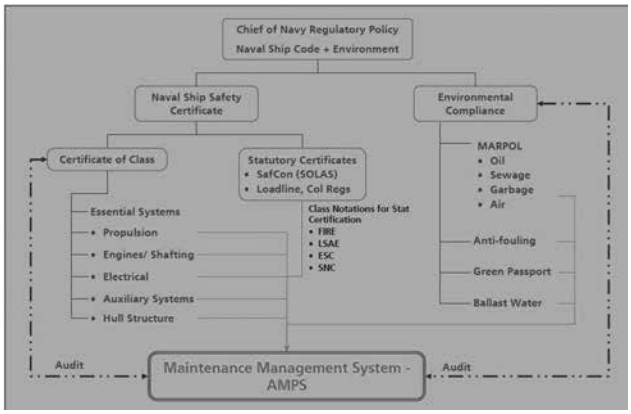
Rizzo Report, July 2011, Recommendation No. 21

"The ANAO recommends that …… Navy and DMO seek an early agreement on the arrangements for the Navy Flag Authority."

Australian National Audit Office Report No. 57, 2010–11, Recommendation No.7

Leveraging Maintenance to Satisfy the Regulator

Here Adrian Showed a flowchart to illustrate how the various certificates relate to each other.



Leveraging maintenance to satisfy the regulator
(Image courtesy Adrian Broadbent)

All of this is held together by the maintenance management system.

What is Classification?

Classification is a process to assure stakeholders that a ship or other marine platform complies with a set of rules or other technical standards that have been shown to be appropriate for the function of the ship or platform. It us achieved by an independent audit of the design, equipment and material supply, construction, and through-life maintenance. Knowledge gained from the activities of the classification society is used to maintain and develop the society's rules and inform other bodies publishing technical standards of their effectiveness in use.

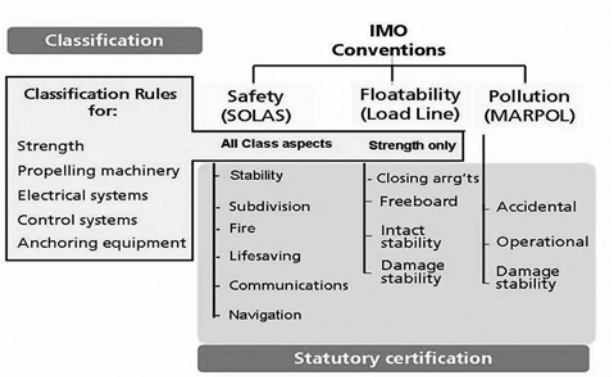
The classification cycle involves the approval of plans and equipment in accordance with rules, survey during construction, preparation of as-built plans, service, and then feedback from service and research informing the further development of rules.

Classification has a role to play in the implementation of IMO conventions, and here Adrian showed a slide illustrating the relationship between them.

The Naval Ship Code

Commercial ships use classification for hull and machinery and statutory IMO regulations for fire, lifesaving, navigation, load line, etc.

The RAN's Chief of Navy signal of 27 September 2011 established the Naval Flag Administrator and adopted the



The relationship between classification and IMO conventions
(Image courtesy Adrian Broadbent)

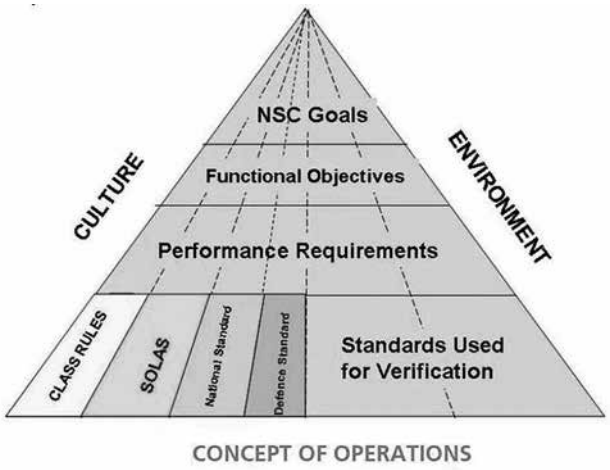
Naval Ship Code (a NATO document).

The Naval Ship Safety Certificate (NSSC) certifies that:

- survey showed that the condition of the ship was satisfactory and the ship complied with the Naval Flag Administrator requirements; and
- the ship is certified to operate in the environmental conditions specified in the annex to the certificate.

The Naval Ship Code is not prescriptive like SOLAS, but allows the use of individual equivalent solutions. This does not imply "fit for purpose", because this involves operational issues as well.

Here Adrian showed a diagram of the goal, objectives, requirements and standards involved in the Naval Ship Code.



Goals, objectives, requirements and standards
in the Naval Ship Code
(Image courtesy Adrian Broadbent)

The Naval Ship Code has ten chapters and an annex, and specifies "deemed to satisfy" verification standards.

Chapter	Title	"Deemed to satisfy" Verification standards
I	General Provisions	
II	Structure	Naval Ship Rules
III	Buoyancy, Stability and Controllability	SOLAS Ch II-1 Load Line and Def(Aust) 5000
IV	Engineering Systems	Naval Ship Rules
V	Not used	
VI	Fire Safety	SOLAS Ch II-2
VII	Escape, Evacuation and Rescue	SOLAS Ch III and Naval requirements
VIII	Radiocommunications	SOLAS
IX	Navigation and Seamanship	SOLAS Ch V and COLREGS
X	Dangerous Cargoes	Dangerous Goods Code
Annex	Guide to Naval Ship Code	

The Naval Ship Code is available for free download from the Internet, but is approximately 800 pages!

The LHDs will be delivered as full commercial vessels, so to comply with the Naval Ship Code, deemed-to-satisfy

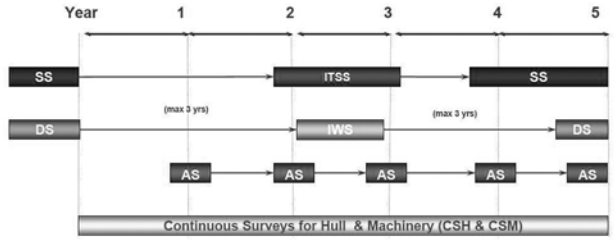
solutions can be dropped in, e.g. class rules for structure, DEF(Aust) 5000 for buoyancy and stability, NSC for engineering systems, SOLAS Ch II for fire safety, etc.

The Spanish navy has sent their vessel *Cantabria* to Australia to work with the RAN. Theirs is a different culture, and they have a different way of working. For example, the tropical and Antarctic conditions which Australians must face are very different to the Spanish working in the Mediterranean.

The concept of operations is set out in the annex to define how the ship is to operate, and sets the boundaries, but gives flexibility to meet individual requirements.

LHD Survey Cycle

Here Adrian showed a slide of the proposed survey cycle for the LHDs.



Proposed survey cycle for the LHDs
(Image courtesy Adrian Broadbent)

There are approximately 1200 items to be surveyed on an LHD so, over a five-year docking cycle, that means one or two items per day! Whenever the ship is available, then someone must be surveying.

Supporting documents for the survey of the LHDs include:

- Master List of Surveyable Items: Items to be surveyed (included in Maintenance-in-Class Manual).
- Tailoring Document: Rule interpretations for the LHDs, including the agreed waivers and exemptions.
- Certification Basis: Agreed technical standards that that vessel is being certified against
- Equipment Certification Matrix: Certificate requirements for every item of classed equipment (included in Maintenance-in-Class Manual).

Who Does the Surveys?

Consider the surveys necessary for HMAS *Tobruk*:

Hull	Class and Naval hull surveyors
Watertight integrity	Class and Naval hull surveyors
Machinery	Class and Fleet
Safety Equipment	Ship staff and Fleet
Fire Safety	Fleet
Navigation	Fleet (Sea Training Group)

The surveys proposed for the LHDs are as follows:

Hull	)
Watertight integrity	)
Machinery	) Class, supported
Safety Equipment	) by authorised RAN
Fire Safety	) and contract inspectors
Navigation	)

Medical, aviation, magazines and combat systems by specialist survey groups

This provides independent assurance to the Chief of Navy.

Conclusion

In order to achieve a 40-year life for the LHDs, the RAN will need to:

- adopt the Naval Ship Code for the LHDs;
- use a single survey authority for platform surveys and certification; and
- ensure that AMPS is fully populated to support the Assurance process

Questions

Question time was lengthy and elicited some further interesting points.

Entering the LHDs into class covers about 80% of the traditional safety case; the safety case does not consider everything—it all depends on how the safety case is treated. The vessels were, in fact, designed with the safety case in mind; there is a lot of work going on in that area.

Safety cases are useful in and of themselves, but class can feed in a lot to the safety case. The offshore sector uses class and the safety case a lot. The safety case is quite succinct, and is used on a daily basis. The safety case picks up the operational stuff, which class doesn't.

Newbuildings are 100% inspected, but commercial vessels are not 100% inspected in operation; there is always sampling. However, every tank (for example) would be inspected at least once in every five-year survey cycle. The sampling regime can be amended to suit the particular case.

The design of the LHDs was fully appraised by the London office of LR, and they were also involved at the tendering stage of the landing craft, to help develop the design to meet the Naval Ship Rules.

LR is already involved in a transfer of expertise. Bob Simpson from the London office of LR spent 18 months in Sydney and can reach back into previous naval vessel approvals for guidance.

When asked were the LHDs opting for condition monitoring or inspection, Adrian indicated that LR is open to whatever the Navy wants.

There is no shock notation for class.

The vote of thanks was proposed, and the "thank you" bottle of wine presented, by the Chief Executive, Trevor Blakeley, who said that the presentation had given a fascinating insight to the relationship between class and the Navy, for the benefit of both. The vote was carried with acclamation.

Adrian's presentation was not recorded by Engineers Australia.

Revision of the National Standard for Commercial Vessels

Adam Brancher, Manager Standards and Operations in the Domestic Vessel Division of the Australian Maritime Safety Authority, gave a presentation on *Revision of the National Standard for Commercial Vessels* to a joint meeting with the IMarEST attended by 19 on 3 April in the Harricks Auditorium at Engineers Australia, Chatswood.

Introduction

Adam began his presentation by saying that his presentation would be structured around two key issues; what is happening now (and should have been done at federation), and how to achieve the aims of the national reform, highlighting the challenges and opportunities.

Maritime Reform

There is a number of drivers for the maritime reform which was started in 2007 by the incoming government.:

- The Navigation Act 2012 implements Australia's obligations under international conventions for vessels which travel outside the EEZ and foreign vessels in Australian waters as of 1 July 2013.
- The Marine Safety (Domestic Commercial Vessel) National Law Act 2012 (National Law) establishes the National System for Australian commercial vessels which operate domestically (within the EEZ) as of 1 July 2013.
- The Maritime Labour Convention enters into force in August 2013.
- The Australian International Shipping Register entered into force in July 2012.

The two acts establish a clear and coherent national approach to the regulation of commercial vessels and complement each other. The Navigation Act 2012 applies predominantly to those vessels to which the international conventions apply, including Australian vessels which travel beyond the EEZ and foreign vessels in Australian waters. The National Law establishes requirements for Australian commercial vessels which operate domestically. Unlike the Navigation Act 1912, the Navigation Act 2012 is not voyage-based, meaning that vessels will not move between different pieces of legislation depending on what type of voyage they are undertaking. The previous system of voyage-based determinations created costs and uncertainty for both government and industry.

The National System for Commercial Vessel Safety

The fundamentals of the new system are that there will be *one regulator* (the Australian Maritime Safety Authority), *one law* (the Commonwealth's National Law Act), and *one system* implementing agreed national standards. Having one set of national rules promotes clarity and consistency, and there will be no barriers to domestic commercial vessels and qualified seafarers moving freely around Australia.

Clearly, there will need to be transitional arrangements and these will apply between 2013 and 2016. The golden principle will be that, as of 1 July 2013, vessels can operate the same way as on 30 June 2013, and "grandfathering" lasts for ever; i.e. there will be no retrospective application of the new standards.. However, if the operation of a vessel changes in any way, then it will need to comply with the new standards.

Role of States/NT in Service Delivery

The role of the states and the Northern Territory maritime safety agencies will be the "same service, same people". Their staff will deliver the National System as delegates of the National System. Business rules and agreed processes should maximise nationally-consistent product.

What is Covered Where under the New Arrangements

State/NT Law	National Law	Navigation Act
Recreational vessels	Domestic vessels used for commercial, government or research activity in Australian waters	Foreign-flagged vessels
Other vessels not captured by National Law (e.g. inflatable rafts) or Navigation Act		Australian vessels leaving EEZ
		Australian vessels with certification for unrestricted Navigation Act operations
		Australian vessels which apply to AMSA to opt in

Elements of the National Law Act

The National Law Act covers:

Certificate Requirements:

- Certificate of Survey;
- Certificate of Operation — linked to Vessel Safety Management System; and
- Certificate of Competency.

Vessel identification.

General safety duties.

Assistance and reporting obligations.

Marine safety inspectors' powers.

General provisions dealing with review of national regulator decisions.

AMSA Domestic Vessel Division

AMSA's Domestic Vessel Division is responsible for domestic vessels (out to the EEZ), domestic seafarer qualifications and domestic vessel safety management systems. It applies the National Law, the regulations, and administers the National Standard for Commercial Vessels, and the National Standard for the Administration of Marine Safety. It has a compliance and enforcement function and an education function. Most importantly, it will be responsible for a whole-of-industry and regulatory cultural change which will be manifold, including shifting a prescriptive regulation base to a proactive responsibility base.

The Challenge in the Standards

The standards embodied in the NSCV pre-date the National Law. Because this is the case, they have quasi-regulatory aspects which are no longer necessary. The NSCV standards are not consistently applied at present. However, AMSA is attempting to address this by providing on-line calculator tools, similar to those on the NSW Roads and Maritime Services website. The NSCV is a great concept in that it specifies the required outcome, then gives a deemed-to-satisfy way of achieving the outcome, but allows innovation through the use of equivalent solutions. The NSCV was initially very clearly written and unambiguous. However, it has subsequently attracted some criticism of some sections. Most sections, however, are due for review and require technical updating to cope with emerging trends.

Common Tasks

Tasks common to most sections include alignment with the National Law (this is internal work), re-drafting and style changes (also internal work), evaluation and incorporation of issues identified (this will be done by the reference groups), alignment with international best practice (this is the domain of internal research and reference groups) and, finally, to consult widely.

Standards Work Plan

Here Adam showed a slide of the proposed work plan for various sections of the NSCV, broken into 31 separate tasks, with the most important 17 to be completed by February 2014, the next seven by February 2015, and the remaining seven to be completed by February 2016.

Opportunities

The revision of the NSCV opens up opportunities to:

- revise the construction standard to allow other standards for smaller craft, such as ISO or Asutralian Standards, etc.;
- increase the size limit for non-classed craft to, say 54 m;
- align better with the Large Commercial yacht Code LY3 of the UK's Maritime and Coastguard Agency and other codes; and
- revision of the fire standard.

How can You Influence the Revision?

You can influence the revision directly in a number of ways: you can become a panel member or, better, a panel chair; you can comment on the draft standards as they are issued; you can make a submission at any time on any subject; or you could become involved via paid consultancy on specialist topics. Any of these can be done either as detailed via the AMSA website or directly to adam.brancher@amsa.gov.au.

Questions

Question time elicited some further interesting points.

Some rules really do need overhaul. There is the 1200 rpm rule (carried over from the USL Code) which states that if a vessel is of length exceeding 35 m, proceeds more than 30 n miles to sea and has engines which rotate at more than 1200 rpm, then the engineer must be rated to take charge of the power of one engine. However, if the engines rotate at less than 1200 rpm, then the engineer must be rated to take charge of the total power of all engines! Try explaining that to an overseas designer or builder!

The approval of drawings for new vessels will not be done centrally by AMSA, but will be done by the state/NT survey authorities. However, there will be no local anomalies, because they will all be working to the one set of rules (the NSCV) and under the administration of AMSA.

AMSA cannot set fees for the states/NT to charge; the states/NT will be able to set their own fees and timescales for approval. This could well become a competitive area.

The National Marine Safety Committee (and its website) will cease to exist on 1 June 2013.The National Law commences on 1 July 2013, so there will be a one-month gap. However, the USL Code is still referred to (e.g. Section 7 Load Lines). The sections of the USL Code, currently available on the NMSC website, will therefore be available on AMSA's website after 1 June 2013.

The vote of thanks was proposed, and the "thank you" bottle of wine presented, by Neil Edwards. The vote was carried with acclamation.

Adam's presentation was recorded by Engineers Australia and is available as a webcast at www.mediavisionz.com/ea/2013/easyd/130403-easyd/index.htm.

A Low-cost Vehicle/passenger Ferry

Clive Evans of Lightning Naval Architecture gave a presentation on *Development of a Low-cost Vehicle/Passenger Ferry in Response to Increased Competition from Air Travel in South-east Asia* to a joint meeting with the IMarEST attended by 17 on 1 May in the Harricks Auditorium at Engineers Australia, Chatswood.

Clive's paper was included in the proceedings of the International Conference on Ship and Offshore Technology: Developments in Ship Design and Construction held in Ambon, Indonesia, 7–8 November 2012, and is published elsewhere in this issue.

The vote of thanks was proposed, and the "thank you" bottle of wine presented, by Adrian Broadbent. The vote was carried with acclamation.

Clive's presentation was recorded by Engineers Australia and is available as a webcast at www.mediavisionz.com/ea/2013/easyd/130501-easyd/index.htm.

Phil Helmore

CLASSIFICATION SOCIETY NEWS

Gas Technology Report Issued by Lloyd's Register

Adoption of, and interest in, LNG as fuel for ships is gathering pace, but the challenge is as much in safe bunkering and port operations as in ship design: LNG bunkering guidance is one of the key subjects addressed in LR's latest *Gas Technology Report*.

The growth in gas production is important for shipping and LR's gas technology insight into the issues being faced today is more relevant than ever.

"It has been a big year so far for gas in shipping," comments Luis Benito, LR's Global Marine Marketing Manager. "We are seeing robust demand for LNG carriers; the world's biggest LNG-fuelled passenger ship, the LR classed *Viking Grace,* is now in operation in the Baltic Sea carrying 2 800 passengers; we have a growing number of gas-as-fuel projects underway or maturing; and late last month Shell took delivery of a brand-new inland waterway tanker. Our marine stakeholders are looking to understand how to manage the risks involved with gas. We have the experience and the expertise to help them make informed decisions whether they are looking for off-the-shelf solutions or first principles."

As the *Viking Grace* operations show, the port operations are as important as those onboard ship. LR's LNG bunkering guidance can help ports worldwide address the risks involved.

"This is a critical area," says Benito. "When you have large centres of population and passenger and freight operations underway, all stakeholders need to put themselves in a position where they can make commercial decisions on the basis that they have addressed the risks involved. Having been involved with LNG in marine operations from the very beginning, we are well positioned to advise all in the marine supply chain—whether you are looking to transport LNG or LPG, use gas as a marine fuel, or examining safe bunkering and port operations—we can help."

The report also looks at the potential for methanol as a marine fuel—and methanol can be manufactured from LNG. As Benito concludes, "Gas has a big future, but there are more options than just LNG. Methanol and other alternatives that can be developed from natural gas today, and from bio-sources at some point in the future, are also worth looking at."

The report can be downloaded from www.lr.org/gas.

Global Marine Trends 2030

Lloyd's Register, Qinetiq and Strathclyde University released *Global Marine Trends 2030*, a report based on two years of research into the future of the maritime industries in launch events held in both Singapore and London to maximise the potential number of attendees and the reach of the launch.

The report indicates that 2030 could usher in a world where China would own a quarter of the merchant fleet. Almost half of offshore oil is taken from the deepest waters and there are 100 times as many offshore wind platforms. The tanker fleet grows the slowest of all the major ship types, and the number of containerships with a capacity that exceeds 7 600 TEU grows three times faster than those below that threshold.

These are just some highlights in a vast report with insight into all key areas related to maritime operations.

The GMT 2030 team used three scenarios to model the future. These scenarios, using three key drivers—population growth, economic development and demand for resources—describe what maritime trade, sea power and the offshore energy sectors could look like in 2030.

The three scenarios are:

Status Quo—The world will continue its current growth momentum with some booms and busts over the next twenty years.

Global Commons—A shift to concern over resource limitation and environmental degradation will see a desire for a more sustainable world being developed and fairness in wealth distribution. Governments will find common ground and accelerated economic growth, within a framework of sustainable development, which will follow.

Competing Nations—States act in their own national interest. There will be little effort to forge agreement amongst governments for sustainable development and international norms. This is a self-interest and zero-sum world with a likely rise in protectionism and slower economic growth.

Richard Sadler, Lloyd's Register's CEO, said "What is striking is that, even in the most negative of the scenarios envisaged, maritime growth is strong. For anyone looking for a future in an important sector, they have to consider maritime: whether for employment, investment or an understanding that, without seaborne trade, offshore energy and naval power, the geopolitics of tomorrow will be highly fragile and the quality of life precarious. The sea and its industries are vital for our global future."

The report team also included disruptive factors which could radically alter the likelihood of the scenario results. But, barring cataclysmic change, the China factor will still be the big story in 2030. China, consuming three times-as-much oil as it does today and 60% of the world's coal, will be the marketplace for maritime trade. The United States will, however, be the biggest consumer of natural gas and the report indicates, in a substantial section on naval power, that American military power on the oceans will remain pre-eminent.

To read the report, go to www.lr.org/gmt2030

First LNG-electric IWW Vessel Christened in The Netherlands

On 15 March the first LNG-electric inland waterways (IWW) tanker, *Greenstream,* was christened at Peters Shipyard in Kampen, The Netherlands. The vessel was christened by Daniella Voser, the wife of Peter Voser, the president of Shell. Shell has chartered the vessel for ten years from owner Interstream.

In his speech, Mr Voser said that Shell is moving towards being a gas company rather than an oil company and, therefore, they foresee a bright future for the use of LNG in the shipping industry.

The vessel is classed as a chemical tanker but will be used

to transport lighter oil products. It has six cargo tanks which can load two different cargoes at the same time.

There are two independent LNG fuel tanks situated on the aft deck. Also on the aft deck, two independent machinery spaces each with two Scania gas generators installed. The two aft thrusters and the bow thruster are electrically driven. The capacity of the LNG tanks is calculated for a trip from Rotterdam to Basel and back on one tank. The bunkering will be done by trucks as long as there are no other bunkering facilities available.

The whole design of the vessel is completely different from what is usual on IWW tankers. The most significant change is the wheelhouse and the accommodation, which are situated in the fore part of the ship.

The underwater part of the hull is newly designed, and the strengthened side shell is of a new design.

Greenstream is the first vessel of a series of at least four sister vessels.

Chris Hughes

COMING EVENTS

NSW Section Technical Meetings

Technical meetings are generally combined with the Sydney Branch of the IMarEST and held on the first Wednesday of each month at Engineers Australia, 8 Thomas St, Chatswood, starting at 6:00 pm for 6:30 pm and finishing by 8:00 pm.

The program of meetings remaining for 2013 (with exceptions noted) is as follows:

5 Jun	IMarEST
3 Jul	Matt Duff, ASO Marine Consultants *Conversion of a Gas Carrier to an FPSO*
7 Aug	IMarEST
4 Sep	Elliot Thompson, Department of Defence *Application of the IMO's Energy Efficiency Design Index to Naval Vessels*
2 Oct	Drew Shannon, Consultant *Salvage of the Vessel* Rena *in New Zealand*
5 Dec	SMIX Bash

RAN 100th Anniversary International Fleet Review

On 4 October 1913 the first Royal Australian fleet entered Sydney Harbour led by battlecruiser HMAS *Australia*, followed by cruisers HMAS *Melbourne*, *Sydney* and *Encounter* and destroyers HMAS *Warrego*, *Parramatta* and *Yarra*. Many of the vessels featured in this historic event were newly commissioned for the Royal Australian Navy, including HMAS *Australia*. On the steps of Admiralty house, Admiral Sir George King-Hall, the last flag officer of the Royal Navy's Australian Station handed over command of the Australian station to the Royal Australian Navy.

In order to mark the 100th Anniversary, the Royal Australian Navy will hold an International Fleet Review of participating vessels in early October 2013. Proposed events include:

Late Sept	RAN and International naval vessels rendezvous in Jervis Bay
Wed 2 Oct	Briefing and preparations for review
Thu 3	Tall ships (up to twenty expected) entry to Sydney Harbour
Fri 4	Fleet entry to Sydney Harbour
Sat 5	International Fleet Review, followed by pyrotechnics/light display in the evening
Sun 6	Religious services and ships open for inspection

For further details of planned events visit www.navy.gov.au/event/international-fleet-review-2013 or contact CAPT Nick Bramwell at nick.bramwell@defence.gov.au.

The Pacific 2013 International Maritime Exposition and Congress will be held at the Sydney Convention and Exhibition Centre in Darling Harbour from Monday 7 to Wednesday 9 October 2013. It will include:

- The International Maritime and Naval Exposition, organised by Maritime Australia Ltd, to be held from Monday 7 to Wednesday 9 October.
- The Royal Australian Navy Sea Power Conference 2013, organised by the Royal Australian Navy and the Sea Power Centre — Australia, to be held from Monday 7 to Wednesday 9 October.
- The International Maritime Conference, organised by the Royal Institution of Naval Architects, the Institute of Marine Engineering, Science and Technology, and Engineers Australia, to be held from Monday 7 to Wednesday 9 October.

Pacific 2013 IMC

The Pacific 2013 International Maritime Conference, organised by the Royal Institution of Naval Architects, the Institute of Marine Engineering, Science and Technology, and Engineers Australia, will be held from Monday 7 to Wednesday 9 October.

The remaining timescale for submission of papers for the International Maritime Conference is as follows:

Deadline for submission of refereed papers	15 July
Deadline for submission of non-refereed papers	5 August
Deadline for presenter and early-bird registration	5 August

For any queries on submission of papers, contact the Chair of the IMC Papers Committee, Adrian Broadbent, at adrian.broadbent@lr.org.

Further information on the conference, including the conference and social programs, can be obtained from the conference website www.pacific2013imc.com or by contacting the conference organisers, arinex Pty Ltd GPO Box 128, Sydney, NSW 2001, phone (02) 9265 0700, fax (02) 9267 5443 or email pacific2013imc@arinex.com.au.

The Pacific 2016 International Maritime Exposition and Conferences are expected to be held, as usual, in late January–early February 2016.

ORGANISED BY

The Royal Institution of Naval Architects

Institute of Marine Engineering, Science & Technology IMAREST

ENGINEERS AUSTRALIA

PACIFIC 2013
International Maritime Conference

7 – 9 OCTOBER 2013
SYDNEY CONVENTION & EXHIBITION CENTRE
DARLING HARBOUR, SYDNEY, AUSTRALIA

PRELIMINARY PROGRAM CONFIRMED

MARK THE KEY DATES IN YOUR DIARY!

Abstract Submission: Now closed

Registration: Now open

Abstract Submission Deadline: Now closed

Author Acceptance Notification: April 2013

Refereed Papers Submission deadline: 15 July 2013

Full Paper Submission Deadline: 5 August 2013

Presenter Registration Deadline: 5 August 2013

PACIFIC 2013 INTERNATIONAL MARITIME CONFERENCE gratefully acknowledges Maritime Australia as the Principal Partner.

MARITIME AUSTRALIA LIMITED

Pacific 2013 Maritime Congress comprising:
- Pacific 2013 International Maritime Conference
- RAN Sea Power Conference 2013

In association with the **Pacific 2013 International Maritime Exposition**
Organised by Maritime Australia Ltd

Register on the website www.pacific2013imc.com

KEYNOTE SPEAKERS

Rear Admiral Michael Uzzell AM RAN
Head Navy Engineering, Navy Strategic Command

Janis Cocking Chief of Maritime Platforms Division (MPD), DSTO

Rear Admiral Bob Love CB OBE RN (Rtd)
Deputy CEO Babcock Australia Ltd

In addition to the keynote speaker presentations, Rear Admiral Mark Purcell RAN will host the Naval Shipbuilding Quadrilateral Panel Discussion with representatives from the UK, US and Canadian Navies.

PRELIMINARY PROGRAM CONFIRMED

The International Maritime Conference will have 70 papers arranged in two streams of parallel sessions so as to give registrants a wide choice of papers. The Program includes three Keynote Addresses and a panel discussion with members of the Naval Shipbuilding Quadrilateral.

Registrants to the Pacific 2013 International Maritime Conference will be issued with the Proceedings of the conference in CD-Rom format at the Registration Desk.

The Sessions will cover the following topics:

- Commercial Ship Technology
- Naval Ship Technology
- Submarine Technology
- Commercial Ship Operations
- Maritime Safety
- Maritime Environment Protection
- Offshore Resource Industry

For more information contact Pacific 2013 IMC Managers
Managed by arinex **pty ltd**: Level 10, 51 Druitt St Sydney NSW 2000
P: +61 2 9265 0700 E: pacific2013imc@arinex.com.au
W: www.pacific2013imc.com

Images courtesy Department of Defence and Australian Customs and Border Protection Service

To view the program and to register visit...
www.pacific2013imc.com

The 2013 Defence White Paper

The 2013 White Paper released on 3 May 2013 outlines the capabilities that the Australian Defence Force will need in the coming years to address strategic challenges.

Maintaining a capable ADF, including through appropriate force posture and preparedness settings, is central to Australia's continued effectiveness in contributing to sustainable security in our region.

The Government affirmed its committment to ensuring that the Australian Defence Force has the capability and culture which it needs to effectively serve Australia's national security interests.

It intends to ensure that we have one of the most capable military forces in the region to protect Australia's strategic interests, support regional security and to undertake the four priority tasks required of it by Government:

- Principal Task One: deter and defeat armed attacks on Australia;
- Principal Task Two: contribute to stability and security in the South Pacific and Timor-Leste;
- Principal Task Three: contribute to military contingencies in the Indo-Pacific region, with priority given to Southeast Asia; and
- Principal Task Four: contribute to military contingencies in support of global security.

To provide the future force to meet these tasks, the Government remains committed to delivering the core capabilities identified in the 2009 Defence White Paper.

Since 2009, the Government has approved more than 125 proposals for new or enhanced defence capabilities with a total value of over $17.3 billion. Over this period, Defence has taken delivery of a number of major systems, including C-17 heavy lift aircraft, F/A-18F Super Hornet combat aircraft, Bushmaster protected mobility vehicles and two large amphibious/sea lift vessels. By the end of this decade, the ADF will also take delivery of three air-warfare destroyers, two landing helicopter dock amphibious ships and the initial two F-35A Joint Strike Fighter aircraft.

Since 2009, the Government has also taken decisions to acquire or progress priority acquisitions including ten C-27J battlefield airlift aircraft, the EA-18G Growler electronic attack capability, Australia's new air-combat capability, the replacement land vehicle fleet and future submarine capability.

Building on these acquisitions, the 2012 Force Structure Review assessed capability priorities against the backdrop of Australia's contemporary strategic environment.

The review confirmed the need to deliver priority ADF capabilities for Navy, Army and Air Force within available resources in the near term, while continuing to progress enabling capabilities essential to the ADF being a capable, integrated joint force.

Examples of major planned acquisitions are outlined below.

Navy Capabilities

The Government remains committed to replacing the existing Collins-class submarines with an expanded fleet of 12 conventional submarines which will meet Australia's future strategic requirements. The future submarines will be assembled in South Australia.

The Government has taken the important decision to suspend further investigation of future submarine options based on military-off-the-shelf designs in favour of focussing resources on progressing an 'evolved Collins' and new-design options which are likely to best meet Australia's future strategic and capability requirements.

The Government intends to replace the capability currently provided by the supply ships HMAS *Success* and HMAS *Sirius* at the first possible opportunity. This will include examination of options for local, hybrid and overseas build or the leasing of an existing vessel. The Spanish Navy vessel *Cantabria* is assisting Australia's afloat support requirements while HMAS *Success* is in refit. This operational experience, along with other information and activity, will contribute to Defence's understanding of relevant capabilities as options are developed.

The Government will also bring forward the replacement of Australia's Armidale-class patrol boats, with both Australia's patrol boats and the Pacific patrol boats being replaced, preferably by proven designs. A multi-role vessel remains a possible longer-term project, subject to technological maturity and an ability to provide operational flexibility with lower costs of ownership.

Army Capabilities

The Government is committed to a range of capability improvements in order to ensure that land forces remain both highly credible and sustainable for their roles in support of the Principal Tasks.

In response to the increasing complexity and lethality of land operations, the Government is committed to acquiring deployable, protected and armoured vehicles offering improved firepower, protection and mobility compared to existing systems. This will include new medium and heavy trucks to replace Army's existing ageing fleet.

Air Force Capabilities

In 2012, the Government announced its commitment to acquiring the EA-18G Growler electronic attack aircraft capability based on converting 12 of Australia's current F/A-18F Super Hornet aircraft to Growlers.

The 2013 White Paper outlines the Government's decision to acquire 12 new-build EA-18G Growler aircraft. This decision will retain all 24 Super Hornets in their current air-combat and strike-capability configuration. This decision will assure Australia's air combat capability through the transition period to the Joint Strike Fighter.

The Government remains committed to acquiring the fifth-generation F-35A Joint Strike Fighter aircraft for Australia. Australia's existing Super Hornet aircraft, together with the future Growler and Joint Strike Fighter capabilities will provide a world-class air-combat force capable of controlling the air and electronic environments and conducting effective land and maritime strikes.

Joint Capabilities

The White Paper also outlines key areas for investment in capabilities which support the whole ADF, and Defence more generally. These include an enhanced amphibious capability based on the introduction of Australia's two new Canberra-class landing helicopter dock ships in the middle of this decade, and cyber, intelligence, communications, space situational awareness, command and control, and simulation capabilities.

Defence will also analyse the value of further investment in unmanned aircraft for focussed area, overland intelligence, surveillance and reconnaissance, including for use in border security operations. This will include the potential expansion of the role of these assets in the ADF to include interdiction and close air support, subject to policy development and Government consideration. Domestic and international policy and legal considerations will be important elements of any Australian consideration of armed unmanned aircraft in the future.

Additional details on the Government's plans for developing the future ADF will be provided in an updated four-year Defence Capability Plan and six-year Defence Capability Guide which will be released in coming months.

The Future Submarine Program

On 3 May the Prime Minister, Julia Gillard, Minister for Defence, Stephen Smith, and Minister for Defence Materiel, Mike Kelly, announced further steps that the Government has taken to progress the future submarine program.

The 2013 Defence White Paper highlights the strategic value and importance of Australia's submarine capability and confirms the Government's commitment to replacing the existing Collins-class fleet with an expanded fleet of 12 conventional submarines to be assembled in South Australia.

The future submarine project will be the largest and most complex Defence project ever undertaken by Australia. It is a capability design, construction and sustainment challenge of unprecedented scale and complexity, and will span decades.

The 2009 Defence White Paper outlined the Government's commitment to acquire 12 new submarines to be assembled in South Australia.

In May 2012, the Prime Minister and Minister for Defence announced that the Government would provide $214 million for the next stage of the future submarine program for detailed studies and analysis to inform the Government's decision on the design of Australia's next submarine. This funds the design, modelling, analysis and technology studies to examine in detail the options for the future submarine capability.

At the same time, the Government announced that it was considering four broad options for the future submarines:

- an existing submarine design available off-the-shelf, modified only to meet Australia's regulatory requirements;
- an existing off-the-shelf design modified to incorporate Australia's specific requirements, including in relation to combat systems and weapons;
- an evolved design that enhances the capabilities of existing off-the-shelf designs, including the Collins Class; and
- an entirely new developmental submarine.

The Government has now taken the important decision to suspend further investigation of the two future submarine options based on military-off-the-shelf designs in favour of focusing resources on progressing an 'evolved Collins' and new-design options which are likely to best meet Australia's future strategic and capability requirements.

The Government has also taken the important decision to use the United States AN/BYG-1 combat system as the reference system for future design work. The early definition of a combat system is a feature of a successful submarine program. It allows the submarine design to proceed utilising more accurate projections of space, weight and power requirements.

The Government has also directed further work on a new Submarine Propulsion Energy Support and Integration Facility in Adelaide. This land-based facility will substantially reduce risk in the future submarine program by providing the capability to research, integrate, assemble and test the propulsion and energy systems of the future submarine. Elements of the facility will also be located in Western Australia (where Navy will have easy access for training purposes) and Victoria (where DSTO maritime specialists are based).

The implementation of the project will require a sustained and coordinated national effort harnessing the knowledge, skills, expertise and lessons learned over the last 50 years of Australian submarine ownership. The success of the project will depend critically on close collaboration with Commonwealth and state agencies and strategic partners, along with Australian industrial capacity. In particular, the Government will continue close cooperation with the United States on developing undersea warfare capabilities.

The sustainment of the Collins-class submarines is an essential part of Australia's submarine capability. It is a complex task which has proven very challenging since the first Collins-class submarine, HMAS *Collins*, was commissioned in July 1996. The sixth and last of the Collins Class, HMAS *Rankin*, was commissioned in March 2003. The Collins Class was designed with a theoretical platform life of 28 years, which provides for an on-paper indicative service life for the fleet of 2024 to 2031.

A Service Life Evaluation Program was undertaken by Defence in 2012 to identify any issues that would prevent the Collins class from achieving their indicative service life. The study also considered the possibility of a service-life extension for the submarines.

The study found that there is no single technical issue which would fundamentally prevent the Collins-class submarines from achieving their indicative service life or a service life extension of one operating cycle which is currently around seven years, excluding docking periods.

Guided by outcomes of the Study into the Business of Sustaining Australia's Strategic Collins Class Submarine Capability, led by Mr John Coles, an extensive transformation program is being implemented.

Availability improvements are being achieved through a variety of mechanisms, including the delivery of more-efficient logistic-support arrangements, implementation of performance-based maintenance contracts with defence industry and development of a revised approach to the

programming of planned maintenance and usage.

This will increase the availability and reliability of the Collins class and ensure that the submarines will remain a viable capability until replaced by the future submarine.

Naval Shipbuilding Skills

On 3 May the Prime Minister, Julia Gillard, the Minister for Defence, Stephen Smith, the Minister for Climate Change, Industry and Innovation, Greg Combet, and the Minister for Defence Materiel, Mike Kelly, released the *Future Submarine Industry Skills Plan*.

The Government's response to the plan addresses key issues in the long-term management of the Australian naval shipbuilding industry.

The Government intends to assure Australia's maritime security capability while providing more certainty to Australian industry through consideration of a smoother, coordinated shipbuilding program which will provide a more stable pattern of work for the industry and retain critical skills for the future through a range of specific measures:

- In September 2012, the Ministers announced a change to the AWD construction schedule following extensive consultation with Australia's shipbuilding industry and Navy which involved extending the keel-to-keel interval to 18 months between each ship.
- The Air Warfare Destroyer Alliance will reallocate construction of four AWD steel hull blocks from the Forgacs shipyard in Newcastle to the BAE Systems shipyard in Melbourne. This recognises that BAE Systems has the capacity and skill to successfully take on an increased share of the workload. Additional work on existing hull blocks is being provided to Forgacs to ensure that there is no reduction of work in Newcastle.
- The Government will, at the earliest opportunity, replace Australia's supply ships HMAS *Success* and HMAS *Sirius*. This will include examination of options for local, hybrid and overseas build or the leasing of an existing vessel.
- The Government has brought forward the replacement of Australia's Armidale-class patrol boats, to be assembled in Australia.
- The Government will also give consideration to bringing forward the replacement of the current Anzac-class frigates with a new future frigate to be assembled in Australia. This will include further investment in the Australian-developed phased-array radar technology already in service in the Anzac-class frigates.
- The Government has also made key decisions on the future submarine program, including narrowing the options to be considered and has directed further work on a new Submarine Propulsion Energy Support and Integration Facility to be based in Adelaide.

HMAS *Dechaineux* leading HMAS *Waller* and HMAS *Sheean* during exercises in March this year
(RAN photograph)

- The Government will also implement the Future Submarine Industry Skills Plan.

In May 2012 the Government released the terms of reference for a plan to identify what is required to build and sustain the skills required to successfully deliver Australia's future submarine capability.

The plan was developed by the Chief Executive Officer of the Defence Materiel Organisation supported by an Expert Industry Panel, headed by Mr David Mortimer AO, which included the CEOs of the major ship construction companies and systems houses, unions, industry bodies and other government organisations.

The development of the plan was informed by research and benchmarking undertaken by the DMO team and expert industry advisers. It was the subject of broad consultation with State Governments, Australian industry, unions, industry associations and universities.

The Government considers that the Future Submarine Industry Skills Plan presents a practical long-term approach to the management of naval shipbuilding in Australia and sets out a new way for Defence to do business. It uses future naval shipbuilding projects as a way to improve skills and productivity in the shipbuilding industry, through practice and innovation.

The skills needed will include systems design, naval architecture, propulsion and combat-system engineering, production engineering, project planning and control, production scheduling, material procurement, risk management, budget control, financial accounting, contract management, systems integration, and trade skills such as welding, boilermaking, and electrical.

The plan makes eleven recommendations to develop and retain the skills needed to build the future submarines and other warships for the future fleet.

The Government supports the recommendations and is confident that the Australian naval shipbuilding industry will be truly world class. The Government will implement the Future Submarine Industry Skills Plan as it takes decisions on future naval platforms. In doing so, it will balance carefully the capability, resource, workforce and industry factors, as well as implications for competing funding priorities.

These recommendations include:

- Naval shipbuilding projects should be planned with the aim of retaining, wherever practical, current workforce skills to place Defence and industry in the best position possible at the start of the next generation of projects.
- Defence should structure the future submarine program as a rolling-build program, including establishing structured, funded and ongoing engineering and science and technology programs to deal progressively with equipment obsolescence and capability upgrades, and
- The Defence Materiel Organisation should engage in detailed discussion on a frequent and ongoing basis with companies, unions and industry groups involved in naval shipbuilding. No plan should be approved which is not broadly practical in terms of industry capability and capacity, schedule and budget.

The Government is committed to working with industry so that Australia will have a highly-capable and productive naval shipbuilding industry, capable of delivering the future warships the Australian Defence Force requires to fulfill the tasks requires of it by Government.

The plan is available at: www.defence.gov.au/dmo/publications/fsisp.cfm.

Australian Defence Posture

On 3 May the Prime Minister, Julia Gillard, and Minister for Defence, Stephen Smith, announced the Government's response to the *Australian Defence Force Posture Review*. In 2011, the Government commissioned the first major review of the ADF's posture in over 25 years, to assess whether the ADF is correctly geographically positioned to meet Australia's current and future strategic and security challenges.

The review was undertaken by Defence and overseen by an expert panel comprising Dr Allan Hawke and Mr Ric Smith, both former Defence Secretaries.

The Government released the final report of the Australian Defence Force Posture Review (ADF Posture Review) on 3 May 2012. The review concluded that the Australian Defence Force needs a force posture which can support operations in Australia's northern and western approaches, as well as operations with our partners in the wider Asia-Pacific region and the Indian Ocean rim.

The report found that our changing strategic environment does not require widespread changes in the location of our Defence force bases, but that some adjustments should be made to meet future needs.

The 2013 Defence White Paper outlines the principles underpinning Defence's force posture and the work directed by Government to implement the recommendations from the review and the associated Defence Estate Consolidation Project.

It reflects the Government's broader theme in the White Paper of responding actively to the strategic transformation in our region and making choices about our posture and capabilities over time within our fiscal constraints.

As the 2013 Defence White Paper highlights, the ADF's ability to deliver against its principal tasks and respond to contingencies as directed by Government depends as much on appropriate force posture and preparedness settings as it does on the structure and particular capabilities of the force.

The Government's implementation strategy for the review, as set out in the White Paper, will be achieved from within Defence's allocated resources as determined through the 2013–14 budget process. The White Paper notes that substantial progress has already been made in implementing many of the review's recommendations, including:

- ensuring greater visibility of the high levels of ADF activity in Australia's north-west;
- enhancing the ADF's presence in northern Australia;
- updating operational plans for defending the north;
- developing a better understanding of the ability of civil infrastructure and logistics capacity available to support ADF operations in the north-west;
- supporting border protection operations; and
- enhancing defence engagement with state and territory governments and industry.

Fred Olsen Cruise Line's *Balmoral* alongside at Fleet Base East on 27 February this year. Not surprisingly, the Defence White paper makes no concessions to the demands by the cruise industry for greater access to these berths (Photo John Jeremy)

Many other Review recommendations will be progressed and funded through the Defence Capability Plan and Defence Major Capital Facilities Program. The 2013 White Paper indicates that the Government will proceed with plans to:

- develop Fleet Base East as the home port for the landing helicopter dock ships and air-warfare destroyers;
- enhance Fleet Base West to support submarine and major surface-combatant capability and operations;
- implement infrastructure requirements (as they are refined) to support major future naval capabilities including the Future Submarine, Future Frigate, Offshore Patrol Vessel and the earlier replacement of the Armidale-class patrol boat;
- upgrade Royal Australian Air Force (RAAF) bases Tindal and Learmonth to enhance KC-30 air-to-air refuelling-tanker operations and Cocos (Keeling) Islands airfield facilities to support P-8A maritime surveillance aircraft operations;
- enhance RAAF bases Darwin, Edinburgh, Pearce and Townsville to support future P-8A operations (enhancements which will also support KC-30 aircraft operations); and
- upgrade airfields to support Joint Strike Fighter operations at RAAF bases Darwin, Tindal, Williamtown, Amberley, Edinburgh, Townsville, Learmonth, Curtin and Scherger.

The Government will also implement plans for enhancing amphibious mounting base capacity in Darwin and Townsville and, if required in future, will exercise commercial arrangements using existing infrastructure to allow large amphibious ships to embark ADF personnel based in Brisbane and Adelaide.

However, the Government has decided not to proceed at this time with the review's recommendation to build a second major fleet base on the east coast, and nor will a new major coastal ADF training area be acquired in the near term. Defence's more-detailed analysis of these options has revealed implementation challenges and high costs. Together, implementation of these two recommendations would cost in the order of $6–9 billion.

Defence has assessed that the existing fleet bases in Sydney and Perth will meet the Royal Australian Navy's needs for the foreseeable future. The problem of cruise ship berthing in Sydney remains under review.

RFT Issued for FFG GMC

On 7 May the Minister for Defence Materiel, Dr Mike Kelly, announced the release of the Group Maintenance Contract (GMC) Request for Tender for the Navy's Adelaide-class frigate (FFG) fleet.

"This is the second of the grouped-asset, long-term, performance-based contracts for the repair and maintenance of the Navy's major surface ships," Dr Kelly said.

"It demonstrates the Government's commitment, through the Defence Materiel Organisation (DMO), to transform the naval ship-repair sector and apply innovative contracting practices to get the best outcome for the Navy, for industry and for every Australian taxpayer.

"The DMO has now received all the technical clearances necessary to release the tender documentation to the three short-listed companies — BAE Systems, Rolls Royce/KBR and Thales Australia."

The contract will be for an initial five-year period, with the potential for rolling year-on-year contract extensions if contracted quality and service level requirements are met, and efficiencies are achieved, up until the life-of-type of the Adelaide class of ships.

This announcement followed the first Group Maintenance Contract, signed in May last year, for the repair and maintenance of the Navy's eight Anzac-class frigates.

"Already under the first contract with Naval Ship Management (Australia), a joint venture between Babcock and United Group Infrastructure, Defence is reporting savings on a like-for-like scope of work in the order of 20 percent," Dr Kelly said.

"We have long recognised that the grouping or 'batching' of ship-repair and maintenance events offers the potential for real savings by reducing the administrative burden of per-event tender contracting, providing greater certainty of revenue streams and work effort, and promoting better planning.

"This initiative will provide industry with the predictability and stability it needs to achieve efficiencies, to offer job security to its workforce and to invest in capital infrastructure."

The Group Maintenance Contract model also offers benefits to the Royal Australian Navy through improved forecasting and planning of maintenance localities and duration, and the opportunity to realise lower costs while achieving greater continuity in the repair and maintenance of its ships.

HMAS *Choules* returns to sea

HMAS *Choules* has returned to sea following sea assurance testing of the ship's six propulsion and power-distribution transformers which were replaced after a defect was identified in June 2012.

The ship then followed a graduated program of trials and training which concluded with a final successful readiness assessment on 12 April 2013.

Navy and the Defence Materiel Organisation have worked together to achieve this outcome. Air Force also assisted by transporting the transformers from Germany.

The ship will now participate in a number of minor amphibious exercises in North Queensland during May and June 2013 before joining other Navy ships in Exercise Talisman Sabre 13 off the Queensland coast.

HMAS *Choules* alongside in Cairns on 27 April
(RAN photograph)

First AWD Mast Delivered

On 2 April the Minister for Defence Materiel, Dr Mike Kelly, announced that the 22 metre-high mast for the first Air Warfare Destroyer (AWD) had been delivered to the Alliance in Adelaide.

Dr Kelly said the five-storey high mast, delivered by barge from local company, MG Engineering, further underscored Australia's shipbuilding credentials.

"This is an exciting day for the AWD project with the arrival of the mast for the first ship, *Hobart*," Dr Kelly said.

"The mast is one of the most defining features of the destroyers and will house significant elements of the Aegis weapon system, including the navigation radar and the SPQ-9B, or 'Spook' horizon-search radar.

"The equipment incorporated into the mast structure will enable the destroyers to search and track targets immediately above the sea surface, such as low-flying aircraft, unmanned aerial vehicles and missiles."

Dr Kelly said that the AWDs would be the most capable asset the Royal Australian Navy (RAN) had operated once assembly was complete.

"Seeing local Port Adelaide company, MG Engineering, delivering the first of three 25 t masts under its $3.25 million contract makes today's announcement even more significant. MG Engineering has hired an additional 12 production staff to undertake the AWD mast work over a two-year period, taking their total staff to 45," Dr Kelly said.

"The first mast was transported by barge down the Port River in a horizontal position and then unloaded in a logistical effort taking about three hours.

"Further work will now be carried out on the mast by the AWD Alliance at the Common User Facility adjacent to the ASC shipyard, prior to being consolidated onto the first destroyer."

First Cape-class Patrol Boat Officially Named

The first-of-class Cape-class patrol boat for the Australian Customs and Border Protection Service was officially named *Cape St George* during a ceremony held at Austal's Henderson shipyard in Western Australia on 15 March 2013.

Cape St George is the first of eight new ships being built by Austal for the Australian Customs and Border Protection Service under a design, construct and in-service support contract valued at approximately $330 million.

The vessel was launched at Austal's Henderson shipyard in January 2013. She has since undergone final fit out and sea trials, with some other testing to be completed prior to final delivery to the customer.

The naming ceremony was attended by the Australian Special Minister for State, the Hon. Gary Gray AO, and former President of the Australian Senate, Margaret Reid AO, who officially named the vessel.

Austal Chief Executive Officer, Andrew Bellamy, said that the naming of the first Cape-class vessels was a significant milestone for the company.

"The official naming ceremony is an occasion that allows us to celebrate the first of eight state-of-the-art, highly sophisticated Cape-class vessels which we are designing and constructing using our hallmark aluminium design," he said.

"The Cape-class contract has repositioned our Henderson facility as a defence-focused operation, while reaffirming our position as an emerging global defence prime contractor.

"Close to 300 staff have been involved in the construction

Cape St George, the first of eight Cape-class patrol boats to be built by Austal for the Australian Customs and Border Protection Service (Photo courtesy Austal)

of this first vessel, and the contract has underpinned work at our Henderson shipyard.

"I would like to thank our staff and Austal's many suppliers for their important contribution on *Cape St George* as we look forward to delivering all eight patrol boats by August 2015."

Austal's role extends beyond the design and construction of the vessels. The company is also using its in-house expertise to develop and integrate sophisticated electronic systems for command, control and communication.

As part of the $330 million contract, Austal will also perform ongoing in-service support for the Cape-class fleet over at least eight years, encompassing a full range of intermediate and depot-level maintenance activities, valued at a minimum of $50 million.

"Our ability to deliver the systems and support for the Cape-class fleet demonstrates our total solution capability, which represents the future of our Australian business," Mr Bellamy said.

"We will continue to expand and enhance the strategic industry capability necessary to meet the current and future defence needs of Australia and other nations."

Construction of the second Cape-class vessel is well underway, with the keel laid in January, while work has commenced on the third vessel.

JHSV 2 Successfully Completes Builder's Trials

The Austal-built Joint High Speed Vessel (JHSV) 2, the future USNS *Choctaw County*, completed builder's sea trials in March. She is the second ship of the JHSV class.

"JHSV 2 is the second ship in this class to go through rigorous builder's trials testing," said Strategic and Theatre Sealift Program Manager, CAPT Henry Stevens. "At this stage, JHSV 2 is more complete than the lead ship, and we are benefitting from JHSV 1's lessons learned. This was the first step in preparing the ship for acceptance trials and delivery later this year."

During trials the ship reached speeds of more than 41 kn.

Austal will complete any required corrective actions in preparation for acceptance trials before *Choctaw County* is delivered to the US Navy in the northern summer.

The JHSV is designed to commercial standards, with limited modifications for military use. The vessel is capable of transporting 600 t over 1200 n miles at an average speed of 35 kn and can operate in shallow-draft ports and waterways, interfacing with roll-on/roll-off discharge facilities, and on/off-loading a combat-loaded Abrams Main Battle Tank (M1A2).

Other joint requirements include an aviation flight deck to support day and night aircraft launch and recovery operations. JHSV 2 will have airline-style seating for 312 embarked forces with fixed berthing for 104.

Delivery of Incat 112 m Catamaran

Incat Tasmania's latest 112 m wave-piercing catamaran, *KatExpress 2*, has been delivered to Mols Linien, an experienced Danish high-speed ferry operator which provides high-speed car-ferry links between Eastern and Western Denmark.

KatExpress 2 is the fourth 112 m catamaran to be built by Incat and she can carry up to 1000 persons and 415 cars (or 210 cars and 567 truck lane metres). Characterised by high-payload capability, efficient slender hull lines, wide beam and the absence of drag-inducing underwater appendages, the vessel offers industry-leading transport efficiency, economies of scale, speed and seakeeping.

For *KatExpress 2,* Mols Linien specified a modern, high-quality yet functional dual-class interior which maximised comfort and on-board revenue. Notable features include a business class with luxury leather seating and panoramic views, a bistro restaurant, a large Baresso™ café bar outlet, two cinemas, a children's play area, a protected promenade deck and a large outdoor aft deck.

Access to the passenger lounges is by a passenger lift, ramps or stairwells, all designed to minimise embarkation and disembarkation times. The main vehicle deck has hydraulically-operated stern gates. The upper car deck can be accessed by either a two-lane ramp on the main deck or, notably, from innovative dual-tier shore ramps already installed by Mols Linien in Odden port.

KatExpress 2 achieved a speed of 42.1 kn at 671.5 t deadweight during sea trials.

The vessel's 12 500 n mile delivery voyage from Hobart, Tasmania included passage via the Panama Canal to Aarhus, Denmark. In early May 2013, *KatExpress 2* entered commercial service on the 39 n mile Danish domestic route between Aarhus and Odden alongside her Incat-built sistership, *KatExpress 1,* which entered service in May 2012. The two vessels are scheduled to operate at 37–38 kn with fast 20–30 minute turnarounds. Each vessel will operate eight crossings per day and sail up to 109 000 n miles per year. *Max Mols*, an Incat 91 m catamaran delivered to Denmark in 1998, will be transferred to the Ebeltoft-to-Odden route operating between four and eight sailings per day.

Passenger accommodation in *Kat Express 2*
(Photo courtesy Incat Tasmania)

Mols Linien CEO, Soren Jespersen, commented: "In 2011 we concluded a strategic business review which redefined our tonnage strategy to focus on solely operating high-speed car/passenger ferry services. The entry into service of the 112 m *KatExpress 1* in May 2012 has directly resulted in a year-on-year traffic increase of 8.2% to 751 635 cars, a 28% reduction in fuel consumption, a 33% reduction in CO_2 emissions, significantly lower operating costs per car carried, higher revenue per sailing and, most importantly, a second-half operating profit of DKK21 million before depreciation and amortisation."

"I am very pleased to have taken delivery of our second 112 m, *KatExpress 2*, she offers a fantastic on-board experience tailored to our client base, she continues our business transformation, expands our route capacity by 65% and will ensure good full-year profitability for Mols Linien in 2013."

Incat Chairman, Robert Clifford, commented: "I am delighted that Mols Linien has chosen to operate a fleet that is entirely composed of Incat-built vessels, including two of our 112 m flagships customised for the European market. "The Mols Linien vision is not about speed at any cost, rather about incorporating efficiency and best practice in every aspect of their operation, both onboard or onshore. "The collaborative efforts of Mols Linien and Incat specialists on *KatExpress 1* and in particular, *KatExpress 2*, have challenged conventional operating wisdom to deliver not only an unrivalled passenger experience but a profitable high-speed ferry operation in difficult economic times. I take this opportunity to congratulate Mols Linien on taking delivery of *KatExpress 2* and in taking the initiative to design and install a dual-tier linkspan which ensures that full-load turnarounds can be achieved in only 28 minutes and the capabilities of the 112 m vessel are fully exploited."

Principal Particulars

Length overall	112.6 m
Length waterline	105.6 m
Beam	30.50 m
Draft	4.184 m
Gross Tonnage	10 500
Deadweight	1497 t
Passengers	1000 persons (including crew)
Vehicles	415 cars or 567 lane metres of freight at 4.6 m clear height with 210 cars at 4.5 m length
Main Engines	4 × MAN 28/33D diesels, each 9000 kW.

Kat Express 2 at speed
(Photo courtesy Incat Tasmania)

New Icebreaker for Australia

On 9 January 2013 the Australian Government, acting through the Australian Antarctic Division, invited interested parties to submit proposals for the design, construction and long-term operation and maintenance of a new multi-purpose icebreaker.

The Environment Minister, Tony Burke, said the bright orange icon of Australia's modern Antarctic program, *Aurora Australis,* had been supporting Australia's Antarctic program for more than 23 years and is nearing the end of its useful life.

"Our Antarctic explorers stand on the shoulders of the great explorers and scientists, and they stand on the decks of the great vessels which have made the journey through the ice," Mr Burke said.

"Australia is committed to remaining a leading Antarctic nation. The icebreaker plays an essential role in resupplying our Antarctic stations and supporting critical Antarctic and Southern Ocean research. Ensuring that Australia has future access to an icebreaker appropriate for the challenging conditions and future requirements is a top priority."

Mr Burke said that the Government had allocated $1.7 million in 2012–13 for the development of a detailed

business case for a new Antarctic shipping capability, including essential associated infrastructure and support.

"Today we have invited industry to come forward with cost-effective proposals for a new ship to inform the next stage of the Government's consideration, but no decisions have yet been made on proceeding with further stages of the procurement," Mr Burke said.

"The Australian Antarctic Territory covers 42% of the continent. We must look at how we sustain our strong Antarctic presence into the future — modern sophisticated transport is critical to that."

Mr Burke said that Australia's Antarctic research program is critical to our understanding of how the planet works, including the impacts of climate change on Antarctica and the Southern Ocean and, as a result, the global climate system.

"Our scientific research also helps us conserve Antarctica's unique wildlife and informs our management of Southern Ocean fisheries to protect marine biodiversity for the future.

"As an original signatory of the Antarctic Treaty and one of the principal proponents of its Protocol on Environment Protection, Australia is a strong and long-standing supporter of the Antarctic Treaty system, and works through it to advance Australia's interests.

"To continue to lead a world-class Antarctic research program into the future and to maintain our position as a leader within the Antarctic Treaty System requires modern, sophisticated research and transport systems. An icebreaker is, and will remain, the backbone of Australia's support to our Antarctic stations and expeditioners."

The complex process of replacing the *Aurora Australis* will take some time. It is expected at this stage to be at least five years before a new ship is operating.

LHD Training Facility Opened

On 24 April the Minister for Defence Materiel, Dr Mike Kelly, opened the landing helicopter dock (LHD) training facility at Mascot in New South Wales.

Over the next two-and-a-half years the new facility will provide training to Australian Defence Force (ADF) personnel in the safe operation and maintenance of the LHDs.

The facility has the potential for follow-on training and through-life support training, and to manage and conduct other future training for the ADF.

"The opening of this training facility is another example of the effective collaboration between the Defence Materiel Organisation, the Royal Australian Navy and BAE Systems Australia," Dr Kelly said.

"This facility will train over 700 ADF personnel to safely operate and maintain the LHDs in anticipation of acceptance by Navy of Australia's first LHD, NUSHIP *Canberra*, in early 2014 and the acceptance of NUSHIP *Adelaide* in the following year," Dr Kelly said.

The two LHDs will each have a crew of over 350 Navy, Army and Air Force personnel.

"The redevelopment of this site took around six months at a cost of $5 million which gives the ADF a purpose-built, state-of-the-art training facility which has simulated training suites, LHD ship-fitted equipment, classrooms and an office," Dr Kelly said.

Patrol Vessel Contract for Strategic Marine

Strategic Marine, a specialist shipbuilder with operations in Singapore, Australia and Vietnam, is to build the Long Term Ashmore Capability (LTAC) for Gardline Australia Pty Ltd on behalf of the Government of Australia. The LTAC will be a 40 m on-station vessel designed for reliable, flexible self-sufficiency on long-term deployment in tropical areas.

The contract was awarded in March following a successful tender prepared under a teaming arrangement between Gardline Australia Pty Ltd, the owner and operator of the current *Ashmore Guardian*, Strategic Marine, the builder of the new vessel, and McAlpine Marine design Pty Ltd, the designer.

Once delivered, the LTAC will be deployed by Australian Customs and Border Protection to Ashmore Island, an external territory of Australia lying 500 n miles from Darwin in the Indian Ocean

The vessel's steel hull and aluminium superstructure design

BAE Systems' LHD Training Manager, Robert Stirling, explains the training and simulation systems for HMAS *Canberra* at the new Mascot training facility to the Hon. Dr Mike Kelly, Minister for Defence Materiel
(RAN photograph)

AMC Australian Leader in Maritime Training and Consultancy

In addition to the renowned Maritime Hydrodynamics Research facilities, Australia's national centre for maritime education and training, the Australian Maritime College (AMC) provides an extensive range of maritime training courses, consultancies and publications through its commercial arm, AMC Search Ltd. AMC Search Ltd Registered Training Organisation, and has ISO 9001:2008 Quality Accreditation.

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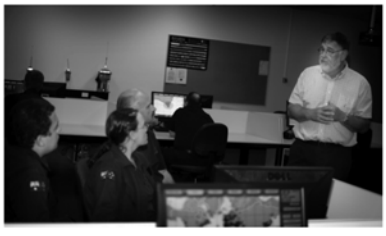
- Fire Prevention and Fire Fighting
- Chief Integrated Ratings
- Ship Security Officer
- Tanker Safety
- Safe Bulk Loading Practice
- Fast Rescue Craft
- Vessel Traffic Services (VTS)
- Dynamic Positioning:
  - BASIC (Induction)
  - ADVANCED (Simulator)

An extensive range of port and terminal operations courses are also available. Many of these are designed specifically to meet the clients requirements.



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stems from Gardline's previous experience with *Ashmore Guardian*, the vessel currently operating in the same location and which the LTAC is intended to relieve and replace in mid-2014

Among the LTAC's technical specifications are twin main Caterpillar 32 engines and a bow thruster, twin davits and tenders, a draft of 2.4 m and breadth of 11.5 m. There will be accommodation for 17 crew and 26 passengers. The ship will be built at Strategic's multi-purpose shipyard in Vietnam

Strategic Marine has also recently delivered *Njord Lapwing*, the fourth in a series of eight vessels ordered by Njord Offshore (UK), underscoring Strategic's global capability to supply service ships for the offshore windfarm sector. *Njord Lapwing* follows February's delivery of *Njord Curlew* and a third vessel, *Njord Petrel*, was to be delivered in April.

24 m Catamaran Passenger Ferry from Incat Crowther

Incat Crowther has announced that a 24 m catamaran passenger ferry under construction at Aluminium Marine in Brisbane has left the shed. This vessel is available for immediate sale, and can be customized to suit the operator's requirements. She is suitable for commuter service, day-cruise operations or crew transfer.

Built to Aluminium Marine's consistently-high standard, this vessel follows in the wake of *Fantasea Sunrise*, *Freedom Sovereign* and *Riverside Avalon*. This new generation of 24 m passenger vessels has set new standards of performance, efficiency and seakeeping.

The vessel's contemporary, sophisticated look commends it well to high-profile tourist operation whilst, below the skin, the vessel is extremely rugged and versatile.

The vessel is fitted with a pair of Yanmar 6AYM-GTE main engines, and is capable of speeds in excess of 28 kn. The vessel will efficiently and comfortably operate at a service speed of 25 kn.

The vessel is available on short notice. To enquire about the vessel, please contact Incat Crowther's Sydney office or Aluminium Marine.

Principal particulars of the new vessel are

Length OA	24.0 m
Length WL	23.8 m
Beam OA	8.50 m
Depth	2.75 m
Draft (hull)	1.10 m
(propeller)	1.70 m
Passengers	194
Crew	5
Fuel oil	4000 L
Fresh water	500 L
Sullage	500 L
Main engines	2×Yanmar 6AYM-GTE each 618 kW @ 1900 rpm
Propulsion	2×propellers
Generators	2×62.5 kVA
Speed (service)	25 kn
(maximum)	28 kn
Construction	Marine-grade aluminium
Class/Survey	NSCV Class 1C
Flag	Australia

Freedom Sovereign
(Photo courtesy Incat Crowther)

36 m Monohull Crewboat from Incat Crowther

Incat Crowther is has announced that it has been awarded a contracts to design a 36 m monohull oilfield crewboat for Arpoador Engenharia in Brazil. This 36 m vessel will be designed to meet the Petrobras type P2 specification.

The vessel's aft main deck features 60.5 m^2 dedicated to a man-riding basket, and a further 28 m^2 for cargo. Forward of this is the passenger cabin with 60 seats in a mixture of forward-facing and booth styles. Ample luggage storage is also provided, along with a pair of heads. A bow-loading platform is integrated into the design to facilitate passenger embarkation and disembarkation from offshore facilities. Stairs lead to the upper-deck wheelhouse, and down to the hull where crew are accommodated in five cabins. Galley, mess and bathrooms are also to be fitted in the hulls.

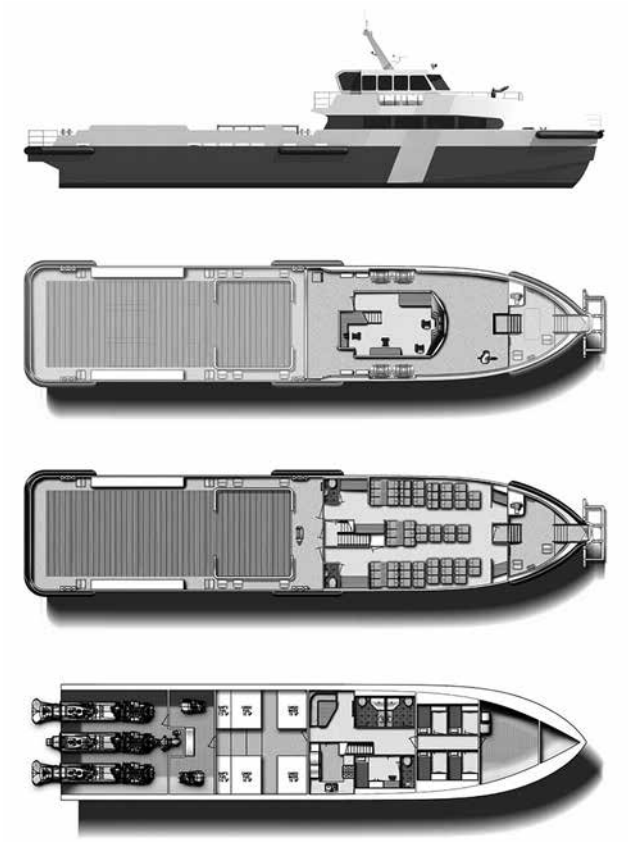
The vessel will be fitted with a trio of Caterpillar C32 main engines coupled to Doen DJ290 waterjets. The centre engine will drive a 600 m^3/h fire pump. All main engines and generator sets are serviced by soft patches over.

The vessel will be capable of speeds in excess of 25 kn, with a fully-loaded service speed of 17 kn.

Principal particulars of the new vessel are

Length OA	36.0 m
Length WL	33.0 m
Beam OA	7.50 m
Depth	3.50 m
Draft (hull)	1.20 m
Passengers	60
Crew	10
Deck area	28 m^2
Deck load	50 t
Deck strength	2.5 t/m^2
Ship's fuel oil	15 000 L
Cargo fuel oil	30 000 L
Ship's fresh water	5800 L
Cargo fresh water	30 000 L
Black water	1250 L
Grey water	2500 L
Main engines	3×Caterpillar C32
Waterjets	3×Doen DJ290
Generators	2×60 ekW
Speed (service)	17 kn
(maximum)	25 kn
Construction	Marine-grade aluminium
Flag	Brazil
Class/Survey	RINa

Rendering of 36 m monohull crewboat
(Image courtesy Incat Crowther)



General arrangement of 36 m monohull crewboat
(Drawing courtesy Incat Crowther)

48m Monohull Fast Supply Vessels from Incat Crowther

Incat Crowther has been awarded a contract to design a 48 m monohull fast oilfield supply vessel which will comply with the type UT4000 specification for Arpoador Engenharia in Brazil, and six of these vessels will be built.

The aft main deck features 225 m^2 of cargo space, with an additional 33.4 m^2 of cargo space provided inside. A lounge area with day head is provided, as is a bathroom and laundry.

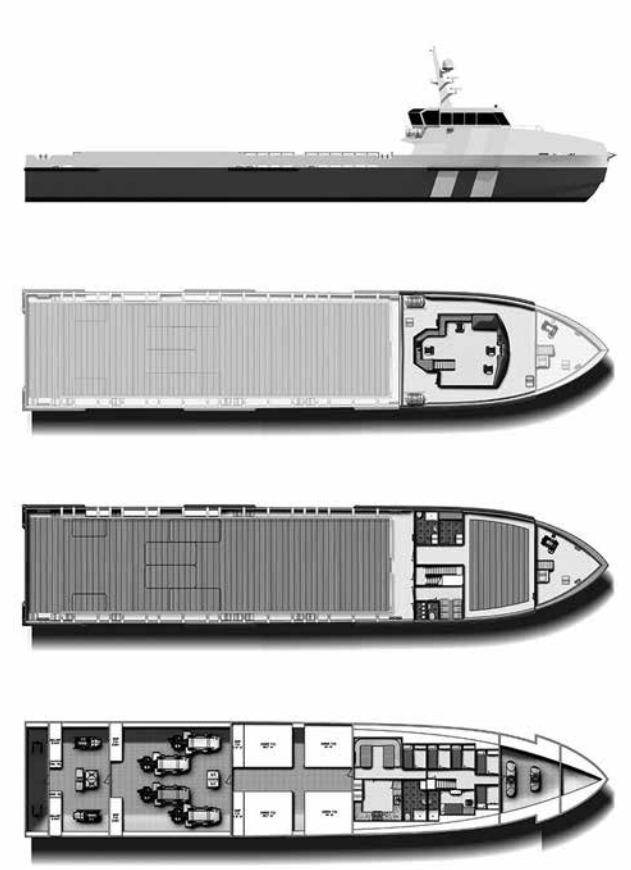
Below decks, 11 crew members are accommodated in six cabins. Aft of these are the crew mess, galley and bathroom.

The vessels will be powered by a quartet of main engines and will be propelled by fixed-pitch propellers. Maneuverability will be enhanced by a pair of 112 kW bow thrusters. The vessels will have a service speed of 21 kn, with a top speed of 25 kn.

Principal particulars of the new vessels are

Length OA		48.0 m
Length WL		46.1 m
Beam OA		9.50 m
Depth		4.25 m
Draft	(hull)	1.70 m
	(propeller)	2.20 m
Crew		11
Deck area		225 m^2
Deck load		250 t
Deck strength		3.0 t/m^2
Ship's fuel oil		42 800 L
Cargo fuel oil		91 400 L
Ship's fresh water		10 300 L
Cargo fresh water		88 000 L
Black water		2710 L
Grey water		2670 L
Speed	(service)	21 kn
	(maximum)	25 kn
Main engines		4×high-speed diesels
Propulsion		3×propeller
Generators		2×300 ekW
Construction		Marine-grade aluminium
Flag		Brazil
Class/Survey		RINa

Rendering of 48 m monohull fast supply vessel
(Image courtesy Incat Crowther)



General arrangement of 48 m monohull fast supply vessel
(Drawing courtesy Incat Crowther)

Kilimanjaro IV from Incat Crowther

Incat Crowther has announced the launch of *Kilimanjaro IV*, a 45 m passenger ferry for the African operator, Coastal Fast Ferries. The vessel capitalises on the rapid growth in the operator's passenger numbers, bringing the Coastal Fast Ferries' fleet to seven successful Incat Crowther-designed vessels. A process of close cooperation between the builder, Richardson Devine Marine Constructions, the operator and the designer resulted in a vessel offering high speed, high passenger capacity and rugged efficiency.

Kilimanjaro IV's main deck has two partitioned passenger spaces—an 86-seat business-class cabin, and a 168-seat economy-class cabin. Upstairs is a premium-class cabin with 88 seats. Each class has its own independent boarding ramp to port and starboard. Additional boarding is provided on the upper deck aft. Exterior economy-class seating is provided on the upper aft deck (130 seats), roof deck (90 seats) and foredeck (70 seats).

Starboard bow view of *Kilimanjaro IV*
(Photo courtesy Incat Crowther)

In addition to high passenger capacity, in order to service growing demand for fast freight, *Kilimanjaro IV* has a large freight capacity enabling carriage of 32 freight carts in a dedicated freight compartment, with a fully-integrated freight-transfer system.

Powered by a quartet of Cummins KTA 50 M2 main engines, *Kilimanjaro IV* shares common machinery with earlier vessels in the fleet, to streamline maintenance and spares inventory. Propulsion is through KaMeWa 50A3 waterjets. In recent trials, *Kilimanjaro IV* achieved a loaded service speed of 35 kn, and is capable of a top speed of 38 kn.

Incat Crowther is pleased to continue to support Coastal Fast Ferries, and believes that the growth in business is in part due to their attention to client service and ability to add value to the client's operation.

Principal particulars of *Kilimanjaro IV* are

Length OA		44.7 m
Length WL		42.9 m
Beam OA		11.5 m
Depth		3.9 m
Draft (hull)		1.10 m
Passengers		606
Crew		10
Fuel oil		20 000 L
Fresh water		4000 L
Sullage		3000 L
Main engines		4×Cummins KTA 50 M2 each 1342 kW @ 1900 rpm
Gearboxes		4×ZF 7600 NR2H
Waterjets		4×KaMeWa 50A3
Generators		2×Cummins 170 kVA (ship's power) 1×Cummins 17 kVA (crew supply)
Speed	(service)	34 kn
	(maximum)	36 kn
Construction		Marine-grade aluminium
Flag		Tanzania
Class/Survey		NSCV Class 1C

Starboard quarter view of *Kilimanjaro IV*
(Photo courtesy Incat Crowther)

24 m Catamaran Passenger Ferry from Incat Crowther

Incat Crowther has been selected to design a 24 m catamaran passenger ferry for Sealink. Construction of the aluminium vessel, to be operated by subsidiary Captain Cook Cruises, has commenced at Richardson Devine Marine Construction in Tasmania. The vessel is designed to operate throughout Sydney Harbour with class-leading efficiency, seakeeping and robustness.

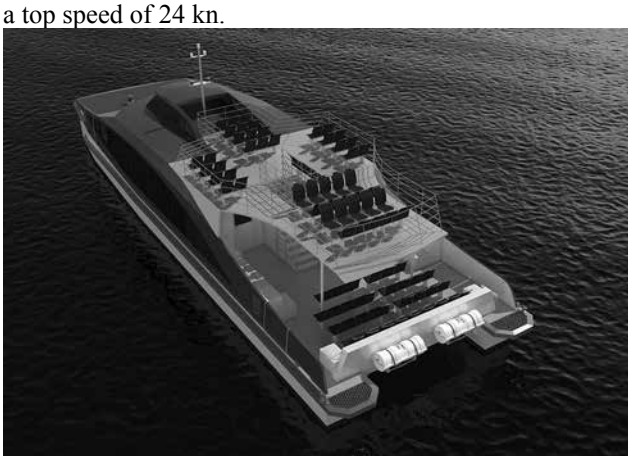
Incat Crowther has worked closely with Sealink to develop a vessel which offers exceptional value to the operator, with tangible measures taken to reduce both capital investment and running costs. In addition to low fuel usage, machinery selection and systems design has focussed on reducing ongoing maintenance costs.

The vessel will feature a main passenger cabin with seats for 116 passengers. A further 31 seats are located on the aft deck. Toilets are located adjacent to the stairs to the upper deck. Large hinged engine hatches provide ample access to the engine rooms for day-to-day maintenance tasks.

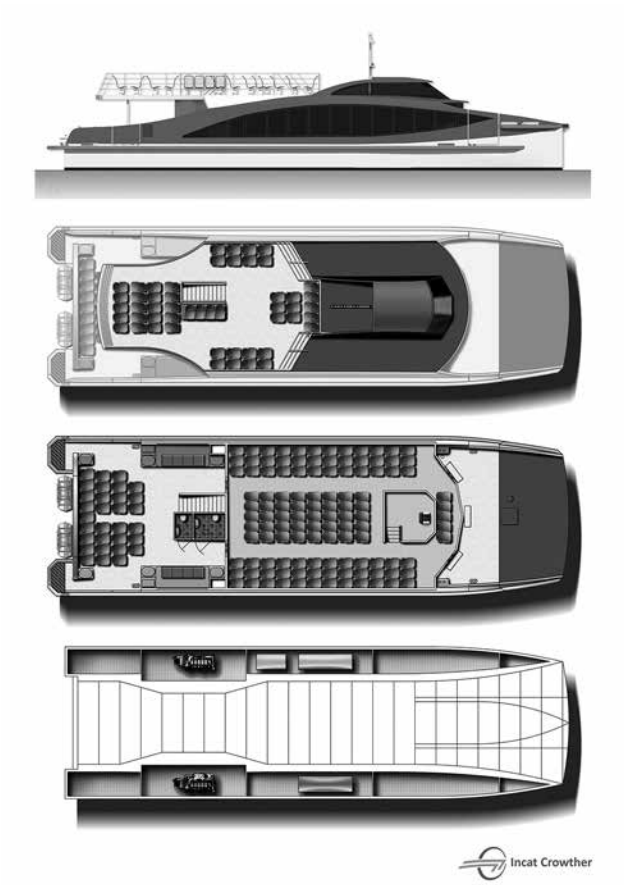
Boarding gates are located on the foredeck, with particular attention having been paid to the visibility of these from the wheelhouse. Behind the wheelhouse, an open upper deck has seats for 51 passengers, with ample space for passengers to stand and view the sights.

The vessel will be certified to carry 127 passengers for coastal operations and 198 passengers for harbour operations.

Powered by a pair of Scania DI13 070M main engines, the vessel will operate at a loaded service speed of 22 kn, with a top speed of 24 kn.



Port quarter of 24 m catamaran passenger ferry
(Image courtesy Incat Crowther)



General arrangement of 24 m catamaran passenger ferry
(Image courtesy Incat Crowther)

Incat Crowther is pleased to be working with Sealink on this new-generation vessel, which offers cutting-edge design, low fuel consumption and increased capability for iconic Sydney Harbour operator, Captain Cook Cruises.

Principal particulars of the new vessel are

Length OA	23.9 m
Length WL	23.5 m
Beam OA	7.20 m
Depth	2.20 m
Draft (hull)	1.00 m
(propeller)	1.40 m
Passengers	198 (1D)
	127 (1C)
Crew	3
Fuel oil	2000 L
Fresh water	250 L
Sullage	1500 L
Main engines	2×Scania DI13 070M
	each 368 kW @ 1800 rpm
Propulsion	2×propellers
Speed (service)	22 kn
(maximum)	24 kn
Construction	Marine-grade aluminium
Flag	Australia
Class/Survey	NSCV Class 1C/1D

Stewart Marler

Starboard bow view of 24 m catamaran passenger ferry for Sealimk
(Image courtesy Incat Crowther)

Cruising

The summer season wound down through autumn, with visits to Sydney by *Radiance of the Seas, Seabourn Quest, Asuka II, Pacific jewel, Rhapsody of the Seas, Voyager of the Seas, Sea Princess, Europa, Aurora, Queen Victoria, Balmoral, Seabourn Odyssey, Arcadia, Pacific Pearl,* and *Costa Dellziosa* in late February. March saw return visits by many of these vessels, and added visits by *Oosterdam, Pacific Princess, Celebrity Solstice, Queen Mary 2, Dawn Princess, Saga ruby, Caledonian Sky, MS Marina, Carnival Spirit,* and *Ocean Princess*. April saw return visits by some of these vessels, and added visits by *Sun Princess* and *ITU Triathlon*.

Pacific Jewel, Pacific Pearl and *Carnival Spirit* are the only vessels scheduled for cruises over the winter months until *Sea Princess* arrives on 7 October to begin the arrivals heralding the next summer season.

Phil Helmore

New Strategic Plan for DSTO

A blueprint for future scientific advice and technology support to Defence was launched by the Minister for Defence Science and Personnel, Warren Snowdon, on 12 April.

The five-year strategic plan for the Defence Science and Technology Organisation (DSTO) sets out priorities and initiatives designed to enhance DSTO's reputation as a leader in technology innovation and a collaborative partner with industry and the science community.

"DSTO is positioning itself to better meet future challenges and opportunities in the face of the changing global security and Defence environment, rapid advances in technology and increasing budget pressures," Minister Snowdon said.

"By leveraging partnerships with industry and universities, DSTO will become an even-more-valued advisor to Defence and the Australian Government.

"DSTO has world-class scientists who will be involved in delivering high-impact technology outcomes for Defence and national security by working closely with external partners on large, complex and scientifically-challenging programs."

Minister Snowdon said that these initiatives would help DSTO to keep Defence capability at the leading edge.

Chief Defence Scientist, Dr Alex Zelinsky, said that the strategic plan had been developed in consultation with staff, the Defence leadership and external stakeholders.

"Staff are committed to the plan and keen to begin its implementation," Dr Zelinsky said.

The DSTO Strategic Plan 2013-18 is available at www.dsto.defence.gov.au/strategicplan/.

A wide variety of passenger-carrying options evident during the visit of *Queen Mary 2* to Sydney on 19 March
(Photo John Jeremy)

Developing a Low-cost Vehicle/Passenger Ferry in Response to the Increased Competition from Air Travel in South-East Asia

J C Knox and C M Evans
Lightning Naval Architecture

Summary

The transportation of people around South-East Asia, particularly Indonesia, is a changing market. The growth of low-cost airlines in the region is bringing the option to fly within the financial means of more and more people, taking business away from traditional passenger ferry routes and operators. At the same time, vehicle ownership and demand for consumer goods is increasing. Lightning Naval Architecture believes that these trends indicate the need for more passenger/vehicle ferries which provide increased revenue streams compared to those carrying only passengers. This paper discusses the development of a low-cost ferry design for routes of between 150 n miles and 300 n miles in Indonesia. Whilst the build and operating cost are of primary concern, the design also looks to address widely-reported safety concerns with ro-ro vessels operating in the archipelago.

Introduction

Air travel in Indonesia grew by 15% in the first quarter of 2012 [1], a pattern being repeated around South-East Asia. Whilst tourism may have stimulated this growth, it has widely been reported in the maritime press that cheaper air fares will see more of the local population travelling domestically by air rather than sea. Coupled with concerns identified by IMO and Interferry [2] over safety standards on ferries in the developing world, there is a dual threat to ferry markets in the region.

Lightning Naval Architecture (LNA), a Sydney-based ship-design consultancy, believes that a different approach to ferry operations in the region is required. With the increase in air travel and falling passenger revenues, a natural response is to look for vehicle-carrying capacity to increase revenues, particularly as the Indonesian Government predicts a 200% growth in car ownership and 50% increase in road freight by 2025 [3]. However, in such a highly-populated developing region, passengers will remain a very important source of revenue.

LNA therefore presents a conceptual day-ferry design to respond to the changing travel market in Indonesia. At 70.2 m LBP with facilities for 670 passengers, it retains a high-passenger capacity for the size of vessel whilst providing 280 lane metres for heavy vehicles. Targeted at 150–300 n mile routes it has facilities designed to match the market and anticipated 12–20 h crossing in either single- or two-class configurations. The design utilises a simple hullform and arrangement to reduce construction and operating costs whilst eliminating design elements which have provided safety concerns in existing vessels.

Indonesian Ferry Market Review

Routes and Trade

Indonesia is an archipelago of some 17 500 islands, of which around 1000 are permanently inhabited. The most heavily-populated island (by some margin) is Java, where the capital, Jakarta, is located. Besides Java, significant populations live on the islands of Sumatra, Kalimantan (Borneo), Sulawesi, Bali and Lombok. Smaller populations are present in the eastern portion of the country. The national ferry company, PELNI, operates the most extensive network in Indonesia through its fleet of over 20 passenger ships. Much of PELNI's fleet are relatively-modern passenger-only vessels built at Germany's Meyer Werft shipyard. Their capacity for ro-ro is, at the time of writing, limited to one vessel operating a two-week schedule on routes between Java, Kalimantan and Sulawesi [4]

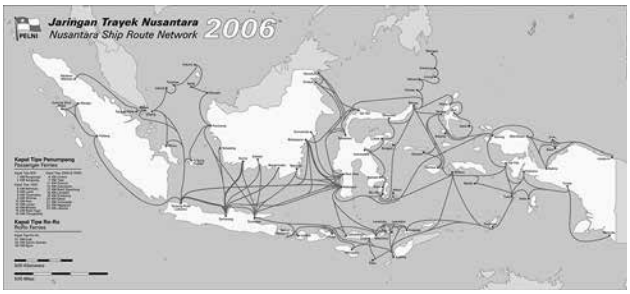


Figure 1: 2006 PELNI Ship Route Network

One of the main operators of ro-ro vessels in Indonesia is another state-owned ferry company ASDP [5]. The ASDP network is smaller than that of PELNI and focusses mainly on short-sea crossings between islands, for example Ketapang (Java) to Gilimanuk (Bali), or across bays within islands such as the Bajo'e to Kolaka crossing within Sulawesi. ASDP also operates longer routes between Kalimantan and Sulawesi.
The busiest and most-competitive ferry route in Indonesia is the Merak (Java) to Bakauheni (Sumatra) route [6] which is operated by several ferry companies. Competition on this route is intense; however, with the threat of the Sunda Strait bridge development looming large, investment in new tonnage seems unlikely [7].

Information on numbers of people and vehicles carried can be difficult to obtain, however, it has been suggested that some 60% of vehicles carried on the Merak–Bakauheni route are motorbikes [6].

Future Ferry Demand

A future ro-ro design would source its income from both passenger and vehicle revenue streams. As with ferry operations in the developed world, the transportation of freight is likely to be the key factor in the profitability of any ferry operation. Reliance on freight revenues only seems somewhat risky, however, in a developing economy and so personal or trade vehicles must also be considered important.

It has already been stated that car ownership and road freight numbers are predicted to rise substantially by 2025. More-detailed statistics on numbers of vehicles are available from the Indonesian statistics office, Badan Pusat Statistik [8]. The website provides a range of high-level statistics which can be used to establish general trends.

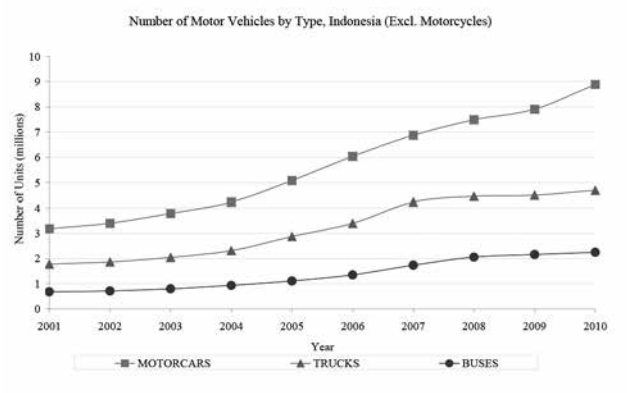


Figure 2: Number of vehicles by type

Figure 2 shows that, since 2001, there has been a significant increase in the numbers of motorcars and trucks in Indonesia, with a smaller increase in bus numbers. These increases, however, are considerably smaller than the increase in motorcycles as shown on Figure 3.

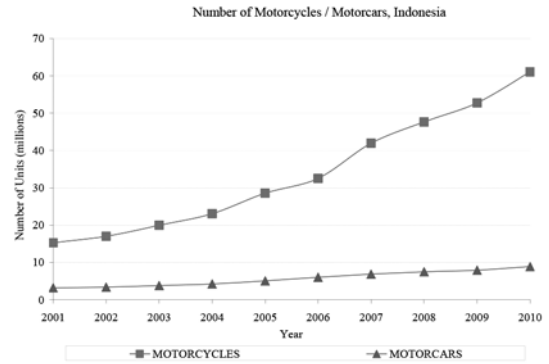


Figure 3: Number of Motorcycles and Motorcars

It would appear, therefore, that motorcycles will form a significant proportion of the numbers of vehicles carried.

This is good news for the demand to transport these vehicles between islands. However, since an estimated 75–80% of the population live on either Java or Sumatra, there is clearly a much smaller population and associated share of the vehicular movements on offer to the ferry market when, or if, an economically-viable Sunda Strait Bridge is completed.

If investment in ferries between Java and Sumatra is unattractive whilst the Sunda Strait Bridge is under consideration, there are still considerable populations in Kalimantan (estimated at 19 million) and the islands of Sulawesi (estimated at 16 million) and Bali (estimated at 4 million). These destinations are already served by existing ro-ro routes (PELNI and ASDP) either between these islands or from Java to one or more of the islands.

Badan Pusat Statistik has statistics on the numbers of domestic passenger journeys undertaken in Indonesia over the eight years 2003–10 by both air and sea.

Figure 4 indicates that, whilst passenger numbers travelling domestically by air annually has more than doubled from 21 to 48 million journeys, the numbers of passengers travelling by sea has oscillated between 15 and 20 million journeys. This supports the argument that the ferry industry faces increased competition from airlines which may be stunting the growth in journeys undertaken by sea. Ferries

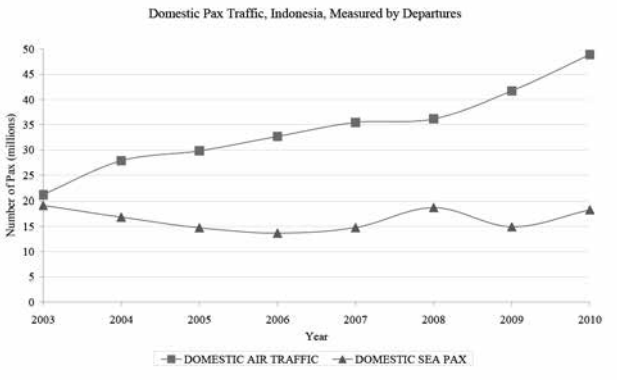


Figure 4: Eight-year Passenger Departures by Air and Sea

do still have an important role to play in the transportation of passengers; however, with increased vehicle numbers, the opportunity to carry vehicles as well as passengers is attractive.

Location of Future Ferry Demand

Determination of where future demand (the route it will be on) for new ferry tonnage is a complicated decision outside of the scope of this paper; however, some publicly-available information gives an indication of where demand may exist. Badan Pusat Statistik has some information on the trade at Indonesia's five largest ports for domestic trade which are of interest. The largest ports in Indonesia in terms of handling domestic cargo are as follows:

- Tanjung Priok (Jakarta, Western Java)
- Balikpapan (Eastern Kalimantan)
- Tanjung Perak (Surabaya, Eastern Java)
- Makassar (Southern Sulawesi)
- Belawan (Medan, Northern Sumatra)

Figure 5 shows the balance of loading/unloading of cargo at these ports in 2011 together with the total cargo handled.

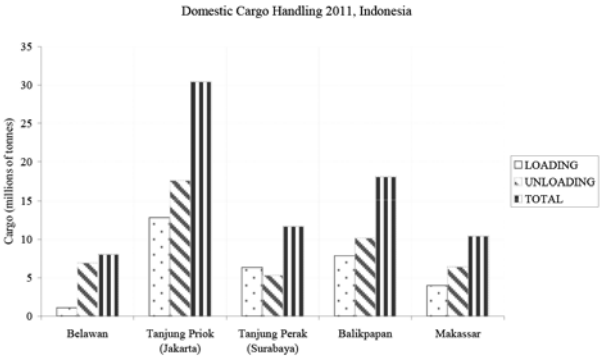


Figure 5: Domestic cargo handling for five largest ports

It can be concluded that all ports discharge more cargo than loading, with the exception of Tanjung Perak. What cannot be certain, from these limited statistics, is what this cargo is, other than its intention for domestic transportation (at least initially) and that the five busiest ports in Indonesia include Balikpapan and Makassar.

A better indication for viable routes for ro-ro ships would be to look at the level of development of the local economies, since ro-ro cargoes are likely to be relatively high-value manufactured or processed consumer goods.

A traditional method for indicating standard of living is Gross Domestic Product (GDP) per capita. Badan Pusat

Statistik has published GDP figures for 2010 for all 33 Indonesian provinces. Elsewhere on their website are the 2010 provincial populations, thus allowing GDP per capita to be calculated. Whilst it is acknowledged that this method does not mean that high GDP per capita ensures everyone in the province is wealthy, it does indicate a strong local economy which is likely to offer more jobs and earning potential to the local population than provinces with lower GDP per capita.

Figure 6: GDP per capita for the 33 Indonesian Provinces

It is evident that there are four provinces which have a GDP per capita in excess of 50 million rupiah. These regions are, in decreasing GDP per capita, Kalimantan Timur, DKI Jakarta, Riau and Sulawesi Selatan. It is interesting to note that three of the busiest ports, Tanjung Priok, Balikpapan and Makassar, lie in three of these four regions, DKI Jakarta, Kalimantan Timur and Sulawesi Selatan respectively.

The figures would indicate that a ro-ro route connecting these three ports would be attractive, since these are amongst the most economically-developed provinces in the country. Logistically, the distance between Tanjung Priok and either Balikpapan or Makassar of some 750 n miles, a two-day voyage, renders this option less attractive. As an alternative, the option of Tanjung Perak (Surabaya) to either Balikpapan or Makassar is possible in 36 h. The relatively developed roads in Java further encourage this option over that of Tanjung Priok. Balikpapan to Makassar is a voyage possible within 24 hours including loading and unloading times at either end.

Future Ferry Possible Cargo

It has already been stated that personal vehicle ownership is growing rapidly in Indonesia and that passenger demand still exists, despite the growth of airlines. Since personal vehicle ownership is still somewhat rare (1 in 25 of the population) it is, however, the carriage of commercial vehicles which is likely to make a new ro-ro vessel commercially attractive. The container freight market between Java, Sulawesi and Kalimantan appears to be well developed, so cargoes which are likely to be commercially viable to carry on a ro-ro vessel include:

- locally-manufactured products;
- perishable food items, for example: fruit and seafood;
- imported containerised cargoes which are broken in Java for shipment to multiple destinations;
- economy mail and courier packages;
- imported or Java-manufactured motor vehicles for use in Kalimantan or Sulawesi; and
- buses of passengers for onward destinations, e.g. holiday passengers.

With most of the above being retail goods, the growth forecast in this area is of interest. A 2012 outlook report for the Asian retail sector compiled by PriceWaterhouseCoopers [9] indicates an expected growth in retail sales in Indonesia of 35% between 2012 and 2015.

Future Ferry Safety

In discussing future ro-ro ferry tonnage for Indonesia, it is important to consider safety concerns with existing ro-ro vessels. IMO and Interferry have recently set up a forum to try to improve safety standards on ferries in the developing world. A recently-published action plan by that forum highlighted the need for governments to establish "appropriate shipping safety policies and standards (e.g. for purchase and operation of second-hand and converted ships, and newbuilding standards to ensure adequate safety margins on stability);"

It would appear that many recent incidents involving fatalities on Indonesian ferries are as a result of loss of intact stability. An investigation at the University of New South Wales [10], undertaken by a master's degree student, found that, in the majority of cases where a ro-ro vessel had capsized, it was as a result of water encroaching onto the open vehicle deck during bad weather/large sea states and becoming trapped. The resultant free-surface effect, and possible downflooding through openings on the vehicle deck, ultimately destroyed the vessel's stability leading to sudden capsize.

The ease by which water can enter the vehicle deck can, at least partially, be attributed to the open nature of the vehicle-deck design on typical vessels operated in Indonesia. Many vessels are ex-Japanese vessels designed to minimise tonnage (and, hence, port dues) on sheltered coastal routes. These vessels take advantage of the fact that vehicle decks with sufficiently-large openings in the side may be excluded from the tonnage calculation. Whilst this is an adequate arrangement for short coastal voyages, it is considered by the authors to be unsuitable for operation on open water for long voyages where the weather can change unexpectedly. The casualty rate would appear to support this conclusion.

Subject to safe operation by the crew and ship's management, there should be no reason why these vessels cannot be operated safely on short sheltered routes. It is the longer routes, such as those considered in this paper, which represent the most-significant risk.

In our design, LNA offers some technical solutions to the problem of insufficient intact stability.

Indonesian Ferry Market Review Conclusion

Indonesia is a vast archipelago and, despite increased competition from air travel, it seems likely that there will be continued and sustained demand for ferry links between the various islands. With added competition it seems prudent to diversify operations to include the carriage of vehicles, especially when the number of vehicles is increasing strongly.

With the prospect of a bridge across the Sunda Strait in the medium term, it would appear that investment would be best made in routes between Java, Kalimantan and Sulawesi, where the local populations are likely to have greater demand for manufactured goods and processed food produce.

Such a ro-ro vessel should be fit-for-purpose for the intended route. A crossing time of around 18–24 h at a considerable distance from land exposes the vessel to increased risk of encountering storm conditions which have been the likely cause of recent ferry capsizes in the country.

A Ro-Ro Vessel for Indonesia

Design Brief

The LNA design is intended to fulfil the following design brief. This is based on the perceived demand from the research outlined in this paper.

Intended Route

LNA, as a design consultancy, cannot be certain of the exact demand anticipated on specific routes; however, LNA has so far concluded that the development of a design suitable for operation between the ports of Tanjung Perak, Balikpapan and Makassar would offer the best potential for the development of a profitable route. If an economical average voyage speed of 15 kn is assumed then the following voyage schedules are possible with a single-ship operation.

Tanjung Perak – Balikpapan

500 n miles at 15 kn, 33 hr 20 min (one crossing every other day, three-day return with one lay day gives two return crossings a week)

Tanjung Perak – Makassar

500 n miles at 15 kn, 33 hr 20 min (one crossing every other day, three-day return with one lay day gives two return crossings a week)

Balikpapan – Makassar

280 n miles at 15 kn, 18 hr 40 min (one crossing per day, two-day return with one lay day gives three return crossings a week)

An alternative is to operate a loop incorporating these three ports. This would require two vessels to deliver a regular service in both directions. Having more than one ship allows an operator to continue to operate a reduced service when one vessel is in drydock. Reliability of service is a powerful driver of freight growth.

Determining the exact route is beyond the scope of this paper, since LNA is not privy to commercial information on existing routes; however, with the need for economical operation the average speed of 15 kn has been assumed.

Construction

The vessel would be built in Indonesia so that it can offer benefit to the local economy during construction and when in operation. To reduce building costs, the arrangement should be as simple as possible whilst still providing the necessary facilities for cargo and passengers. The hullform should be designed to reduce the requirement for large numbers of double-curvature plates which considerably add to the cost of construction. The machinery arrangement should be chosen to provide the most economical solution in terms of initial build and operation, with the compromise being convenience in manoeuvring which is less important for a long route with long turn-around time in port. The long turn-around time available negates the need for a bow or side ramp for vessel loading; a single stern ramp is considerably cheaper to construct.

Vessel Capacity

The use of ro-ro ships on these routes is an emerging market. For an emerging market, a small vessel having between 250 and 300 lane metres would be suitable. This should have a full-height deck of 4.6 m to allow a full-freight cargo to be carried. This full height also provides flexibility for the future installation of mezzanine decks for the carriage of additional small vehicles. Passenger numbers should be the maximum practicably achievable for the resulting vessel particulars. LNA would design the passenger lounges in a single-class configuration with the flexibility to segregate into further class divisions to suit an operator's requirements.

Regulatory Regime

The ship would be designed to meet the requirements of an IACS classification society. For route flexibility, and allowing for the length and remoteness of the routes previously discussed, the ship should comply with the requirements of SOLAS for a short international voyage. The design would be sufficiently adaptable to relax the SOLAS requirements if domestic regulations allow.

The problem of water on deck has been described as a major concern with the safety of ro-ro vessels in the region. This paper discusses the stability performance of the design with water on deck. This will be of particular importance if the vehicle deck is required to be open to reduce the tonnage and, consequently, port dues. It is the opinion of LNA that, for a route of this nature, the vehicle deck should be weathertight, i.e. openings in the side shell to reduce tonnage should be avoided.

Design Overview

A general arrangement of the LNA design to meet the design brief is presented in Figure 8.

This section of the paper outlines some of the features of the design

Principal Particulars

Length OA	82.0 m
Length BP	70.2 m
Beam	17.4 m
Draft, design	3.6 m
Depth, Vehicle Deck	6.0 m
Depth, Weather Deck	11.4 m
Lane Metres	280 at 4.6 m clear height
Deadweight	800 t
Passengers	670
Crew	30
Service speed	15.5 kn
Normal range	1900 n miles at 15.5 kn
Range with LR Fuel	3700 n miles at 15.5 kn
Access Arrangement	15 m universal stern ramp
Main Engines	2 × Wärtsilä 8L26 each 2720 kW
Gensets	3 × Mitsubishi S6R2-MPTA each 500 kW
Propeller diameter	2.7 m
Propeller Type	2 × fixed pitch
Fin Stabilisers	Yes
Bow Thruster	1 × 600 kW
Anti-heel System	Optional
Fuel oil	154 t

Additional LR fuel	145 t
Fresh water	146 t
Water ballast	202 t
Classification	✠100A1 Passenger/Vehicle Ferry
Reg. Compliance	SOLAS Short International Voyage

Hullform

The vessel's beam was chosen to provide four vehicle lanes, a central casing and space for the side-shell structure. The length of the ship is that required to provide the necessary lane metres of vehicles.

The hullform has been designed to minimise the amount of double-curvature plates. The aft buttocks are straight and the bilge features a double chine which dispenses with the need for any curvature in this section.

The bow section has mainly single-curvature panels with a double-chine system. The bulb is knuckled to further reduce the complexity and cost of construction. The only double-curvature plates required are at the bulb/stem intersection. Further refinement of the hullform to further reduce the construction cost is certainly possible as the design progresses.

Vessel Layout

The general arrangement is shown in Figure 8. The ship has seven working decks. Some of the features of the vessel are:

Deck 1 (Tank-top)

- Fwd and aft engine rooms
- Engine control room in the forward engine room.
- Stabiliser spaces
- Access from Deck 5

Deck 2 (Tween Deck)

- Provisions, stores
- Sewage/auxiliary space
- Laundry
- Crew fitness/potential crew prayer area

Deck 3 (Main Deck):

- Vehicle deck
- Bosun's store
- Main access via stern ramp

Deck 4 (Stair Deck)

- Upper Bosun's store
- Potential mezzanine vehicle decks

Deck 5 (Passenger Deck)

- Outside seating (64 seats)
- Inside lounge (265 seats)
- Cafeteria (176 seats)
- Galley
- Toilets
- Mooring decks
- Potential passenger prayer room

Deck 6 (Crew Deck)

- Outside seating (48 seats)
- Inside lounge (171 seats)
- Crew mess
- Crew cabins

Deck 7 (Bridge Deck)

- Crew recreation
- Meeting room and office
- Crew cabins
- Bridge

The layout has been arranged to provide as flexible an arrangement as possible for tailoring by the operator. LNA recognises the probable requirement for prayer facilities onboard for passengers and crew. The recreation room on Deck 2 can provide optional space for crew prayer. Passenger prayer facilities would be best constructed on Deck 5 at the loss of some passenger seating. The Deck 2 area is not currently passenger accessible.

The superstructure has minimum curve and shape to reduce construction cost.

Ship-shore Interface

LNA recognises the potential lack of dedicated ro-ro port facilities at some Indonesian ports. With this in mind the ship has been designed with a single aft ramp for vehicle/passengers/provision and waste handling. This is an economical alternative to multiple dedicated stations or doors to provide each service. The design can operate stern-to on quays from 0.8 to 4 m height above the waterline using the ramp as shown on the general arrangement drawing. Once the actual facilities for the intended route are known, the actual ramp could be reduced in size to lower construction cost.

Lifesaving Arrangements

The ship has a lifesaving provision in accordance with SOLAS for a short international voyage. This requires, for 700 persons onboard, the carriage of two lifeboats with an aggregate capacity of 210. In this case, two 106-person lifeboats are provided. The remainder of the lifesaving capacity is provided by davit-launched liferafts mounted on Deck 6. Boarding of the liferafts is from Deck 5. Davit-launched lifeboats are a more-economical alternative to MES systems.

Vessel Stability

Regulatory Requirements

The vessel complies with the intact stability requirements of IMO Resolution A749(18) for a passenger ship. Damage stability has been assessed to comply with the requirements of SOLAS 2009 consolidated, Part B-1, for 700 persons on board.

Additional Stability for Water on Deck

In addition to the statutory stability requirements for a passenger ship, calculations have been undertaken to demonstrate the vessel's ability to remain stable with a specified quantity of water on the vehicle deck. This is considered important since, as already discussed, there has been a large number of recent ferry losses in Indonesia attributed to a loss of stability due to water ingress onto the vehicle deck without any damage to the ship being sustained.

LNA considers a closed vehicle-deck design to be the safest option, however, should the vehicle deck be required to be opened to reduce the tonnage, the ship's ability to remain stable with water on the vehicle deck is important. In order to perform the calculation, a NAPA stability model of the design was set at the service draught of 3.6 m with a GM of 2.4 m, corresponding to a preliminary departure loading condition. A quantity of water was then added to the deck at the lowest freeboard point in 10 cm increments. The residual stability was considered adequate if all SOLAS 90 deterministic stability criteria were met (this being considered equivalent to SOLAS 2009 probabilistic damage stability). The results indicated that, even with 1 m of water on the vehicle deck, all stability requirements are met. This is shown in Figure 7 below:

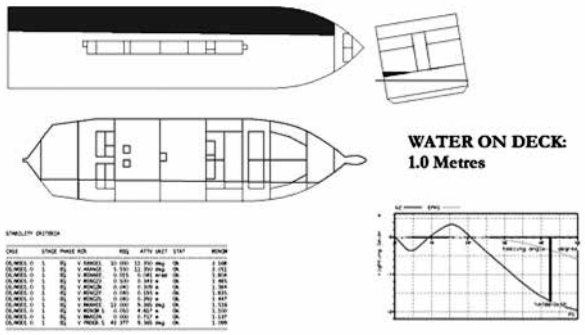


Figure 7: 1 m Water on Deck SOLAS 90 compliance

This water on deck stability performance is vastly superior to existing vessels operating in the region, as analysed by Anggoro [10]. This can be attributed to the relatively large beam of the LNA design together with the corresponding relatively large intact GM of the design. The heel angle with 1 m of water on deck is 9.4º. Whilst this is a large heel angle for the vessel to adopt, it is based on the assumption that 1 m of water has built up on the vehicle deck — an unlikely scenario if the vessel is fitted with blockage-resistant scuppers and has a crew trained in damage control methods.

Commercial Viability

Assessment Method

The commercial viability of the LNA design is, of course, an important consideration. In illustrating the commercial viability of the design, LNA has undertaken an analysis based on one vessel operating on the Balikpapan–Makassar route, with the following assumptions:

- 340 Operational days per year;
- voyage distance 280 n miles;
- average Speed 15 kn;
- one voyage per day (two-day return);
- ship's generators used 265 days per year; and
- ship's main engines as required.

In order to perform the analysis, data is needed in the following areas:

- ship purchase cost;
- running costs; and
- likely occupancy and freight rates.

These factors will be considered in turn with the numbers finally brought together to determine the required occupancy rate for each voyage to achieve profitability.

Ship Purchase Cost

This is difficult to estimate without the benefit of quotes from Indonesian shipyards. LNA has undertaken a breakdown of the ship to assist shipyards in pricing the vessel. The lightweight of the vessel is preliminarily estimated to be 2228 t including:

- 1527 t of steel;
- 293 t of passenger and crew space outfit;
- 47 t of mooring equipment;
- 39 t of lifesaving equipment;
- 220 t of machinery; and
- 103 t of piping and cabling.

For the purposes of this analysis, an estimate from similar ro-ro vessel projects from the ShipPax annual report *Designs* [11] was made. From six similar ships built in the period 2007 to 2011 it would seem that a value of $US20 million would be reasonable if the ship was to be build locally in Indonesia.

The possibilities for financing this amount are many, but an allowance for this is considered in the running costs section below.

Running Costs

The fuel consumption of the vessel was estimated as part of the design process. From these consumption values, the annual fuel cost can be estimated based on bunker prices from Bunkerworld [12]. This suggests an annual fuel cost of $US5.7 million.

Wages for the estimated 64 crew required to perform the 30 roles on the ship on a 24/7 basis were sourced from the Pelaut Yahoo group [13]. This group features job advertisements for crew required for vessels operating in the Java Sea. An analysis of wages per month for the various roles leads to an annual wages cost of $US0.9 million.

Additional running expenses, which include provisions, lubricants, spares and repairs and registration and port fees (estimated), amount to $US1.4 million. These were sourced for similar ships using the Opcost 2011 report [13].

Finance costs were assumed for the entire $US20 million over 15 years at an average interest rate of 7%.

Freight Rates

The ship can carry a range of vehicles in varying numbers. For the purposes of the calculation, the following cargo has been assumed. This is the 100% occupancy benchmark.

- 670 Passengers;
- 36 Motorcycles (2.40 m each);
- 7 Private motorcars (4.80 m each);
- 6 Pickups (4.80 m each);
- 5 Small buses (7.00 m each);
- 2 Large buses (9.50 m each);
- 3 Small trucks (5.70 m each);
- 2 Large trucks (7.00 m each);
- 5 Trontons (9.50 m each); and
- 3 Trailers (12.45m each, trailer only).

Freight rates were determined using ASDP and PELNI published fare prices [4, 5] in terms of average freight rate for each vehicle/passenger type per n mile on similar routes. A small income from food and beverage sales of $US2 per person for the voyage was assumed. This gives an income

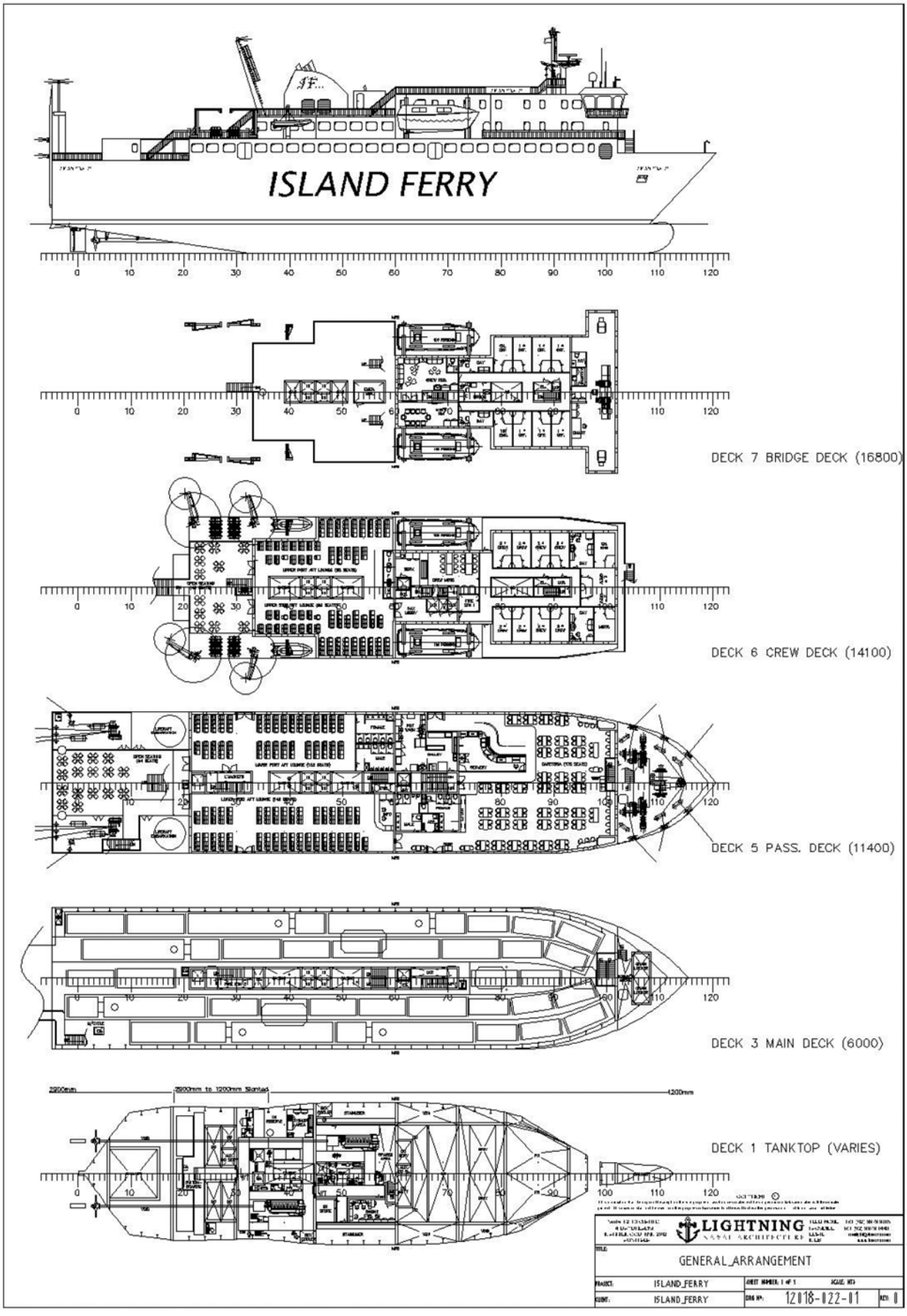


Figure 8: Concept design general arrangement drawing

of $US35 250 per voyage based on 100% occupancy.

Annual Balance

Based on the assumptions made above, the percentage occupancy rate required for break-even during the first 15 years of the project to can be estimated. LNA has calculated this to be 85% occupancy average over 15 years.

Clearly, this is not an attractive investment from a purely economic point of view. However LNA has calculated that if the finance was in the form of a 0% loan, then this rate of occupancy to break-even would fall to 78%. Similarly, if half of the purchase price was gifted via an international or local economic-aid program and the rest financed as per the original calculation (at 7% average), the break-even point would be 76%. These values are more attractive to a potential investor, especially considering that the loan is over 15 years and, as the expected ship life could be 25–30 years, the financial situation improves dramatically in the later years.

This form of international aid, either in terms of gifts or interest-free loans, has many precedents as in the case of the building of MV *Lady Samoa III* [15]. This vessel, along with two earlier similarly-sized vessels, was granted to the Samoan government under the Japanese gift program in 2010.

Conclusion

This paper has examined the changing Indonesian ferry market from an independent consultant's point of view. Information on the ferry market is not readily available to those outside of the local industry; however, the information which is available has allowed LNA to study the trends and examine possible future developments.

It is clear that the industry is facing increased competition for passenger carriage in the form of air travel. Whilst a large percentage of the population still travel by sea, passenger journeys by sea are not keeping pace with domestic air travel. In order to increase revenue, LNA believes that a change from passenger only to ro-ro vessels is required. This trend has already begun with PELNI currently operating a pilot-project vessel and ASDP operating a fleet for short-sea crossings.

The LNA solution has been designed to operate on 150–300 n mile routes which are longer than the majority currently operated by ASDP and similar to those operated by PELNI. LNA does not consider the Sunda Strait route to be a viable investment opportunity whilst the Sunda bridge solution is still under consideration.

The design presented is a 70.2 m LBP vessel with a single vehicle deck and passenger day accommodation for 670. The design is of simple, inexpensive construction with savings made in the hullform, superstructure arrangement, loading/unloading arrangement and machinery installation. The relatively large beam and corresponding GM at sea has resulted in good stability during potential water-on-deck situations. Water on deck is known to have been the cause of several ship losses in the country. LNA considers that closing the vehicle deck weathertight and having such water-on-deck stability performance in the event of damage will result in this design having vastly-improved safety over those vessels currently operating on similar routes.

Whilst utilising a new design like the LNA concept will assist in growing the local economies of the regions it serves, LNA recognises that financing such a project will be challenging. An economic analysis undertaken by LNA for a Balikpapan-to-Makassar route has indicated that an occupancy rate of some 85% would be required to break even. This is likely to be too high to be attractive to potential business investors. If assistance were to be available, however, possibly in the form of interest free loans or international aid programs then this can be reduced to near to 75%. This is more viable, especially considering that the finance is considered to be over 15 years whereas the life of the ship would be 25–30 years.

Such aid programs have been successful in the past; however, they often result in the ship being built overseas. LNA believes that, if the Indonesian government can assist in financing new vessels then they can be built locally, benefiting the local economy from day one.

Whilst financing new ro-ro tonnage for Indonesia will be a challenge, such new vessels can help to grow trade between the islands of the archipelago, provide local jobs and improve passenger safety and comfort.

References

1. *Q1 Air Passengers up 15%, Tourism estimates double digit growth to Indonesia*, Official Indonesian travel website www.indonesia.travel, accessed 1 May 2012.
2. *Regional Forum on Domestic Ferry Safety, Bali, Indonesia 6 and 7 December 2011, Action Plan*, www.imo.org, acccessed 16 December 2011.
3. Ministry of Transportation and Ministry of Environment, Republic of Indonesia, *Indonesian Country Report on Environmentally Sustainable Transport Implementation*, www.uncrd.or.jp/env/4th-regional-est.../08_BS2_Indonesia.pdf, 2008.
4. PELNI Ferries, www.pelni.co.id, accessed 12 July 2012.
5. ASDP Ferries, www.indonesiaferry.co.id, accessed 12 July 2012.
6. Lam A., 'Connecting Java with Sumatra: An analysis of Indonesia's busiest ferry link', *Cruise & Ferry info Feb 12*, February 2012
7. Hussain Z., 'Indonesia Signs Deal for $10.9 Billion bridge Linking Sumatra to Java', *Jakarta Globe*, 21 April 2012.
8. Badan Pusat Statistik, www.bps.go.id, accessed 13 July 2012
9. PriceWaterhouseCoopers, *2012 Outlook for the Retail and consumer Products Sector in Asia*, pp 33–34, www.pwc.com, accessed 12 July 2012.
10. Anggoro S, *Analysis of the Intact Stability of Indonesian Small Open-deck Roll-on/Roll-off Passenger Ferries*, University of New South Wales master's thesis, March 2008.
11. ShipPax, *Designs 07-11*, ISSN 1403-3437, 2007-2011.
12. Bunkerworld, www.bunkerworld.com, Singapore 3 month average March-June 2012, accessed June 2012.
13. Pelaut yahoo group, www.groups.yahoo.com/group/pelaut.
14. Moore Stephens, 'Opcost 2011 report', Moore Stephens LLP, September 2011.
15. Samoa Shipping, www.samoashipping.com/vesselinformation.htm.

EDUCATION NEWS

Australian Maritime College

Neil Bose appointed as Principal of the Australian Maritime College

Following an extensive national and international search, Professor Neil Bose has been appointed Principal of the Australian Maritime College (AMC) at the University of Tasmania (UTas). Professor Bose has a distinguished academic career in the field of marine propulsion, including a previous appointment as Canada Research Chair in Offshore and Underwater Vehicle Design, Memorial University of Newfoundland (where he won the President's Award for Outstanding Research in 1992). He joined AMC in May 2007 as Professor of Maritime Hydrodynamics and has been Acting Principal since January 2012.

Professor Bose said he was extremely enthusiastic about leading AMC through an exciting time of revitalisation, change and development. "AMC, with strong support from UTas at all levels, has an agenda to build on its national mandate and international presence, nurture the professional development of its staff, and strengthen its academic profile," he said. "AMC aspires to national and international excellence in maritime training, education and research, strong industry connections and leading-edge innovative solutions."

Professor Bose said that AMC's focus for the next 12 months will be continuing to forge links with industry, educational institutions and other stakeholders; as well as strengthening the college's training and undergraduate programs. "We need to have a very strong focus on our VET (vocational education and training) programs in the future. We also have a very strong focus on building our capacity for research and taking it away from a few pockets of strong research to being much more of a coherent program across the institute," Professor Bose said. "So we plan to be going out in the next year looking for some fairly senior appointments in AMC, and these will include research leaders and National Centre leaders."

AMC Undergraduate RINA Awards and Prizes

On behalf of the Tasmanian Section of RINA, we would like to congratulate the following prize winners for 2013:

- The RINA Prize for the best research project by a final year student in the Bachelor of Engineering (Naval Architecture) was awarded to James Guest for his work *Investigation into the Influence of Landing Craft Tank Bow Form on Added Resistance and Seakeeping in Head Seas*.
- The RINA/Austal Ships Prize for the best team project in Ocean Vehicle Design in the Bachelor of Engineering (Naval Architecture) was awarded to Martin Chambers, Ashley Weir, Matthew Stubbin and Ryan Aberle.
- The 2012 Principal's Roll of Excellence in the Bachelor of Engineering (Naval Architecture) was awarded to Martin Chambers, Rhys Goold, William Pic and Christopher Wong.

Mark Symes

Resent AMC Postgraduate Completions

Gregor Macfarlane, Doctor of Philosophy — *Marine Vessel Wave Wake: Focus on Vessel Operations within Sheltered Waterways*

All ships and boats generate a pattern of waves when they move, and the characteristics of these waves alter significantly with changes in speed, hull shape and water depth. This project investigated the characteristics of the wave wake generated by vessels which typically operate within sheltered waterways. It is well known that these waves can result in issues for other users of the waterway and the surrounding environment. These issues include erosion of the surrounding banks, damage or nuisance to moored vessels and other maritime structures, and endangerment of people working or enjoying activities in small craft or close to the shore.

A review of the wave patterns generated at sub-critical, trans-critical and super-critical depth Froude numbers was conducted, with an emphasis on those craft which commonly utilise sheltered waterways, i.e. small commercial vessels and recreational craft. Particular attention was given to planing and wakeboarding vessels, given the large and increasing number of these craft. One of the major issues often confronted is that of bank erosion, and a study was conducted to determine which measures of erosion potential are the most descriptive in these circumstances.

Over recent decades it has been common to quantify a vessel's wave wake using the characteristics of just a single wave within the entire wave train, usually the highest. However, in this study it was shown that this is generally inadequate when considering craft operating at trans-critical or super-critical speeds. Three significant waves of interest were described and quantified in this study.

A comprehensive set of model-scale experiments was conducted to investigate the effect that water depth and vessel speed has on the waves generated by nineteen different hullforms, including a mixture of typical monohulls and catamarans. Four primary measures were quantified for each of the three key waves, including wave height, wave period, decay rate and wave angle.

The results from the experiments were used to develop an empirical tool to provide wave-wake predictions and to investigate the effect that water depth, hullform and vessel speed has on each of the four primary wave measures. Predictions from the tool were validated against measured data from several independent full-scale trials.

A wave-wake regulatory criterion, suitable for the operation of typical recreational craft and small commercial vessels operating in sheltered waterways, was proposed and incorporated within the prediction tool.

A basic version of the prediction tool is now freely available online to assist those tasked with designing new vessels, or those who wish to identify any potentially-serious wave-wake issues very early in the planning and design stages of any vessel for a particular route. Further information can be found at www.amc.edu.au/maritime-engineering/wave-wake-predictor.

Benjamin French, Doctor of Philosophy — *Slamming of Large High-Speed Catamarans in Irregular Seas*

Current design methods are limited in their ability to predict long-term loading statistics relating to wave loads and fatigue from prolonged cyclic loading. These methods either neglect slamming loads entirely or they are included as post-processed or simplified two-dimensional methods. The work presented in this thesis introduced a combined theoretical-empirical approach to determining long-term load trends in realistic sea conditions during the initial stages of the design spiral. This method builds on a previously-developed non-linear time-domain seakeeping strip-theory method, for high-speed multi-hull vessels, using scale model testing in irregular seas as a basis for an empirical slam module.

Towing-tank experiments, using an extensively instrumented 2.5 m hydroelastic scale model wave-piercing catamaran representative of the 112 m class Incat design, were used to develop a database of slam events in a range of realistic (but idealised) irregular sea conditions. A total of 2103 slam events was identified over 22 test conditions during the scale-model experiments. Of these events, 16 were extreme, with a magnitude exceeding the displacement of the model, the largest one being 132% of the model displacement. Large slams generally occurred in the conditions where large motions were measured; however, significant scatter was present, with extreme events observed to be up to four times the median for most conditions.

Occurrence rates were found to be a function of encounter wave frequency and significant wave height. If the encounter wave frequency coincided with the motion resonance, slam rates increased. Increasing the significant wave height also increased slam occurrences. A slam threshold was identified by extrapolating occurrence rate trends with decreasing significant wave heights; for the model tested, slams are not expected at significant wave heights less than 1.5 m (full scale) at 8.5 s modal period. Pressure measurements also revealed that the cross-deck structure was exposed to large local pressures at each measurement station, suggesting that ship designers should ensure that the structure can withstand large local loads along the entire length of the bow.

The non-linear time-domain seakeeping program was extended to simulate motions and loads in irregular seas and a method for constructing idealised wave spectra was developed as an input to the seakeeping code. The extended code was verified by conducting a series of program tests and then validated by comparing computational ship motions with results from the scale-model experiments in the absence of slamming.

A new module for predicting slam loads, based on a statistical analysis of scale-model tests was then developed and integrated into the extended time-domain seakeeping method, allowing for the slam events to be determined on-line in the time-domain. Slams are identified by defining a location dependent immersion threshold criterion based on the geometry of the hullform combined with a stochastically-determined variation originating from experimental observations. In the event of a slam, the maximum load and slam duration are determined. The maximum load calculation consists of two parts, a deterministic component resulting from a regression analysis of experimental data and a stochastic variation based on the scaled residuals of the regression. Vessel forward speed and relative vertical velocity at the centre bow truncation are used to predict the maximum slam load. Slam loads are ramped up from zero to a maximum and back to zero over a number of time steps. Slam durations are predicted in a similar manner to the maximum slam load, except that forward speed and immersion at the centre bow truncation are the explanatory variables. The slam load is then ramped according to its duration at the location where it was first triggered.

A case study was finally undertaken, demonstrating the application of this method. A high-speed ferry service route was selected and real-wave data used to determine expected wave environments. The computer simulation was run for a range of sea conditions and slam events were identified. Slam event statistics were then extrapolated to produce expectations for long term (20+ years) loading expectations, showing how this method could be a valuable tool when considering the long-term loading implications of a vessel for a particular route.

Alan Fleming, Doctor of Philosophy — *Phase-averaged Analysis of an Oscillating Water-column Wave-energy Converter*

This project was concerned with the application of phase-averaging to experimental data obtained for a forward-facing bent-duct oscillating water column (OWC) wave-energy converter. Experiments were performed on a three-dimensional model of the OWC in monochromatic waves. The research included the development of new curve-fitting and ensemble-averaging algorithms designed to phase-average two-dimensional particle-imaging velocimetry (PIV) data. The phase-averaged PIV velocity fields were then used for qualitative and quantitative analysis. Qualitatively — visualisation of the velocity fields as vectors over a wave cycle showed the average flow-field phenomena including bulk flow, water column slosh, front-wall swash and downwash, vortices and an outflow jet. Quantitatively — two-dimensional kinetic energy and vorticity was calculated from the phase-averaged velocity fields and used in an energy-balance analysis.

Experimental and theoretical data were combined in an energy balance analysis of the OWC to map the flow of energy from the incoming waves to intermediate stores and finally to sinks, which importantly permits the inclusion of non-linear phenomena. Using the energy model it was found that for the OWC model tested that the phase-averaged energy dissipated by the power-take-off was greater during water outflow than during water inflow. Phase-averaged experimental analysis of OWCs is an additional tool suitable for the design of the underwater geometry of OWCs, with potential application to other wave-energy converters.

Alex Robbins, Doctor of Philosophy — *Shallow Water Catamaran Wash: Simple Characterisations for a Complex Phenomenon*

Dr Robbins' research project explored catamaran-generated wash in shallow water, with the specific goal of simplifying this highly-complex phenomenon into user-friendly characterisations.

The wash caused by marine traffic in coastal or inland waterways can have significant effects on waterway users

and shore goers within the littoral zone. Typically wash is a minor irritant, affecting only the enjoyment of others. However, given certain conditions, wash can also be a significant safety hazard, with one death directly attributed to it.

Vessel wash can also have a major impact on the environment with wash-related environmental degradation being reported in many countries, particularly those with high-speed marine traffic. The potential exists for significant and irreversible changes to occur in the environment because of it. Accordingly, wash environmental impact is no longer seen as being of secondary importance to successful operations but, in some cases, has become the key requirement.

Successful mitigation of this wash hazard clearly involves the source of the wash, being vessels and their operation. In response to this hazard, authorities have implemented mitigation strategies, typically route planning and speed restrictions, with limited success. Fundamentally, regulation without an understanding of the wash phenomena cannot be truly effective. Accordingly, a series of simple wash characterisations is proposed to better define shallow-water wash. These characterisations can be utilised by naval architects, operators and regulators in their assessment of wash and, in turn, effect hazard reduction.

A "thesis by publication" approach has been taken, comprising five published papers. As is the case for a conventional thesis, the outcome is of 'a sustained and cohesive theme throughout, being reflected in the thesis' title. The first four papers each examine a separate wash characterisation, outlining performance in shallow water. These papers were the outcome of physical tests conducted at the Australian Maritime College's model test basin in Tasmania.

The first and second papers, on wash decay and divergent wave angle respectively, both confirmed that these parameters vary significantly with water depth, as well as displacement and hullform, and can be utilised as shallow-water characterisations. The third paper investigated unsteadiness which was recorded during experiments and it was concluded that this is due to soliton generation. Furthermore, such highly non-linear waves are known to be a significant safety risk.

The fourth paper provided proof-of-concept that wavelet analysis is successful in characterising vessel wash. The wavelet methodology allows differentiation of various hullforms from their wave patterns alone. The fifth and final paper was a summary of the thesis findings, placing them within the global context of existing vessel performance indicators such as resistance, propulsion and manoeuvring. In turn, this paper established that the simple wash characterisations proposed are a significant extension of existing wash knowledge, and incorporated a new and novel method of wavelet analysis.

Accordingly, the thesis achieved its goals of clearly defining shallow-water wash and establishing a series of simple wash characterisations

AMC Careers Fair

Australian Maritime College students had the opportunity to meet with industry representatives and investigate their future career options at the 2013 Careers Fair, held on Friday 22 March. The annual event was supported this year by 11 businesses and government agencies from across Australia which hire graduates in the fields of marine environment, maritime engineering, maritime business and international logistics.

Participating companies include Petuna, ANL Container Line, Westlink Logistics Pty Ltd, Defence Force Recruiting, Subsea 7, DOF Subsea, Crondall Energy Consultants, GL Noble Denton, Aztec Analysis, Department of Defence, QinetiQ and Technip Oceania. AMC Principal, Prof. Neil Bose, said that the event reflected the college's close relationship with industry and its ongoing commitment to responding to industry training needs.

"The AMC Careers Fair is an excellent forum for our students to gain some insight into the careers which are ahead of them and for industry representatives to promote their companies and scope out potential future staff," Prof. Bose said. "In addition, we will be presenting a number of academic awards to our high-achieving students. Many of these awards are sponsored by industry, so it's a great chance for those representatives and recipients to meet face-to-face.

The event has been running since 2007 with a maritime engineering focus, but this is the first year that the scope has been broadened to include marine environment, maritime business and international logistics. AMC plans to grow the event in coming years to include all maritime related careers. If you would like to take part in next year's event, please register your interest by emailing events@amc.edu.au

Curtin University

ShallowFlow Ship Squat Software

CMST has been writing ship-squat software for the past 15 years, mostly as disjointed pieces of research code. Over the past year, this code has all been re-developed and cohesively programmed to form the software which we've called ShallowFlow. This program can now quickly calculate ship squat for any type of bulk carrier, tanker, containership or warship. Bathymetry able to be modelled includes open water, dredged channels, and canals such as Suez or Panama.

In September 2013, CMST will be testing the ShallowFlow code against other ship-squat codes from around the world at the Duisburg ship-squat benchmarking workshop. This is a blind validation against model-test data for a 6 m model of a modern 355 m containership, tested in the Duisburg tank.

Tim Gourlay

University of New South Wales

Student–Staff Get-together

The naval architecture students and staff held a get-together on Wednesday 20 March. This was to enable the students in early years to meet and get to know the final-year and post-graduate students and the staff on a social level and to discuss the course and matters of mutual interest. Pizza, chicken, beers, wine and soft drinks were provided and, after a slow start, conversation was flowing pretty freely an hour later! This year we have thirteen students in the third year and ten in fourth year, most of whom attended. One of the post-graduate students came along as well as the three full-time staff. A broad mix, and some wide-ranging discussions ensued.

Thesis Projects

Among the interesting undergraduate thesis projects under way are the following:

Development of First-principles-based Concept-level Structural Mass Estimating for Surface Ships

Estimating the mass of the structure of a vessel is often a compromise between a guesstimate and a time-consuming detailed calculation. In the early stages of a design, the structure has not been finalised and so the details are not available. Bradley Abdilla is aiming to improve the accuracy of the mass estimate in the early design stage by investigating previous mass estimates of high-speed monohull ferries, and providing guidelines for more-accurate calculations. The project has many avenues for extension, for example to catamarans and other types of vessels.

Engineering Annual Dinner

The Engineering Annual Dinner will not be held in 2013. It is not known whether it will continue in subsequent years.

Phil Helmore

Twenty-Eighth International Workshop on Water Waves and Floating Bodies

On this occasion, this prestigious yearly workshop took place in L'Isle sur la Sorgue, near Avignon, France, on 7–10 April 2013. A larger-than-usual total of 60 papers was presented at the 28IWWWFB on all topics associated with water waves. Many of the papers were devoted to the matter of wave interaction with floating structures. However, some of the papers dealt with waves generated by ships and the influence of waves upon ships.

There were just two Australian contributions to the meeting: the first paper was presented by Dr Michael Meylan of the University of Newcastle and Dr Colm Fitzgerald of the University of Oxford in England. The topic was *Near Trapping and the Singularity Expansion Method*.

The second contribution was provided by Em/Prof. Lawrence Doctors from UNSW, who discussed his research on the topic, *The Limits of Applicability of Shallow-Water Wave Theory*. In this work, he compared the exact finite-depth linearized water-wave theory with two different shallow-water theories developed by the late Prof. Ernie Tuck of the University of Adelaide. The comparisons were made for sinkage and trim.

Figure 1 shows the geometry of the problem of a vessel travelling in a restricted waterway. Figure 2 depicts the test case—the traditional and standard Wigley model, which was tested in the towing tank at the Australian Maritime College. One example of the sinkage (expressed as a fraction of the model length), plotted as a function of the depth-based Froude number, is presented in Figure 3. This case is for a depth-to-length ratio of 0.25. The two different symbols relate to different sets of tests. The finite-width shallow-water theory (long-dashed curve) represents an improvement over the wide-tank-shallow-water theory (short-dashed curve). Furthermore, the exact or finite-width finite-depth theory (continuous curve) provides the best prediction and is valid up to a depth Froude number of around 0.8. Figure 4 shows the trim (as a fraction of the length) which is seen to be well predicted by the exact theory. In this case, the two

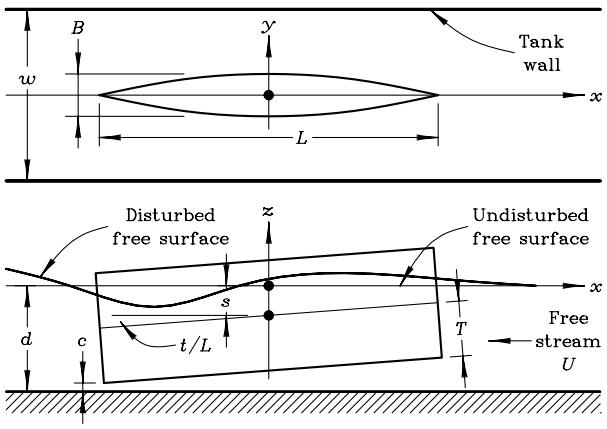


Figure 1

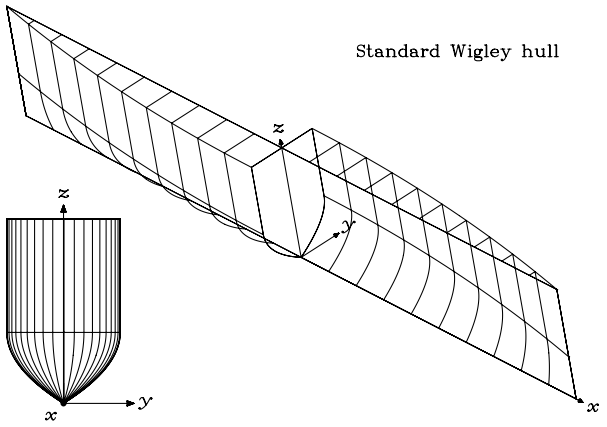


Figure 2

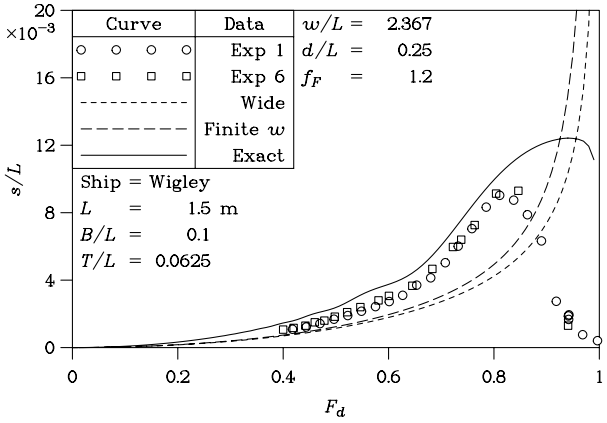


Figure 3

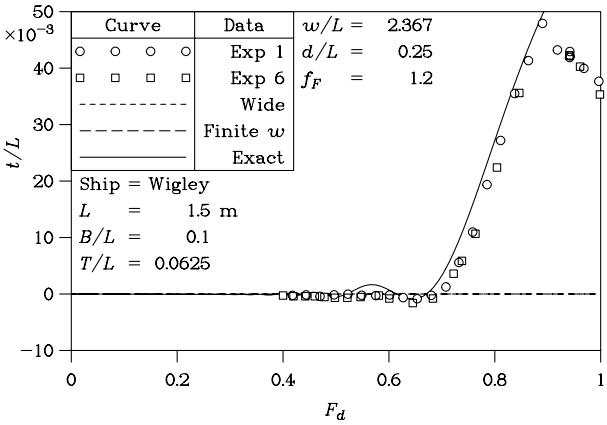


Figure 4
(Images courtesy Lawrence Doctors)

shallow-water theories both predict a zero trim, because the model is symmetric fore-and-aft.

There were six other papers which dealt with ship hydrodynamics, particularly with respect to motions in waves. Many papers also dealt with the topic of efficient power generation from water waves. These will also be of interest to RINA members.

The papers will soon be available on the dedicated website www.iwwwfb.org. Indeed, the papers from the proceedings of all previous workshops have already been uploaded to this website, thereby providing a most useful and beneficial tool for naval architects and ocean engineers.

The Twenty-ninth International Workshop on Water Waves and Floating Bodies is scheduled to take place in Osaka, Japan, from 30 March to 2 April 2014. Further details will be available on the same website. Information may also be obtained from Prof. Doctors at l.doctors.unsw.edu.au.

Lawrence Doctors

INDUSTRY NEWS

Latest Version of HydroComp NavCad Released

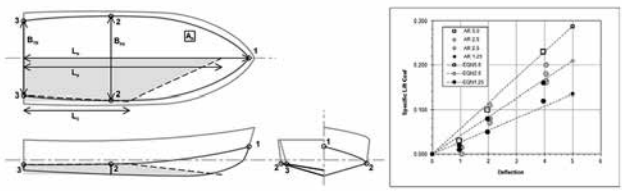
HydroComp's NavCad is software for resistance and propulsion which can be found in the toolbox of naval architects and marine professionals around the world. First introduced in 1988, NavCad has undergone numerous upgrades in its 25-year history but none of the previous upgrades were more significant than those found in this newly-released version of NavCad.

More than just an upgrade for current users, the new NavCad establishes a framework for ongoing feature development and improvements in the user experience. The design for this framework was first sketched out in early 2010. The mandate from HydroComp's management was simple: to add capabilities and reliability, but in a way which simplifies the process and increases user confidence. After nearly three years of development and user testing, the new NavCad fulfills that mandate.

New Technical Capabilities

HydroComp has an active internal research and development program with the objective of delivering new capabilities for NavCad and HydroComp's other software products. Many of the R&D projects are in direct response to end-user requests or HydroComp's own assessment of new industry requirements. Some of the projects are subtle and improve existing calculations. Others are profound and offer new capabilities where none have existed before.

Substantial effort has focused on new tools for planing hull prediction. Built upon steady-state equilibrium of forces and moments, NavCad's planing hull analysis now provides for the definition of hull warp and the influence of propulsor lift, as well as improved trim-tab contributions and new support for interceptors.



Planing hull developments

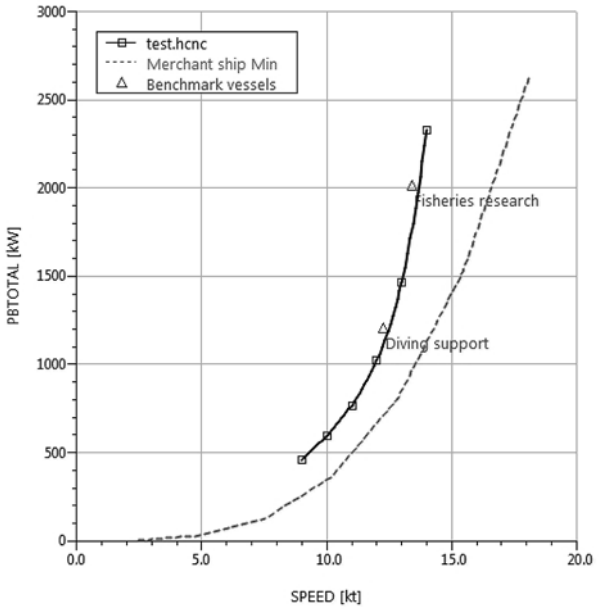
Resistance prediction is more than just bare-hull drag, of course, so new capabilities for added drag prediction can be found in NavCad. A few examples include extended definition and drag prediction for appendages, addition of spray drag for both planing and fast displacement hulls, and a new "Workboat" added-seas drag prediction.

The biggest addition to NavCad for propulsion analysis is the new system prediction for contra-rotating propellers (CRP). This is supplemented by improvements in propeller sizing and alignment to propeller model tests.

Increasing User Confidence

Forecasting vessel resistance and propulsion performance is a lot like forecasting the weather. In the absence of direct past experience, engineers will apply margins that may, or may not, be appropriate and necessary. Unnecessary margins can reduce the overall effectiveness of a design in meeting its mission. So, NavCad now provides new utilities to build user confidence in the predictions.

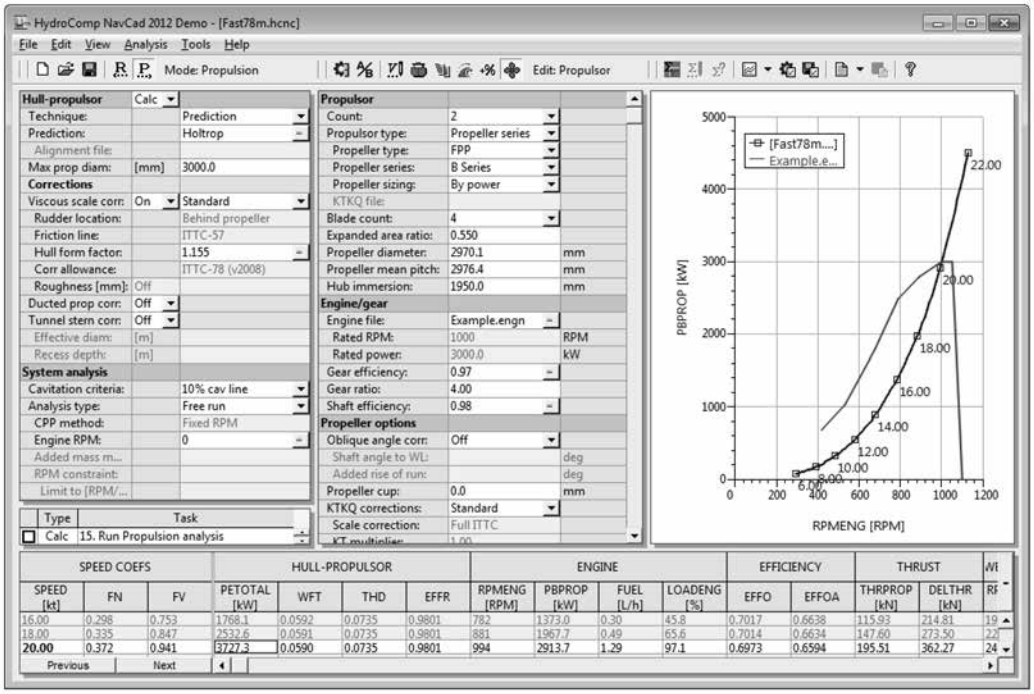
Users can define "benchmark" vessels for graphical comparison on NavCad's new "Confidence" plots for resistance, power, and propulsor efficiency. On these plots, vessel category "confidence lines" set down historical "best case" minimum drag and power limits. This feedback can be very useful to confirm that the entire system analysis is proper and reasonable.



"Confidence: PBTOTAL" plot

Updated Interface and Enhanced User Experience

NavCad now sports an improved interface, offering procedural directives and guidance. The arrangement of the principal data-entry and display groups will be easily



The HydroComp NavCad interface
(Images courtesy HydroComp)

recognised by NavCad users. Leveraging its current layout, NavCad adds a more attractive table-oriented data entry, as well as optional color themes to clarify data grouping.

A new common file format was developed for all HydroComp products for 2013. It is a text file, based on the JavaScript Object Notation (JSON) syntax. Of course, full export and import is supported for legacy NavCad files, as well as for data from other sources.

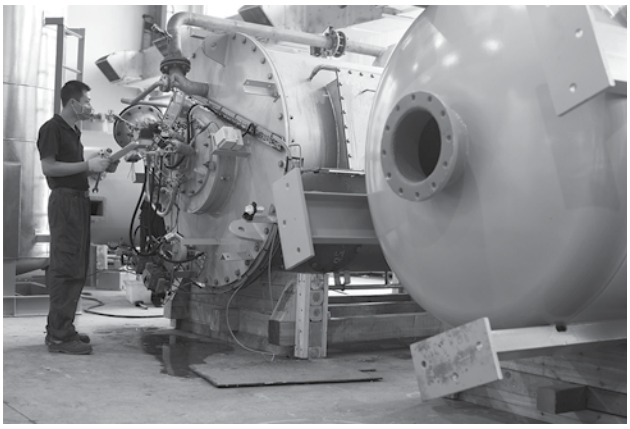
Wärtsilä to Supply Inert Gas Systems for Three new Oil and Gas Sector Vessels

Wärtsilä is to supply inert gas systems for a Floating Storage Unit (FSU) to be located on Norway's Heidrun offshore oil and gas field, and for two shuttle tankers which will support the FSU. The FSU is owned by Statoil, the Norwegian state-owned energy company and the tankers by AET Tanker Holdings, the Singapore-based petroleum transportation company. All three vessels are being built by Samsung Heavy Industries (SHI) in South Korea. The Wärtsilä contract with SHI was signed in February 2013. Delivery of the Wärtsilä equipment is scheduled for October, 2013.

The design and engineering of the systems is specifically intended for offshore applications with the nitrogen generators allowing for larger capacities. "Wärtsilä is the market leader in the supply of inert-gas systems to the offshore industry, where the technical specifications are extremely high. Our comprehensive offering to this sector is based on years of experience and highly-developed in-house know-how, and this order is further evidence of the company's strong reputation for providing technically-advanced and reliable solutions," said Juha Kytölä, Vice President, Environmental Solutions, Wärtsilä Ship Power.

Inert-gas generator systems are used to prevent the gas mixture in cargo tanks or bunkers from reaching a range where explosions could occur. Inert gas maintains the oxygen content of the tank atmosphere below 8 per cent, thus making the air and hydrocarbon gas mixture in the tank too lean to ignite. This is especially important during discharging, when more hydrocarbon vapour is likely to be present in the atmosphere. This is also the case for tankers during a ballast voyage. Inert gas can also be used to purge the tank of volatile components in preparation for gas freeing, i.e. replacing the gas mixture with breathable air. Nitrogen generators are then used to supply dry air and oil-free inert gas for purging, pressurising, and blanketing functions.

The FSU is expected to operate in the Norwegian Sea's Heidrun oil and gas field until at least 2045. The FSU will export the oil from the field and will be connected to a buoy. The product crude oil is loaded onto the FSU vessel via a subsea pipeline and underwater hoses which are pertinent parts of the crude oil exporting facility. Cargo from the



Wärtsilä Moss inert-gas generators
(Photo courtesy Wärtsilä)

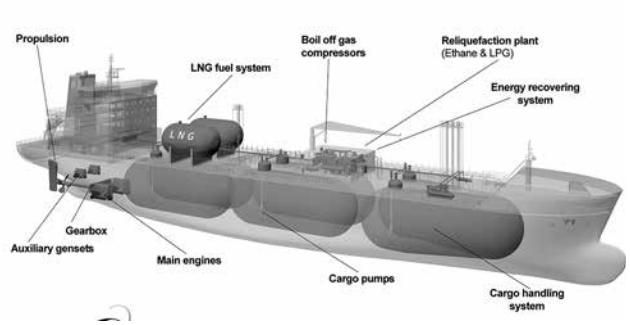
FSU is pumped through offloading hose-strings to shuttle tankers. Wärtsilä has also been contracted to supply deep-well pumps and fire water packages to the same FSU. Since its acquisition of Hamworthy in 2012, Wärtsilä has expanded its offering to the offshore oil and gas sector to include a complete range of liquid cargo-handling products, including inert-gas systems, pumps and gas re-liquefaction plants.

Wärtsilä to Supply Integrated Solutions for New Series of Environmentally-sustainable LNG Carriers

Wärtsilä has received an order to supply a comprehensive package for a series liquefied natural gas (LNG) carriers being built for Danish operator Evergas, a leading transporter of petrochemical gases and natural gas liquids. The ships are being built at the Sinopacific Offshore and Engineering (SOE) shipyard in China. In addition to LNG, the ships will be able to carry and reliquefy ethane and LPGs with the cargo-handling package supplied by Wärtsilä. In addition, Wärtsilä's scope of supply of the integrated systems order includes the dual-fuel engines and propulsion equipment.

"The customer's essential requirements for these vessels are to achieve the operational and fuel efficiencies needed to optimise their operating costs, while at the same time complying with the upcoming Tier III environmental regulations," says Aaron Bresnahan, Vice President Sales, Wärtsilä Ship Power. "The advanced-technology solution to be provided by Wärtsilä, whereby the cargo-handling system, the gas-supply system, and the propulsion machinery are fully integrated with each other, will make the vessels the most-modern and environmentally-sustainable LNG carriers ever built."

Martin Ackermann, CEO of Evergas said "We have enjoyed a lengthy and trusted relationship with Wärtsilä. This, together with Wärtsilä's relentless efforts in understanding and adapting to our demands, has enabled us to successfully achieve a total integrated solution. I am convinced that our Dragon 27500 series will be a benchmark in the LNG carrier markets."



An impression of the new LNG carriers
(Image courtesy Wärtsilä)

Efficiency and fuel savings are also gained through the Wärtsilä Energopac rudder, which because it streamlines the water flow from the propeller, lowers resistance and increases propulsion power.

The vessels will operate primarily on LNG using Wärtsilä dual-fuel engine technology. This will enable them to comply with current and anticipated environmental legislation, including the International Maritime Organisation's Tier III regulations. The Wärtsilä technology, however, also provides operational flexibility and redundancy, since it allows the possibility of utilising various conventional fuels in addition to LNG. The integrated LNG fuel system enables the vessel to operate on natural gas independently of the cargo carried.

The integrated systems contract enables a range of individual Wärtsilä solutions to be combined into a fully optimised package. Engineering and delivery of the complete cargo plant in combination with the gas fuel-supply system and propulsion plant is enabling Wärtsilä to optimise the complete vessel's energy consumption. This is clearly demonstrated, for example, where the LNG supply system is integrated with the cargo-handling system so that it can be used to cool the cargo. In so doing, less energy and power is needed to keep the cargo temperature suitably low, thus providing a more-efficient and environmentally-sound overall system.

Skills Plan Seen as Good Start

BAE Systems has described the Federal Government's Future Submarine Industry Skills Plan as a "positive first step towards creating a sustainable Australian naval shipbuilding capability."

On 3 May BAE Systems Australia Chief Executive, David Allott, welcomed the plan's release.

"It is however, only a first step towards balancing Australia's defence requirements with the necessary industry-sector capability to support it. There is now an urgent need to take the intent of this plan and turn it into action."

Mr Allott said that the Defence White Paper foreshadowed a significant amount of shipbuilding activity in the near-to-long term, including a commitment to replacing Australia's supply ships, HMAS *Success* and HMAS *Sirius,* 'at the earliest opportunity.'

"We welcome this commitment, particularly as it will examine local options, because this project will be important in helping industry to bridge the near-term gap in shipbuilding activity."

"The scale of the task ahead, in particular the Future Submarine Program, requires the combined efforts of the entire naval shipbuilding sector in order to meet the forecast workloads.

"Having rebuilt a significant skills base through the LHD and AWD programs, it is vital that we sustain this capability in the short-to-medium term to ensure that we do not repeat the 'boom and bust' issues of the past.

"As recognised in the plan released today, having the necessary skills, experience and infrastructure in place will be critical to ensure that our naval shipbuilding sector is 'match fit' and equipped to deliver to our Navy the capability edge it requires."

"We are proud to play a front-line role in delivering Australia's naval capability as prime contractor for the LHD project, systems integrator for the upgrade of our Anzac-frigate fleet, and as a trusted supplier of blocks for the AWD Program."

Mr Allott also welcomed the Government's decision to reallocate four AWD hull blocks to BAE Systems' Williamstown Shipyard.

"The decision recognises that our yard has the capacity and skills to take on additional work.

"We look forward to delivering these additional blocks and to working closely with the Government in implementing the plan's recommendations to create a secure and strong naval shipbuilding sector."

USNS *Millinocket* Christened at Austal's Alabama Shipyard

USNS *Millinocket* (JHSV 3) was named during a ceremony on 20 April at Austal's shipyard in Mobile, Alabama. USNS *Millinocket* is the third of ten Joint High Speed Vessels (JHSV) which Austal is building for the US Navy as part of a ten-ship contract worth over $1.6 billion.

The 103 m catamaran vessel was named *Millinocket* by US Secretary of the Navy Ray Mabus on 30 May 2012, after the Maine towns of East Millinocket and Millinocket. According to Secretary Mabus, "Millinocket displays American values of community and ingenuity at their best. I chose to name the JHSV after East Millinocket and Millinocket to honour those values and the men and women of the community which represents them no less today than it did in the early 1900s."

The ship's sponsor, the Hon. Karen Gordon Mills, was sworn in as Administrator of the Small Business Administration in April 2009. A Maine resident, Ms Mills has served in the President's Cabinet since January 2012, where she is a key member of the President's economic leadership team reflecting the important role which small businesses and entrepreneurs play in our nation's long-term economic growth and prosperity.

"Administrator Mills was a particularly appropriate sponsor for this Navy ship," said Austal USA President Craig Perciavalle. "It is a wonderful way to honour the more than 200 small businesses nationwide which support the JHSV program."

Ms Karen Mills christening USNS *Millinocket*
(Photo courtesy Austal)

Over 600 naval and shipyard guests attended the ceremony, which was held underneath the ship, between the iconic twin hulls of USNS *Millinocket*. Vice Admiral William R. Burke, USN, Deputy Chief of Naval Operations for Warfare Systems, was the principal speaker at the event.

Austal USA President, Craig Perciavalle, praised the ship, saying "USNS *Millinocket* is a revolutionary new platform which will bring an unprecedented level of flexibility, mobility, efficiency and support to our combatant commanders and nation." He also praised the shipbuilders, saying "USNS *Millinocket* is a great ship, built by great navy shipbuilders, master craftsmen who worked tirelessly to bring this new ship to life."

Four JHSVs and four LCSs are currently under construction in Austal's Mobile, Alabama shipyard. For the LCS and JHSV programs, Austal, as prime contractor, is teamed with General Dynamics Advanced Information Systems, a business unit of General Dynamics. As the ship systems integrator for the LCS program, General Dynamics is responsible for the design, integration and testing of the ship's electronic systems including the combat system, networks, and seaframe control. General Dynamics' proven open-architecture approach allows for affordable and efficient capability growth as technologies develop.

These two contracts will require Austal to increase its Mobile, Alabama workforce to approximately 4,000 employees.

USNS *Spearhead* (JHSV1)
(US Navy photograph)

Wärtsilä 34DF is First Dual-fuel Engine Family to Receive United States EPA Certificate

Wärtsilä has obtained certification of emission standard compliance from the United States Environmental Protection Agency (EPA) for its Wärtsilä 34DF dual-fuel engines. It will enable Wärtsilä to strongly enter the American market with marine engine technology which offers operators and owners the option of using either diesel or gas as fuel. The certification was obtained on 17 January 2013.

"The Wärtsilä 34DF is the first dual-fuel engine fulfilling the EPA requirements, and this is a very important statutory recognition of Wärtsilä dual-fuel technology," said Andrea Bochicchio, Director, Product Management and Engineering, Product Centre 4-stroke, Wärtsilä PowerTech.

With the passing of this compliance milestone, Wärtsilä anticipates that market demand in the USA for its range of dual-fuel engines will further increase. The first engines will equip *Harvey Energy*, an offshore supply vessel built for Harvey Gulf International Marine. Four sister vessels will shortly be supplied with the same Wärtsilä engines, thus further demonstrating both the viability of liquefied natural gas (LNG) as a marine fuel and its growing popularity among ship owners and operators. LNG-fuelled vessels offer compelling operational cost savings and significant environmental benefits.

"Economic and environmental factors are having a tremendous impact on the shipping industry, and at Wärtsilä we firmly believe that flexible fuel options are a positive step in alleviating these challenges. Our dual-fuel engine

technology enables environmental legislation to be met where necessary, while maintaining the ability to use conventional diesel fuel in unrestricted areas," said Giulio Tirelli, Director, Wärtsilä Ship Power, 4-stroke Portfolio and Applications.

Austal Response to Defence White Paper

Austal has welcomed the release of Australia's 2013 Defence White Paper and the Future Submarine Industry Skills Plan, noting that they foreshadow a more-conducive climate for Australian naval shipbuilding — including two significant patrol boat acquisition programs which lie firmly within Austal's field of expertise.

Austal Chief Executive Officer, Andrew Bellamy, said that the announcements indicated the Government had recognised that naval shipbuilding was a strategic capability which could and should be retained and enhanced through increased co-ordination between Defence and industry.

"It is very encouraging that the Government has expressed a commitment to, at the very least, consider balancing the shipbuilding program to provide greater stability as well as providing specific measures to aid the retention of critical skills," he said.

"We believe that a coordinated, long-term approach to naval shipbuilding would benefit both Defence and industry. More-consistent and more-predictable work would enable companies like Austal to deliver increasingly better value to the Commonwealth and foster the retention and development of the excellent skills which exist in our industry. It would also help mitigate the risks and costs associated with adjusting to meet the large variations in demand which are traditionally associated with naval shipbuilding."

Most specifically to Austal, Mr Bellamy said that the company's existing capabilities in Western Australia could be particularly beneficial to the planned acquisition of new patrol boats for the Royal Australian Navy and the Pacific Maritime Security Program, which were outlined in the Defence White Paper.

"Our success with patrol boat programs for state, Australian and international governments shows that we already have the world-class engineering, manufacturing and management skills and facilities, and a portfolio of proven designs which can readily be applied to both these new projects," Mr Bellamy said.

"The fact that we can undertake construction of these vessels here in Australia, with Australian technology and supported by a significant existing supply chain largely made up of Australian small-and-medium enterprises, means that these programs can directly support the retention and enhancement of the nation's naval shipbuilding capabilities.

"Provided the timing allows for continuing production from the current Cape-class patrol boat construction program, this would be perfectly in line with the recommendations of the Future Submarine Industry Skills Plan.

"This is a tremendous opportunity for the Commonwealth, for Austal and our employees, and for the diverse industry that supports Australia's defence and maritime security capabilities."

As one of Australia's principal naval shipbuilding companies, Austal was represented on the Expert Industry Panel by Andrew Bellamy.

"As an Australian-headquartered globally-operating naval prime contractor, Austal was very pleased to contribute to this important initiative," Mr Bellamy said. "We look forward to reviewing the Skills Plan in detail and contributing to subsequent implementation actions."

HMS *Queen Elizabeth* Refuels at Sea for First Time — in Miniature

Models of the Royal Navy's future carriers and the tankers which will support them are being tested in a giant water tank in Gosport in the UK. A 1:44 scale model of HMS *Queen Elizabeth* and RFA *Tidespring* have been practising replenishments at sea in calm and rough waters at the ocean basin test facility — the largest indoor water tank in Europe.

The Navy's new carrier has successfully carried out its first refuelling at sea — in miniature. Two highly-accurate one-tonne scale models of HMS *Queen Elizabeth* and the future tanker RFA *Tidespring* have been tested in Europe's largest indoor water tank in Gosport to determine how the two ships can sail safely in company.

Key to any future operations by the carrier — the largest warship ever to sail under the White Ensign — will be sustaining her thousands of miles from home.

For that she'll need to conduct a replenishment at sea on a fairly regular basis with a tanker or support ship of the Royal Fleet Auxiliary, whose ships provide crucial sustenance to Royal Navy vessels around the world daily.

Hand-in-hand with construction of *Queen Elizabeth* and her sister HMS *Prince of Wales* is the construction of a new generation of fleet tankers — four Tidespring-class ships of 37 000 t, entering service from 2016.

The basic design for the Tidesprings is almost complete and key to that design has been testing how they perform when working with the future carriers.

When the two ships sail together to conduct a replenishment, of fuel, water or dry supplies such as spare parts or fuel transferred by jackstay, they are subject to hydrodynamic forces which can drive them apart, or pull them together, both of which are highly dangerous.

Two 1:44 scale models — the 37 000 t, 200 m long tanker has been reduced to 4.5 m in length, while the 65 000 t HMS *Queen Elizabeth* has been shrunk from 284 m in length to 6.45 m — were built and taken to the ocean basin test tank, owned by the defence research firm, QinetiQ.

The tank in Haslar, Gosport, is 122 m long, 61 m wide and 5.5 m deep and can simulate both calm and rough seas.

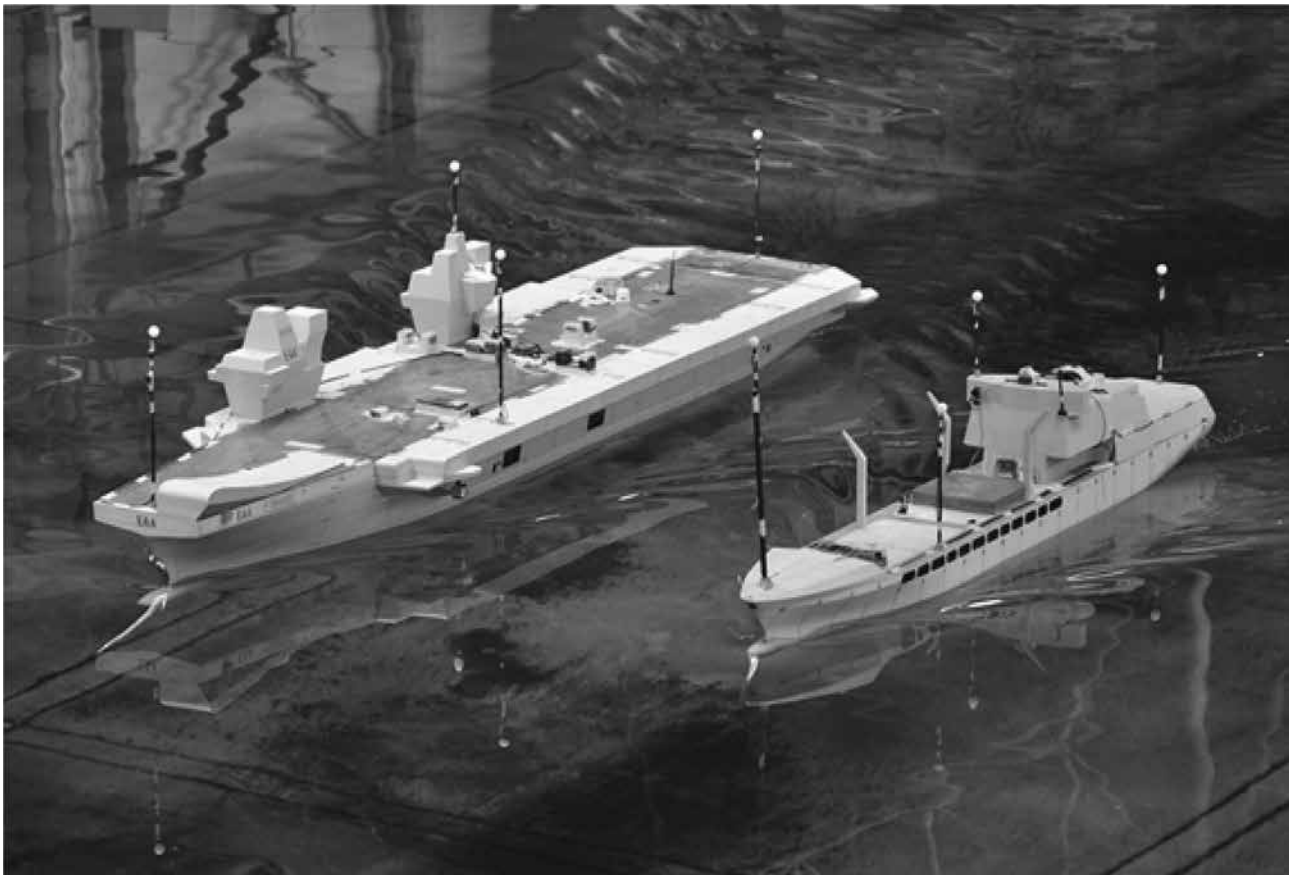
Whilst the tank is regularly used by the maritime community, this is the first time that two new ships have been tested for RAS operations.

"The RFA ships will have to keep station using the Queen Elizabeth-class as a guide during RAS," explained CDRE David Preston, head of RFA Engineering.

"This will take great skill and concentration for long periods in very challenging conditions — so any analysis we can undertake early will provide comfort that the replenishment at sea capability can be met with the new ships."

Tests in the Haslar tank were conducted up to a simulated sea state 6 — very rough seas, with waves up to 6 m high — and the two models also practised emergency breakaways and engine failures.

Once all the data has been gathered and analysed, it will be used by the RN and RFA to draw up the guidelines for safe operations when *Tidespring* joins the Fleet in 2016.



The models of HMS *Queen Elizabeth* and RFA *Tidespring* in the tank at Haslar
(QinetiQ photograph)

THE INTERNET

Building a Very Big Ship

In a shipyard in South Korea, workers are building the world's largest ships — Maersk Line's 400 m long Triple-E container vessels. Maersk and Discovery Channel have teamed up to bring every stage of construction, from design to maiden voyage, to the world's TVs and desktops.

To film a six-episode TV series, Discovery Channel has exclusive access to document every stage of the build; from the design of the vessel's unique hull to the construction of the Triple-E's enormous engines and propellers, from the environmental improvements and safety systems to the ship's naming ceremony and maiden voyage on the Asia-Europe route. All angles relating to the ship's design, build and launch will be covered — with many sequences in 3D.

The series will also focus on the human side of the Triple-E's development and zoom in on the lives of some of the people involved with the ship including the naval architect, members of the site team supervising the build, and the Captain as he trains for his new role and eventually sails the first Triple-E out on its maiden voyage.

"The Triple-E is an exceptional ship, in terms of its size as well as its energy-saving technology and design. We're excited about these vessels, and proud to have Discovery Channel as a partner for showing how it is built and the people and passion behind it," said Morten Engelstoft, Chief Operating Officer, Maersk Line.

"Discovery always delivers a unique and exclusive perspective on the world's most-ambitious engineering projects and the building of the world's largest ship is no exception. The Triple-E's scale is unprecedented, and we're glad our audience will be able watch these mighty ships being built, and launched, on Discovery," said Dan Korn, SVP and Head of Programming at Discovery Networks, West Europe.

Produced by Windfall Films, *The World's Largest Ship* will air on Discovery Channel in November of 2013. For the latest information, visit the website www.worldslargestship.com where you can watch a time-lapse video of the building of the Triple-E. The video consists of 50 000 photos taken over three months.

Webcasts of NSW Section Technical Presentations

Engineers Australia records technical presentations made to RINA (NSW Section) and IMarEST (Sydney Branch) for webcasting. The webcasts are placed on the Engineers Australia website, usually within a few days of the presentation, and the URLs are as follows.

Alan Taylor of the Institute of Marine Engineering, Science and Technology gave a presentation on *Business Continuity Management* to a joint meeting with the IMarEST attended by 25 on 6 February in the Harricks Auditorium at Engineers Australia, Chatswood. This presentation was not recorded.

Adrian Broadbent, Lead Specialist, Naval Business, with Lloyd's Register Asia, gave a presentation on *Maintaining the LHDs in Class* to a joint meeting with the IMarEST attended by 56 on 6 March in the Harricks Auditorium at Engineers Australia, Chatswood. This presentation was not recorded.

Adam Brancher of the Australian Maritime Safety Authority gave a presentation on *Revision of the National Standard for Commercial Vessels* to a joint meeting with the IMarEST attended by 19 on 3 April in the Harricks Auditorium at Engineers Australia, Chatswood. The webcast of the presentation is available at www.mediavisionz.com/ea/2013/easyd/130403-easyd/index.htm.

Clive Evans of Lightning Naval Architecture gave a presentation on *Development of a Low-cost Vehicle/Passenger Ferry in Response to Increased Competition from Air Travel in South-east Asia* to a joint meeting with the IMarEST attended by 17 on 1 May in the Harricks Auditorium at Engineers Australia, Chatswood. The webcast of the presentation is available at www.mediavisionz.com/ea/2013/easyd/130501-easyd/index.htm.

Phil Helmore

MEMBERSHIP

Australian Division Council

The Council of the Australian Division of RINA met on Wednesday 20 March 2013 by teleconference based in Fremantle, chaired by the President, Jim Black. As this meeting was the last before the Annual General Meeting, much of the agenda related to rounding-off the work of the preceding year.

Some of the matters raised or discussed during the meeting are outlined below.

President's Report

Council noted Jim Black's report, which is reproduced in his column in this issue.

Closure of TAFE NSW (Ultimo) Diploma Courses in Naval Architecture

Council was advised that a letter would soon be sent to the Manufacturing Skills Council, seeking cooperative action following the closure of the last non-degree course in Australia.

The Walter Atkinson Award

The attention of Council was drawn to the need for further publicity to be given in this issue of *The ANA* for the closing date of 15 July for nomination of papers. Kim Klaka's letter in this issue provides detailed information.

Membership of Division Council

Following the call for nominations in the November issue of this journal, Council noted the re-election or re-appointment of retiring members Tony Armstrong, Mark Symes, Danielle Hodge, Craig Hughes, Vesna Moretti and Jon Pattie. In expressing appreciation to Tim Lyon, who had completed his maximum permissible term, Council appointed Michael Mechanicos to the resulting vacancy.

London Council Issues

Division Council was briefed on the main issues covered by the Institution's January Council meeting, including preparations for the Annual General Meeting and planning for relocation of Headquarters during the northern summer.

Next Meeting

To be held on Wednesday 19 June 2013 based in Canberra.

Annual General Meeting

The Division's AGM was conducted in the evening of 20 March in Fremantle. Business transacted included noting the President's report and adoption of the audited financial statements for calendar year 2012. Prominence was also given to the call for nominations for the Walter Atkinson Award.

Rob Gehling
Secretary

Changed Contact Details?

Have you changed your contact details within the last three months? If so, then now would be a good time to advise RINA of the change, so that you don't miss out on any of the Head Office publications, *The Australian Naval Architect*, or Section notices.

Please advise RINA London, *and* the Australian Division, *and* your local section:

RINA London		hq@rina.org.uk
Australian Division		rina.austdiv@optusnet.com.au
Section	ACT	rinaact@gmail.com
	NSW	rinansw@gmail.com
	Qld	m-dever@hotmail.com
	SA/NT	danielle.hodge@defence.gov.au
	Tas	mfsymes@amc.edu.au
	Vic	srkelly@globalskm.com
	WA	rina.westaus@gmail.com

Phil Helmore

The Spanish Navy's replensishent ship *Cantabria*, seen here berthed in Chowder Bay, arrived in Sydney for the first time on 20 February. Now operating with the RAN for most of this year, this design is a possible contender for the replacement of both HMAS *Success* and HMAS *Sirius*
(Photo John Jeremy)

NAVAL ARCHITECTS ON THE MOVE

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

Matthew Allen moved on from Technip Oceania many moons ago and, after some moves, has taken up the position of Managing Director with Subcon in Perth. Subcon is a subsea stabilisation service company providing design, fabrication and offshore installation services. Friends can find out more at www.subcon.com.au.

Tom Bromhead moved on from Incat Crowther some moons ago, and took up a position as a wireline field engineer with Schlumberger in the gas fields of Queensland. Wireline field engineers (for those who aren't in the game) use electronic tools and computerised surface systems at the wellsite to perform open-hole, bore-hole seismic, and cased-hole logging to record and analyse sub-surface formations in oil and gas wells. However, he has moved on from there and is currently evaluating opportunities.

Tom Dearling has moved on from Strategic Marine and has started his own consultancy, HKM Naval Architecture, in Canberra and is now contracting to the Department of Defence on the acceptance of the LHDs.

James Fenning has moved on as a result of the acquisition of the Marine Construction Division of Clough by SapuraCrest in December 2011, and took up the position of Project Manager with SapuraClough Offshore in Perth, but has now moved on within the organisation to take up the position of Offshore Construction Manager.

Nathan Gale has moved on from the Centre for Maritime Engineering in the Defence Materiel Organisation and has taken up a position as a naval architect with Burness Corlett Three Quays in Sydney.

James Gutherson continues consulting as Blue Core and now includes Spotless among his clients, for whom he manages the Quality, HSE, Risk and Compliance Manager for the Royal Children's Hospital and associated health services in Orange, NSW, under a PPP arrangement.

John Hayes has moved on from the Department of Planning and Infrastructure in WA and has taken up a position as Project Engineer at DOF Subsea in Perth.

Zensho Heshiki has moved on from Burness Corlett Three Quays Australia and has returned to his home base of Hawaii and has taken up the position of Engineer in the CFD division of Navatek in Honolulu.

Hason Ho moved on from Cochlear two years ago and, after a year with the Breville Group as a project engineer, has now taken up a position as Senior Manufacturing Engineer at ResMed in Sydney.

Regina Lee has moved on from the Scots' College and has taken up the position of Academic Support Officer in Nura Gili, the indigenous studies unit, at the University of New South Wales in Sydney.

Michael O'Connor has taken a sabbatical from Rolls Royce and has enrolled in the EMShip Erasmus Mundus master's degree program. This provides a double master's degree from ULG-Liege, Belgium, and ECN-Nantes, France, with a supplementary diploma from Germany (Rostock), Italy (Genoa), Poland (Szczecin) or Romania (Galati).

Neil Pollock has moved on from his position as Lead Naval Architect on the Shell's Prelude Floating LNG platform and has taken up the position of Marine Technical Lead in G L Noble Denton's new office in Brisbane.

Pete Randhawa has moved on from Australian Marine Technologies and has taken up the position of Senior Structural Engineer at BAE Systems in Williamstown.

Malcolm Rowe moved on from Pongrass Australia many moons ago and, after almost five years as General Manager Business Solutions with Wilcom International, has now taken up a position with Patrick (Container Ports) in Sydney, developing and managing Lean Six Sigma business process improvement projects.

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 Robin Gehling when your mailing address changes to reduce the number of copies of *The Australian Naval Architect* emulating boomerangs.

Phil Helmore

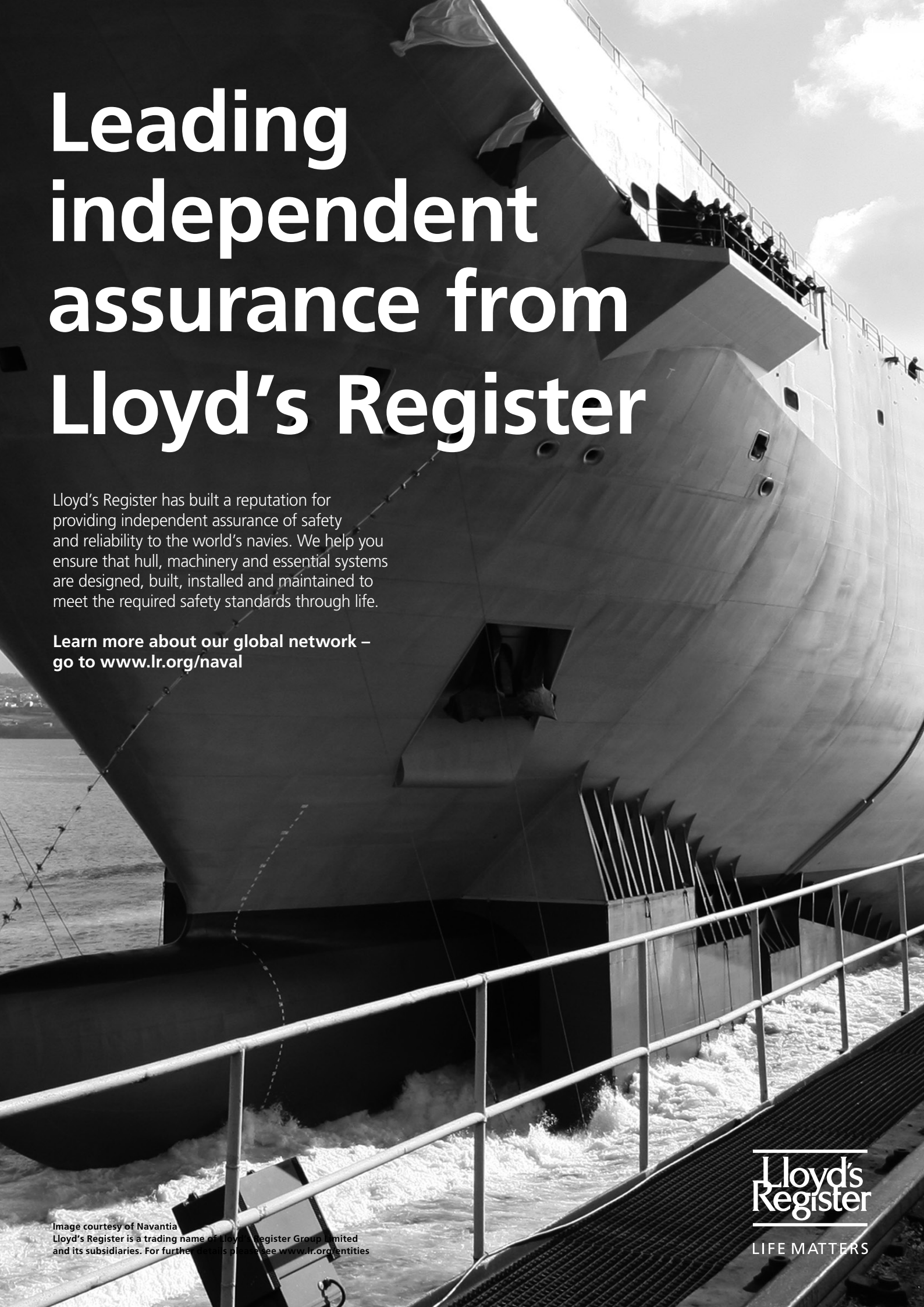
THE AUSTRALIAN NAVAL ARCHITECT

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 300 dpi is preferred.

HMAS *Perth* firing a slaute during the fleet review in October 1986 to mark the 75th anniversary of the Royal Australian Navy. Sydney Harbour will host a similar spectacle in October 2013 to celebrate the centenary of the arrival in Sydney of the RAN's fleet on 4 October 1913
(RAN photograph)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