THE AUSTRALIAN NAVAL ARCHITECT

Volume 16 Number 2
May 2012

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THE AUSTRALIAN NAVAL ARCHITECT

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(Australian Division)

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Cover Photo:
USNS *Spearhead* (JHSV1) during her recent sea trials in the Gulf of Mexico. *Spearhead* is the first of a series of high-speed transports to be built by Austal in the US for the US Navy
(Photo courtesy Austal)

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From the Division President

I would like to start by thanking the members of Council for having the confidence in me to endorse me as Australian Division President at the last Council meeting in March, and I would particularly like to thank Dr Martin Renilson for his brief but active time in this chair. On behalf of all members I should like to wish Martin well in his new venture in the Middle East.

The March Council meeting was followed by the annual general meeting in Brisbane and then by a presentation to the Queensland Section by Guy Anderson of AMSA on the Single National Maritime Safety Jurisdiction or "National System" as I believe it is now termed. This was an opportunity for all of us present to be updated on the current status of the National System and, judging by the many and varied questions which followed, there is still much misunderstanding, confusion and concern about its impending implementation — January 2013 is looming ever closer now!

It was appropriate then that, at the preceding Council meeting, the need to keep our members informed on this most important topic and to provide coordinated responses was recognised. I am extremely pleased to advise that Tony Armstrong has agreed to coordinate this work for us — he has produced an initial summary of the National System and its status for inclusion in this edition of *The ANA*. Ensuring that naval architects' voices are heard and represented during the three-year phase-in period of the system is one of the main tasks facing your Council at the moment. Another important ongoing task is our continued representation in the RINA/Engineers Australia Joint Board and, particularly, the ongoing dialogue concerning CEng/CPEng equivalence. Stuart Cannon has advised that he is prepared to continue in this important role for us. Thank you Stuart!

Shortly after my appointment as Division President, John Jeremy and I attended the April London Council meeting by telephone link. This meeting endorsed the changes to the Australian Division By Laws which we voted on and approved at our own AGM in March — thank you to those who took the time to respond with proxy votes concerning these changes. The meeting also warmly thanked John Jeremy for his active support of London Council as this was his last attendance.

Another topic which generated considerable discussion was the proposed implementation of an Environmental Committee (or sub-committee) at RINA. The whole question of environmental requirements and responsibilities, which seem to be ever changing whichever way we look (another note on USA environmental requirements just slid in to my inbox as I started to write this), is one which we cannot ignore and I see this as area to which the Australian Division will need to dedicate increased time and effort on behalf of members.

Finally, over the coming months we will again need to look seriously at our finances to ensure that our activities are sustainable into the future. On this note we are looking for a volunteer to take up the role of Advertising Manager for *The Australian Naval Architect* (acting, unpaid). Any takers?

I look forward to working closely with you all over the next two years and am always available for discussion and comment on any topic of relevance to Australian naval architects — you can email me at jimb@austal.com or telephone (0418) 918 050.

Jim Black

Jim Black
President, RINA Australian Division

Editorial

The Commonwealth Government has recently released some important reports which will inform the next Defence White Paper, to be brought forward one year to 2013. Two of these reports are of particular interest in the environment of a constrained Defence budget.

The Hawke Report into the berthing of cruise vessels in Sydney Harbour and the possible sharing of Fleet Base East wharves by large cruise ships in the peak season each year clearly highlights two issues which will be an increasing problem for both the navy and commercial operators in coming decades. Ships are getting larger and the availability of space for future port development at the most suitable locations in Australia is becoming severely constrained by a lack of long-term planning in the past, and modern environmental constraints.

Several options were considered to relieve the anticipated log-jamb of large cruise ships in Sydney, but those most likely to actually achieve some benefit are all expensive and likely to be politically and environmentally contentious. It is hard not to draw a parallel with the long saga of trying to find a site for Sydney's second airport.

The second report, of the Defence Force Posture Review, addresses (amongst a wide range of issues) the need for a second east-coast base for the RAN to supplement the limited

capacity of the present Fleet Base East in Sydney. The new RAN ships which will enter service over the next decade or so will be larger than those of the current fleet and will place considerable demands on existing bases, dockyards and other industry. In a country as large as Australia, with a small population, one might be excused for thinking that there must be many options available which would satisfy the future needs. However, the options are quite limited. Near Sydney, for example, Jervis Bay (considered as a site for a naval base about 20 years ago) is now a marine park and space in Newcastle is fully committed for commercial shipping.

Amongst other suitably-located east-coast options, Townsville is constrained by the demands of commercial shipping, a limited industrial base and it lies within the cyclone belt. Brisbane, however, ticks most of the boxes and is the most promising location for a new base for some of the RAN's future submarines and the amphibious fleet. The report recommends that Defence start planning now for the development of an additional fleet base there in the longer term. The cost of such a base is likely to be very high and its construction might lie well in the future, but the report emphasises the need for space to be reserved for the navy as the Port of Brisbane continues to expand.

Over one hundred years ago, Admiral Sir Reginald Henderson recommended that a generous number of naval bases for the RAN should be constructed around the coast of Australia and land was subsequently acquired for some. Construction began in Western Australia and preliminary work was undertaken at Port Stephens in New South Wales but the plans died during the 1920s. The land in Port Stephens was sold and a Western Australian base had to wait for another half century to pass. Today there are far fewer options available and, if early action is not taken to secure space for the needs of the RAN, solutions may be very hard to find.

John Jeremy

LETTERS TO THE EDITOR

Dear Sir,

I am writing to you about one of the most spectacular private yachts I have ever seen, and which is deserving of the awareness of the naval architecture community.

The vessel is the 140 ft (42.67 m) trimaran, *Adastra,* which took five years to design and construct, i.e. longer than the construction of *Titanic*. She was launched recently at the McConaghy yard in China, which normally specialises in building racing yachts. *Adastra* is thus unique, as everything is extremely lightweight, and she may herald the future for efficient long-range cruising. She is built from carbon fibre with a Nomex honeycomb core. The hull was vacuum bagged using a glass/kevlar foam-sandwich layup. Other custom features include unique carbon-fibre hatches, valves in carbon fibre and, if this is not enough, all the hinges and ladders are also made of carbon fibre.

I would like to draw specific attention to the fact that *Adastra* can be controlled from an iPad within a 50 m range. She is able to perform at an average speed of 17 knots on long sea voyages. The tanks on board have the capacity for a range of 3500 n miles, which is the distance from the western tip of France to the Caribbean, so crossing the Atlantic without re-fuelling will not be a problem. After completing a series of trial runs outside Hong Kong, this masterpiece will be delivered to her owner's private island in Indonesia.

I have yet to decide which vacation I would prefer; sailing a luxurious super-yacht on the high seas, taking a cruise to the Caribbean, or staying on a private tropical island. With this yacht, one would be able to do all three ... forget having to choose!

Raymond Fagerli
UNSW Student

Dear Sir,

This year we commemorate the 100th anniversary of the sinking of *Titanic* as well as mourn the recent loss of 32 lives in the *Costa Concordia* tragedy. It is worthwhile considering the things which have changed in 100 years and those that have stayed the same.

The design of *Titanic*, though majestic, was not perfect. The watertight bulkheads, although reaching relatively high decks, were not completely watertight and the steel used became brittle at low temperatures. Furthermore, there were far from enough lifeboats aboard. Despite these design and safety faults, the disaster could have been avoided if the captain had not ordered full speed in the dark of night after having received iceberg warnings from ships in the same area.

One hundred years later, safety is the first priority for ships. There are more lifeboats, a greater understanding of stability, better-trained staff, and highly-technical navigation equipment designed to prevent disaster. *Costa Concordia* was fitted with an alarm which would sound if the ship detoured from her planned route. However, on 13 January this year, this was manually overridden so that the captain could take the ship closer to shore for the entertainment of passengers and spectators. When the ship struck a rock and began to list as she took on water, evacuation was delayed until hours later and, when this occurred, Captain Francesco Schettino was among those on a lifeboat and would not return to his ship despite orders from authorities.

Engineers and naval architects are continuously researching and designing more safety features to prevent accidental disaster, and yet lives continue to be lost at sea. Where does the responsibility lie? How many safety features must be added to completely avoid disaster? What can a naval architect do to enforce a captain to listen to warnings, make use of the computers available, and be a leader in the face of disaster? Mathematics and physics can tell us how a ship will behave under given conditions, but cannot tell us how humans will behave when danger lurks. Until it can, there will always be something left to chance.

Georgia McLinden
UNSW Student

Dear Sir,

I would like to tell how a village boy became a Student naval architect.

My family originated in a remote village in a mountainous area by the edge of the Mu Us Desert, China, which covers 42 000 km^2. The village is surrounded by continuous and endless mountains. Flying by, you may not notice that there are people living in the valleys. An additional reason for this is that our houses are built by digging into the mountains rather than building a structure in the open field, so our villages merge into the landscape.

It is not a surprise to have a Sydney city boy who lives by the beach become a naval architect, but it is quite unusual for a village boy who lives a town where the folks are astonished to hear that the earth is round in the 21st century. When I was a child, we did not have constant access to electricity, and our only electric appliance was a 5 W light bulb which did not work every day.

I moved to the town where my parents work when I reached school age. Village life gave me two advantages. One: I started school as a blank page, and two: I am always curious. I had my first taste of butter on my flight from China to Australia in 2010, so I always have the opportunity to appreciate new things which are normal to others.

In year three at school, I watched the translated documentary, *Accidents of Transportation*, in which were briefly described many recorded accidents, from *Titanic* to Japan Airlines Flight 123, which claimed 1514 and 505 lives respectively.

However, it appears that the public pays more attention to air rather than marine accidents, and it is not as popular among fellow students, despite the fact that that marine transportation is a much larger industry. When an accident happens far from the coast, it is usually very hard to retrieve the wreckage and the gigantic size of it, so we do not always have the luxury of collecting all the tiny pieces and reconstructing the structure as they do for air accidents. Nevertheless, there are always dedicated young men, such as myself, who are willing to devote themselves to overcoming the disadvantages by standardising and improving procedures, both in operations and investigations.

Therefore I embarked upon this life-long journey as a naval architect with extreme curiosity. I hope that I can make my own contribution towards marine safety in this millennium.

Dauson Zhao
UNSW Student

Dear Sir,

With the 100th anniversary of her sinking reviving interest in the loss of the White Star Liner *Titanic* following her collision with an iceberg in 1912, I have been thinking about the sinking.

Firstly, has anyone modelled the dynamics of the sinking, from leaving the ocean's surface to arriving at the sea floor?

My thoughts are as follows. Rather than glide down in a steady manner once completely flooded, I would think the forward section of the wreck may have followed an oscillating motion. Initially the wreck would have fallen down and forward, following the bow as it pointed down, but the larger drag of the superstructure compared to the hull may have firstly levelled off the wreck followed by the aft end falling below the level of the bow. The forward component of motion may have then stalled with the wreck falling down and aft. In turn, this aft component of motion may have stalled. Thus while the vertical sinkage would have continued, the forward and aft components of motion may have taken turns and the overall motion may have been a falling oscillation.

Secondly, I consider that if they sighted the iceberg less than a minute before impact, there could have been virtually no change in speed or course before that impact.

Hugh Hyland

NEWS FROM THE SECTIONS

Tasmania

The first RINA technical meeting for 2012 was held at the AMC on 19 April, when a presentation entitled *Seakeeping Behaviour of Fast Vessels* was given by Pepijn de Jong, a visiting researcher from Delft University of Technology. Pepijn's outline of his talk was as follows:

"Although there exists a wide variety of possibilities to go fast at sea, for a large number of applications the relatively simple and robust monohull is favoured. Typical applications are patrol vessels for the navy, coast guard and police, rescue boats, and offshore crew supply boats. This presentation focuses on the hydro-mechanical research on this type vessel carried out at Delft University in the recent past and on current developments in this research. The specific type of behaviour exhibited by fast vessels in waves will be discussed, as well as the development of computational tools to assist in prediction of this behaviour. Recent design developments to improve the seakeeping behaviour of these vessels will be included in the talk, such as the application of the Axe Bow and the development of a new rescue boat for the Royal Dutch Lifeboat Association (KNRM)."

The project described by Pepijn with the KNRM lifeboats was a wonderful combination of computational, model-scale and full-scale experimentation, optimisation and assessment. To have such a complete explanation of how to really understand a complex phenomenon such as small boat slamming was extremely interesting.

Jonathan Binns

New South Wales

Annual General Meeting

The NSW Section held its fourteenth AGM on the evening of 7 March, following the March technical presentation in the Harricks Auditorium at Engineers Australia, Chatswood, attended by 17 with Graham Taylor in the chair.

Graham, in his Chair's Report, touched on some of the highlights of 2012, which included ten joint technical meetings with the IMarEST (Sydney Branch), with attendances varying between thirty-two for Noel Riley's presentation on *Developing Hullforms of Yesterday's Timber Vessels* and fourteen. SMIX Bash 2011 was successful and was attended by 200, including a number of interstate and international guests.

Adrian Broadbent presented the Treasurer's Report. The EA venue at Chatswood had, as usual, been our major cost for the year. However, with a close watch on the outgoings, we had managed to operate within our budget and had a balance of $518 in the Section account at 31 December 2011. SMIX Bash is funded separately through the Social account which currently has a healthy balance due to accounts still to be paid, but projections are for a small surplus to enable preliminary arrangements for SMIX Bash 2012.

There is a number of changes to the NSW Committee for 2012. Matthew Stevens resigned from the Committee recently due to new employment in Newcastle. Alan Taylor and Nathan Gale were elected to the committee, and Graham Taylor retired from chairing the Committee and Alan Taylor was elected to the chair. Other committee members have agreed to continue in their positions for a further year. As a result, the committee for 2012 is as follows:

Chair	Alan Taylor
Deputy Chair	Craig Hughes
Treasurer	Adrian Broadbent
Secretary	Craig Boulton
Assistant Secretary	Rozetta Payne
AD Council Nominee	Adrian Broadbent
Auditor	Anne Simpson
TM Program Coordinator	Phil Helmore
Members	Valerio Corniani
	Nathan Gale
	Graham Taylor

Committee Meetings

The NSW Section Committee met on 22 February and, other than routine matters, discussed:

- SMIX Bash2011: The 12th SMIX Bash was generally regarded as successful; accounts have yet to be finalised, with some payments still to be made, but projections are for a small surplus which will provide seed funding for SMIX Bash 2012.
- SMIX Bash 2012: Thursday 6 December has been pencilled in with the Sydney Heritage Fleet for the hire of *James Craig*; Chris Hughes has agreed to chair the SMIX Bash organising committee, and the committee is scheduled to meet in the near future. Proposals were made for model for the silent auction.
- Technical Meeting Program 2012: The program of technical meetings for 2012 is nearly complete, with most RINA presentations arranged, and the IMarEST August presentation to be advised.
- Webcast Arrangements: It was decided that, with the concurrence of IMarEST, all remaining technical meeting presentations in 2012 would be recorded and webcast on the Engineers Australia website.

The NSW Section Committee also met on 3 May and, other than routine matters, discussed:

- SMIX Bash 2011: All accounts have been paid, resulting in a small surplus which was shared with IMarEST.
- SMIX Bash 2012: Discussions are ongoing with SHF re increasing attendance; a lines plan has been obtained for a model for the silent auction; sponsors are being approached.
- Technical Meeting Program 2012: There have been two hiccoughs in this year's program, and discussion revealed several presentations which could be called on at short notice if needed.
- Recording of Technical Meetings: The AD Council has requested that we investigate webinars as opposed to webcasts for technical presentations.
- Value of Membership: The value of membership was canvassed, as many of our services (such as technical meetings) are also available to non-members.
- Conferences: The possibility of holding conferences was discussed.

The next meeting of the NSW Section Committee is scheduled for 14 June.

The America's Cup

Andrew Baglin, international sailing umpire and PhD candidate at the University of New South Wales, gave a presentation on *Racing for the America's Cup* to a joint meeting with the IMarEST attended by 39 on 7 March in the Harricks Auditorium at Engineers Australia, Chatswood. This was the fourth-highest attendance of the 52 technical meetings held since Engineers Australia moved from North Sydney to Chatswood in June 2006.

Introduction

Andrew began his presentation by describing how he came to be an international sailing umpire, since he is often asked the question. It came about almost by accident! He was first dragged along by a friend who was umpiring a match-racing event. He discovered that he enjoyed chasing around after yachts in a rubber ducky, did a good job, and was asked back to umpire other events. That led on to achieving umpiring qualifications, then umpiring international events and seeing the best sailors in the world compete in various classes and, eventually, to being approached by the America's Cup team.

History

Andrew then showed a slide of the America's Cup, affectionately called "the Auld Mug" by the sailing community. It is the world's oldest active trophy in international sport, and is probably the hardest to win, having been only won (i.e. by defeating the current holder) six times in 34 challenges in 132 years, and billions of dollars having been spent on both challenging and defending.

The cup was first called the "RYS £100 Cup" and was awarded to the USA yacht *America* when, on 22 August 1851, she raced against 15 yachts of the Royal Yacht Squadron in the Club's annual 53 n mile race around the Isle of Wight. *America* won, finishing eight minutes ahead of the closest rival. According to legend, Queen Victoria, who was watching at the finish line, asked who was second, the famous answer being: "Ah, Your Majesty, there is no second."

The cup was then mistakenly engraved as the "100 Guinea Cup" by the *America* Syndicate, and donated via a Deed of Gift to the New York Yacht Club, specifying that it be held in trust as a perpetual challenge trophy to promote friendly competition among nations.

The first challenge to wrest the cup from the USA was issued by James Lloyd Ashbury's yacht *Cambria* in 1870, and subsequent challenges have been sailed under many different rules, including the New York Yacht Club rule, the Seawanhaka Corinthian Yacht Club rule, the Universal or J-Class rule and, post WWII, the Twelve-metre rule, the International America's Cup Class (IACC) rule, and two Deed-of-Gift (DoG) rules. Australia's first challenge was by the yacht *Gretel*, designed by Alan Payne, in 1962, and the first *successful* challenge was by the Australian yacht *Australia II*, with her winged keel designed by Ben Lexcen, in 1983.

It was becoming clear, towards the end of the Twelve-metre rule era, that the rule was becoming long in the tooth and that a rule giving higher performance was needed. The IACC rule was the result, and went through five versions, with 100 yachts being built in the 15-year reign of the rule. Under the rule, there was lots of development of the class, including the application of computational fluid dynamics, development of materials science, sails, hull shape, and the like.

Switzerland won the Cup in 2003 in *Alinghi*, and successfully defended against New Zealand's *Team New Zealand* in 2007, both under the IACC rule. However, in 2010 the USA challenged under a Deed-of-Gift rule with a trimaran using a wingsail. This vessel had the maximum waterline length of 90 ft (27.43 m) permitted by the rules, but had the amahs (side hulls) 110 ft (33.53 m) long, and the wingsail had more area than the wings on an A380 aircraft! She was known affectionately as *DoGzilla* in the sailing community.

New Rule

The America's Cup Committee is alive to the needs of the various interests in the competition for the Cup. There is a need to bring the sailing to the people, they need to provide a good return for the sponsors, and they need to show that they are attracting the best sailors sailing the fastest boats.

The need for fast boats is being addressed by two new wingsail catamaran rules, the AC45 and the AC72. The AC45 rule is a short-term measure, designed to get boats on the water quickly and for the sailors to learn how to sail these fast craft in 2011 and 2012. The 2013 America's Cup races will be sailed in the AC72s.

AC45

Principal particulars of the AC45 catamarans are

Length WL	13.72 m (45 ft)
Beam	6.9 m
Rig height	21.5 m
Displacement	1400 kg
Wing area	85 m^2
Total sail area	133 m^2 (including gennaker)
Construction	Nomex/prepreg
Crew	5

Andrew then showed a movie of AC45s sailing. It is obviously fast and exciting, and achieves the goal of bringing sailing to the people. These boats are capable of 30 kn in the right conditions and, in one race in September last year, there were gusts of up to 30 kn, making for thrilling sailing!

This is a one-design class (all boats are the same), designed by the Oracle design team, and are hard to sail well. Heart-rate monitors on the crews have shown rates of around 200 per minute *throughout* a race! Crews typically lose weight during a competition series, because they cannot eat enough!

Andrew then showed a number of slides illustrating the construction of the AC45s. They have a wave-piercing hullform, with the main structural element being a central longitudinal spine which supports the mast and takes many loads in order to reduce the size of the usual cross-beams. The boats are suspended from a crane for rigging and launching, and can be in the water sailing in as little as 30 minutes from the time of removal from the shed.

The wing is in five separate elements, so that it can be easily shipped around the world, and is controlled by three spreaders for camber and twist of the trailing section. The leading edge of the wing is a carbon-fibre section to take the "mast" loads, with carbon/Nomex webs and industrial-strength cling-wrap sheathing of the wing.

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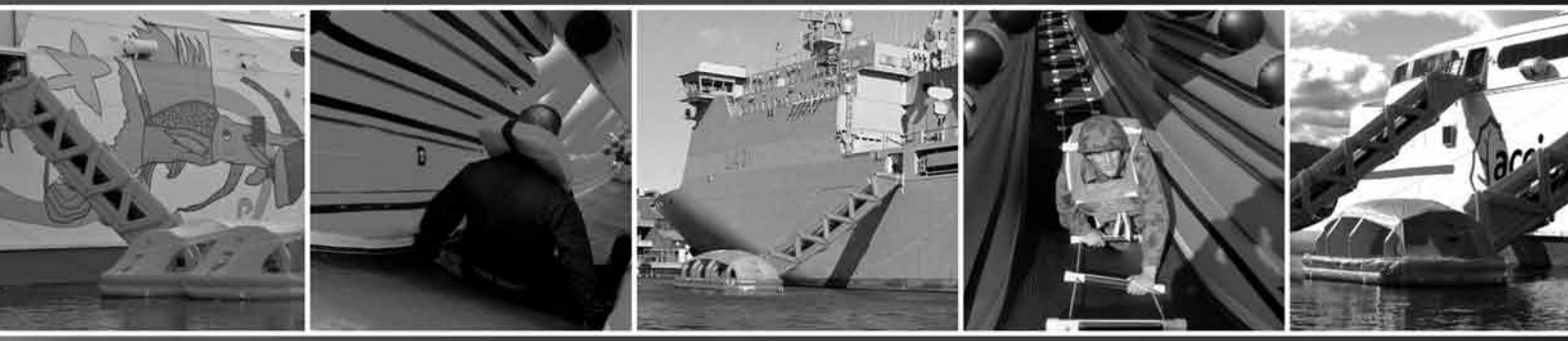

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AC72

Principal particulars of the AC72 catamarans are

Length WL	21.95 m (72 ft)
Beam	14 m
Rig height	40 m
Displacement	5700 kg
Wing area	260 m^2
Total sail area	580 m^2 (including gennaker)
Crew	11

This is a development class, and the rationale is that the speed of these vessels is controlled almost completely by the length and righting moment. So, limiting length and beam in a box-type rule should lead to the boats being similar. Watch this space; the first boats are not allowed on the water until July this year.

Teams racing in the AC45s have included France, Sweden, UK, China, New Zealand, Spain, Italy, USA and Korea. Teams confirmed for the AC72s include Sweden, New Zealand, Spain, Italy, and USA.

Media

Historically, the America's Cup races have been held offshore, and so have been hard for people to see, even with TV coverage, much less for non-sailors to understand what is happening and why the yachts are doing what they are. In addition, the racing typically takes place over a period of a couple of months, limiting the exposure of the sponsors.

This time there is a lot of innovation in bringing the sailing to the people via the media, especially in the schedule and the format.

The 2013 America's Cup will be held in San Francisco, and here Andrew showed a map of the bay area on the south-east side of the Golden Gate Bridge, where the races will be sailed. The sailing area is bounded by the shore and a five-sided shape about 2.5 n miles long by 1 n mile offshore, keeping the boats close to each other and to spectators on the shore.

In addition, there will be lead-up events in the America's Cup World Series (AMWS), which are being sailed in the AC45s and which commenced last year. This means that there are more events, spread out over a longer period of time, giving the sponsors more air time and exposure.

In each match, it will be the best-of-three races, i.e. whoever wins two out of three. TV likes to keep things short and so there will be three short 20-min races, rather than one long one.

Another innovation for the racing will be the Liveline. This is best described in other sports as the line showing the world record in relation to the leading swimmer in the pool in swimming, the advance line in gridiron, or the car details in car racing, and could provide benefits for yachting. For example, the wind and current are hard to see, but they drive the decisions taken by yachts in the race. Photos can be taken from helicopters, and then the Livelines shown as lines superimposed on the water, including boat speed, direction, location in relation to other boats and the boundaries of the sailing area. This data is then available to everyone.

There are cameras on board each boat, including one supported aft of and above the aft cross-beam, and at deck level on each side of the main cross-beam. These give videos of the sailing conditions on each vessel.

There is a big change in the lodging of protests. Instead of a raising white flag and having the protest heard after the race, the sailing master now presses a button on his on-board computer, which shows a light on the mast and is broadcast so that everyone can see the lodgement. The protest is examined immediately by the umpires, considered in light of the Liveline evidence of the positions of the vessels at the time (in relation to each other and to the boundaries), and ruled on immediately. The penalty may be simply slowing the vessel down, because these vessels are so fast that anything less than maximum speed throughout can lose the race!

All crew have radio microphones, and each vessel has six or seven channels, so that with six or seven boats racing, there is an overload of data coming ashore.

The GPS units use the real-time kinematic (RTK) system working on the carrier frequency of 1500 MHz, and are accurate to within 20 mm! Vessel positions will therefore not be in dispute.

The helicopters which provide the data for Liveline use an inertial guidance system (IGS) to determine their position, so that the location, attitude of the helo and the attitude of the camera in relation to the helo can be determined in order to paint the lines on the water. This is clearly a complex operation.

Race Management

Historically, marks to define the course have been buoys or air-bag type marks anchored to the bottom. These are fine in shallow water, but not so wonderful in deep water offshore, especially if a mark has to be re-located, e.g. to shorten course.

Another innovation is the use of America's Cup race-management vessels, which have been designed by One2three Naval Architects in Sydney. These vessels do double duty as marks for the course and as VIP vessels, putting the VIPs at the centre of the mark-rounding action. The GPS gives coordinates of where the mark is required, and the vessel sits on that location. If the mark has to be moved, then the new GPS location is input, and the vessel simply moves to the new location and sits there.

On-course sighting is another area of innovation. Historically, the umpire on the start boat sights along the line, and can see the closest vessel which is over the line at the start gun, but cannot then see any vessels further away which might also have been over. The Liveline picture from the helo above shows up *all* vessels which are over the line at the start gun, and these can be immediately protested by the umpires and penaties imposed, e.g slowing down.

Umpiring is made significantly easier with the benefit of Liveline and the information which is made available. In the past, an umpire would need to be in three positions at once to be able to judge a protest fairly; i.e. directly ahead to see the gap, abeam to judge an overlap, and at the side to judge the distance to the boundary. Liveline gives all this and more.

Conclusion

The America's Cup races in 2013 will be sailed in San Francisco, and will bring in a host of innovations to sailing. They will be in high-speed giant catamarans, close to shore, with sailing boundaries, and the media-friendly Liveline enhancements.

YouTube, one of the big sponsors, will show the regattas, live, and for free.

Questions

Question time elicited some further interesting points.

There will be both fleet racing and match racing. TV wants fleet racing, and so the AMWS events will feature both fleet racing and match racing, as will the Louis Vuitton Cup (to decide the challenger). The America's Cup races will be match racing only.

There are wing extensions being built for the AC45s, to be available soon.

There will be five umpires for each match; two on the water, and three in the booth ashore, all with access to the Liveline feed.

Jetskis are no longer favoured for umpiring, as they have had a history of breakdowns, and produce a heavy wash.

The technology from the America's Cup (e.g. Liveline) is likely to filter to other match racing events, but there is no timescale for that to happen; it will depend on each class making use of the technology when wanted.

The vote of thanks was proposed, and the "thank you" bottle of wine presented, by Alan Taylor, who said that he was glad that he was not sailing one of these new speed machines, as it was difficult enough when he capsized a Hobie 18!

Shipping Disasters

Alan Taylor, Principal of A.H. Taylor and Associates, gave a presentation on *Shipping Disasters and their effects on Ship Design and International Conventions* to a joint meeting with the IMarEST attended by 23 on 4 April in the Harricks Auditorium at Engineers Australia, Chatswood.

Introduction

Alan began his presentation by saying that, in preparing this presentation, he had looked at his own experiences and came up somewhat short, never having had a disaster at sea. However, he has been involved in the investigations of a couple of shipping disasters of note. These included the aftermath of Typhoon Rose, which hit Hong Kong in 1971 in which he counted around 28 ships aground, and there were 130 direct fatalities. MV *Iron Baron* grounded on Hebe Reef at the mouth of the Tamar River in Tasmania on 10 July 1995 and was subsequently dumped off Flinders Island in 4000 m of water. More recently, MV *Rena* grounded on Astrolabe Reef off the Port of Tauranga on the north-east coast of New Zealand on 5 October 2011, has broken in half, and is still there.

A quote of note attributed to Captain E.J. Smith: "When anyone asks me how I can best describe my experience in nearly forty years at sea, I merely say, uneventful. Of course there have been winter gales, and storms and fog and the like. But in all my experience, I have never been in any accident... of any sort worth speaking about. I have seen but one vessel in distress in all my years at sea. I never saw a wreck and never have been wrecked nor was I ever in any predicament that threatened to end in disaster of any sort". That was in 1907, five years before he hit the headlines as master of RMS *Titanic* on her ill-fated maiden voyage across the Atlantic.

Definition of a Shipping Disaster

The Oxford Dictionary defines shipping as "a noun; ships, especially ships of a country, port, etc., and disaster as: "sudden or great misfortune, calamity; ill luck."

This presentation therefore covers the "sudden or great misfortune, calamity or ill luck, which has befallen ships" by generic ship types, the causes and consequences of the disasters, and their ramifications for shipping.

Causes of Shipping Disasters

Shipping disasters can be classified into three categories: loss of life, damage to the marine environment, and loss of assets (both tangible and intangible).

The causes of shipping disasters can include:

- Floundering.
- Sinking.
- Breaking up, e.g. due to stranding on rocks, land or shoals, or poor design.
- Failure of ship's equipment, e.g. hull and machinery or latent defect; operational procedures not followed or incorrectly undertaken; maintenance procedures not followed or incorrectly undertaken; cargo and/or discharge equipment damage.
- Rust causing reduction of hull scantlings, e.g. through non painting of hulls or tank internals; breakdown of paint scheme (non maintenance); cargo or other causes of internal hull corrosion (e.g. sulphur).
- Stress corrosion, which can happen in bulk liquid and ore carriers via bad transition of the hull girder into the forepeak and engine room.
- Instability due to poor design, overloading, improperly stowed cargo, cargo shift, slack tanks (free surface effect), fire-fighting (free surface effect).
- Human error in navigation, collision, fog, heavy rain or equipment failure, running aground, uncharted reefs or rocks, out-of-date charts, incorrect charts, fatigue of personnel.
- Force of weather, e.g. wind, tide or current, ice, or break-up of ship from panting, slamming or swamping.
- Human acts, e.g. warfare, piracy, mutiny, sabotage, terrorist acts (via guns, fire, torpedoes, depth charges, mines, bombs and/or explosives).
- Fire in cargo, accommodation or machinery spaces.
- Explosions in cargo, cargo vapour, oil mist, sabotage or terrorist acts.
- Intentional/planned sinkings by scuttling, e.g. dumping under the London Dumping Convention, target practice (on old vessels), to prevent a ship falling into enemy hands, or as part of an insurance scam.

Cost of Shipping Disasters

The cost of shipping disasters can be measured in various terms, e.g.

- Loss of life: Over 90 000 from a rough count of records of shipping disasters.
- Environmental damage: Tanker oil spills of more than 100 000 tonnes have lost at least 1 853 000 t of oil (rough count from records).
- Loss of assets tangible and intangible: Billions of dollars (*Exxon Valdez*, actual damages $287 million and initial punitive damages of $5 billion after a spill of 36, 918 t)
- Loss of customers: e.g. burning Exxon fuel cards

Passenger Ships

RMS *Titanic*

Probably the most famous of all ships, *Titanic* was British flagged, of 46 328 GT and with a service speed of 21 kn. She struck an iceberg at 2340 on 14 April 1912 and sank at 0220 on 15 April 1912 with 2208 passengers on board. Approximately 1500 passengers and crew perished

The *Titanic* disaster led to the convening of the first International Convention for the Safety of Life at Sea in London on 12 November 1913. As a result, on 30 January 1914, a treaty was signed for the formation of the International Ice Patrol, an agency of the United States Coast Guard.

A draft treaty incorporated provisions for all passenger vessels to have sufficient lifeboats for everyone on board; appropriate safety drills would be conducted; radio communications would be operated 24 hours a day along with a secondary power supply so as not to miss distress calls, and firing of red rockets from a ship must be interpreted as a distress signal. This treaty was scheduled to go into effect on 1 July 1915, but was upstaged by World War I.

Ship design changes resulting included reinforcing the hull and increasing the height of the watertight bulkheads to make compartments fully watertight. The bulkheads on *Titanic* extended 10 ft (3 m) above the waterline. After *Titanic*'s sinking, new ships were designed with double hulls.

RMS *Lusitania*

Lusitania was also British flagged, of 31 550 GT and with a service speed of 25 kn. She was designed for 2198 passengers. During World War I with Britain and Germany at war, *Lusitania* was torpedoed by the German U-Boat *U-20* on 7 May 1915. She sank within 18 minutes, killing 1198 of the 1962 people aboard. The sinking turned sentiments in neutral nations against Germany and helped provoke the United States into entering the war two years later.

SS *Normandie*

The outbreak of WWII found *Normandie* in New York Harbor. In 1940, after the fall of France, the United States seized the ship. In 1941 the United States Navy decided to convert *Normandie* into a troopship, and renamed her USS *Lafayette*. On 9 February 1942, while being converted at the New York passenger-ship terminal, sparks from a welding torch ignited a stack of thousands of life vests filled with kapok. The ship had a very-efficient fire-protection system, but it had been disconnected during the conversion, and the New York City fire department's hoses did not fit the ship's French inlets. All on board fled the ship. As firefighters on shore and in fire boats poured water on the blaze, the ship developed a dangerous list to port (due to increasing free-surface effect) and, at about 0245 on 10 February, *Normandie* capsized.

MV *Sea Diamond*

More recently, *Sea Diamond* ran aground near Santorini overnight on 5 April 2007 and sank at 0600 on 6 April. More than 1600 people, including 15 Australians, had to be evacuated, and two passengers were reported missing.

MV *Costa Concordia*

On 13 January 2012 at about 2145, in calm seas and overcast weather, *Costa Concordia* struck a rock in the Tyrrhenian Sea just off the eastern shore of Isola del Giglio, off the western coast of Italy about 54 n miles northwest of Rome. This tore a 50 m gash on the port side of her hull. The water almost immediately flooded parts of the engine room and caused loss of power to her propulsion and electrical systems. With water flooding in and listing, the ship drifted back to Giglio Island, where she grounded just 500 m north of the village of Giglio Porto.

Ro-ro Car Ferries

MV *Herald of Free Enterprise*

This vessel was a roll-on roll-off (ro-ro) car and passenger ferry which capsized on exiting Zeebrugge Harbour, Belgium, on 6 March 1987, killing 193 passengers. Due to negligence, her bow doors had not been closed before leaving the harbour. When the ferry reached 18.9 kn about 90 seconds after leaving the harbour, water began to enter the car deck in large quantities. This destroyed her stability. Within seconds, at 1828 the ship began to list 30 degrees to port. The ship briefly righted herself before listing to port once more, this time capsizing. The entire event took place in less than a minute.

Since that accident there have been several improvements made to the design of this type of vessel, including sensors which display the state of the bow doors (open or closed) on the bridge, watertight ramps being fitted to the bow sections of the ship, freeing ports to allow water to escape from the vehicle deck in the event of flooding, and efforts to section car decks to reduce the free-surface effect.

MV *Estonia*

Estonia was a cruise ferry built in 1979 at the German shipyard of Meyer Werft in Papenburg. On 28 September 1994 the ship was en route from Tallinn, Estonia, to Stockholm, Sweden, carrying 989 passengers and crew. The weather was rough, with a wind of 15–20 m/s and a significant wave height of 3–4 m. At about 0555 the vessel sank in the Baltic Sea, claiming 852 lives.

The direct cause of the accident was the failure of locks on the bow visor, which broke under the strain of the waves. When the visor broke off the ship, it brought down the ramp. This allowed water in onto the car deck, which destabilized the ship, listed her up to 40 degrees, and the catastrophic chain of events eventually sank the vessel.

The official report indicated that the bow visor and ramp had been torn off at points that would not cause an "open" or "unlatched" indication on the bridge. There was no video monitoring of this portion of the vehicle bay. Recommendations for modifications to be applied to similar ships included separation of the condition sensors from the latch and hinge mechanisms, and the addition of video monitoring.

Bulk Carriers

In 1990, 20 bulk carriers sank, killing 94 crew. In 1991, 24 sank, killing 154. These losses focussed attention on the safety aspects of bulk carriers. The American Bureau of Shipping concluded that the losses were "directly traceable to failure of the cargo hold structure". Lloyd's Register added that the hull sides could not withstand "the combination of local corrosion, fatigue cracking and operational damage".

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Photographs courtesy of Positioninc

Operational damage includes that by grabs in unloading bulk cargoes.

The accident studies showed a clear pattern: sea water enters the forward hatch due to a large wave, a poor seal, corrosion, or hatch-cover collapse. The extra weight of water in Hold No. 1 compromises the partition to Hold No. 2, and sea water enters Hold No. 2 and alters the trim so much that more water enters both holds. With two holds rapidly filling with water, the bow submerges and the ship quickly sinks, leaving little time for the crew to react.

MV *Derbyshire*

Derbyshire was an ore-bulk-oil carrier built in 1976 by Swan Hunter. She was registered at Liverpool and owned by the Bibby Line. She was lost on 9 September 1980 during Typhoon Orchid, south of Japan at 25°30'N, 130°30'E; all hands (42 crew and two wives) vanished. At over 90 000 GT and 160 000 DWT, she was and remains, the largest UK ship to have ever been lost at sea. The wreckage of the ship was found in June 1994.

The investigation eventually concluded that the ship sank due to structural failure and absolved the crew of any responsibility in the sinking. Twelve ventilation holes were found to be responsible for allowing water to enter the ship, flooding her down by the bow. Coupled with the rough seas, the ship experienced greater stresses than those for which she had been designed.

In 2001, Prof. Douglas Faulkner of the RINA advised that the emerging body of scientific evidence regarding the mechanics of freak waves showed that they are far more common than previous modelled. Prof. Faulkner concluded: "Beyond any reasonable doubt, the direct cause of the loss of MV *Derbyshire* was the quite-inadequate strength of her cargo hatch covers to withstand the forces of typhoon Orchid. This conclusion has potentially-dire implications for many earlier-generation bulk carriers, as they were all built to loading standards considered safe before the mechanics of these giant waves were understood. Indeed, such waves may account for the very high loss rate and numerous outright disappearances among this class of vessel.

MV *Seledang Ayu*

This vessel suffered a catastrophic fracture in Hold No. 4 in December 2004. Corrosion, due to a lack of maintenance, had affected the seals of the hatch covers and the strength of the bulkheads, which separate the holds (this also affected MV *Giga 2* at Port Kembla). The corrosion is difficult to detect due do the immense size of the surfaces (close-up survey under Enhanced Surveys of tankers and bulk carriers). Advanced methods of loading and, in some cases overloading, were not foreseen when the ships were designed. These stresses, over time, can damage the hull's structural integrity. Recent use of high-tensile steel in construction has negative side-effects; this material is prone to corrosion and can develop metal fatigue in choppy seas. According to Lloyd's Register, a principal cause was the attitude of ship-owners, who sent ships with known problems to sea.

Other contributing factors were identified, including that the majority of disasters involved ships of more than 20 years in age, and a glut of ships of this age occurred in the 1980s caused by an overestimate of the growth of international trade.

The new bulk-carrier rules adopted in the 1997 annexes to the SOLAS convention focussed on a number of problems, such as reinforcing bulkheads and the longitudinal frames, more-stringent inspections (with a particular focus on corrosion) and routine in-port inspections. The 1997 additions also required bulk carriers with restrictions (e.g. being forbidden from carrying certain high-density cargoes, and alternate hull loading) to mark their hulls with large, easy-to-see triangles.

In December 2002, Chapter XII of the SOLAS convention was amended to require the installation of high-level water alarms and monitoring systems on all bulk carriers. These safety measures quickly alert watchkeepers on the bridge and in the engine room in case of flooding in the holds. As of December 2004, Panamax and Capesize bulk carriers have been required to carry free-fall lifeboats located on the stern, behind the house.

Tankers

MV *Torrey Canyon*

On 18 March 1967, due to a navigational error, *Torrey Canyon* struck Pollard's Rock on the Seven Stones reef between the Cornish mainland and the Scilly Isles with 120 000 tonnes of crude oil on board. Navigation was being done only on small-scale charts; she was using Loran, but not the more accurate Decca Navigator. When the risk of collision with a fishing fleet became obvious, there was some confusion between the master and the helmsman (who was actually the cook and had little experience) as to whether the vessel was in manual or automatic steering mode; by the time this was resolved, it was too late.

MV *Exxon Valdez*

On 23 March1989, the 300 m *Exxon Valdez* set out on a routine voyage from the oil terminal at Valdez, Alaska, to the west coast of the USA. Small icebergs had been reported, and the ship's captain, Joseph Hazelwood, received permission to vary his route, moving into the northbound shipping lane. He then went to bed, telling the watch officer to revert to the southbound lane once a particular island had been reached. Just after midnight, *Exxon Valdez* struck Bligh Reef. Oil began to gush out of its hull, which had been holed from the forepeak through to No. 4 centre tank, spilling approximately 36 000 t of crude oil into Prince William Sound.

The National Transportation Safety Board identified five factors contributing to the grounding of the vessel:

1. The third mate had failed to properly manoeuvre the vessel, possibly due to fatigue and excessive workload.
2. The master had failed to provide a navigation watch, possibly due to the impairment of alcohol.
3. The Exxon Shipping Company had failed to supervise the master and provide a rested and sufficient crew for *Exxon Valdez*.
4. The US Coast Guard had failed to provide an effective vessel traffic system.
5. Effective pilot and escort services were lacking.

In the aftermath of the *Exxon Valdez* incident, the US

Congress passed the Oil Pollution Act of 1990, which set a schedule for the gradual phase-in of a double-hull design. The USA was also able to gain support for a phase-out schedule for single-hull tankers at the IMO.

Exxon Valdez's captain was charged with criminal mischief, driving a watercraft while intoxicated, reckless endangerment and the negligent discharge of oil. He was found guilty on the last count.

The disaster led to many changes in international regulations, for example the Civil Liability Convention (CLC) of 1999 which imposed strict liability on shipowners without the need to prove negligence, and the 1973 International Convention for the Prevention of Pollution from Ships.

Container Vessels

MV *Rena*

This vessel grounded on Astrolabe Reef off the Port of Tauranga on the north-east coast of New Zealand on 5 October 2011. Alan showed slides of the vessel aground, listed 30 degrees to starboard with the container stacks toppling, together with a 3D CAD model of the ship aground, and then the crack in the hull, the vessel broken in two, and then the subsequent CAD model of the aft section sliding down the reef slope while the forward section sits on the reef.

Causes of Disasters

The human factor is estimated to cause around 80% of incidents, while mechanical failure is estimated to cause around 20% of incidents. However, IMO regulations are estimated to occupy 80% of its time trying to design out mechanical failures, and the human element 20% of its time!

Failure Mode and Effects Analysis

Alan then showed a slide of the flowchart for a failure mode and effects analysis, including company policies, procedures and equipment, and the consequences of crises or emergencies.

IMO

Since its inception, the International Maritime Organisation has drafted numerous Conventions, Codes, Protocols and Resolutions covering mainly ship and crew safety, the protection of the marine environment and compensation regimes. In the last two decades it has started to address the human element with the introduction of the STCW Convention and the ISM Code, thereby becoming proactive rather than reactive

There are approximately 160 contracting nations (flag states) to the IMO Convention. There are numerous non-government organizations (NGOs) which have been awarded consultative status (such as RINA and IMarEST). One of the main NGOs affecting ship construction is the International Association of Classification Societies (IACS) which has recently developed the common structural rules (CSR) for the classification of ships.

IMO Conventions include:

- International Convention for the Safety of Life at Sea, 1974 (SOLAS)
- Convention on the International Regulations for Preventing Collisions at Sea, 1972 (COLREGs)
- International Convention on Standards of Training, Certification and Watchkeeping for Seafarers, 1978 (STCW)
- International Convention on Maritime Search and Rescue, 1979
- Convention for the Suppression of Unlawful Acts Against the Safety of Maritime Navigation, 1988
- International Convention on Load Lines, 1966
- International Convention for the Prevention of Pollution from Ships, 1973, as modified by the Protocol of 1978 relating thereto and its seven Annexes (MARPOL 73/78)
  - Annex I: Prevention of pollution by oil
  - Annex II: Control of pollution by noxious liquid substances
  - Annex III: Prevention of pollution by harmful substances in packaged form
  - Annex IV: Prevention of pollution by sewage from ships
  - Annex V: Prevention of pollution by garbage from ships
  - Annex VI: Prevention of Air Pollution from Ships
- International Convention on the Control of Harmful Anti-fouling Systems on Ships (Adoption: 5 October 2001)
- International Convention for the Control and Management of Ships' Ballast Water and Sediments (Adoption: 13 February 2004)
- Liability and Compensation Conventions
- International Ship and Port Facility Security Code (ISPS Code)
- International Management Code for the Safe Operation of Ships and for Pollution Prevention (ISM Code)

Conclusion

There have been continuous improvements in ship design and operational procedures resulting from ship disasters and, hence, fewer disasters up until the end of the 20th century.

However, growing incompetence of crews resulting from shortages of officers and crew, possibly brought on by new recruits, poor retention rates and overworked seafarers, could be the reason for the increase in the frequency rate of serious accidents.

Questions

Alan's presentation was marvellously illustrated, with some (and, in some cases, many!) slides of all the vessels mentioned.

Question time elicited some further interesting points.

The human element is being recognised as one of the principal contributors to marine incidents, and increasing attention is being paid to it.

The AIS track of MV *Costa Concordia* is interesting, as it indicates a U-turn back towards the coast at a speed which could not have resulted from drift, and the gash in the vessel's hull was on the port side but she capsized to starboard. There are many unanswered questions concerning this incident.

The vote of thanks was proposed, and the "thank you" bottle of wine presented, by Rozetta Payne.

CLASSIFICATION SOCIETY NEWS

LR and Vessels in the Offshore Wind Industry

Rob Whillock, Lloyd's Register's Lead Offshore Specialist for the renewables sector has recorded a video blog on the regulatory requirements for vessels operating in the offshore wind industry. See the summary below, or follow this link to view the full video:

http://blog.lr.org/2012/03/what-is-different-about-vessels-in-the-offshore-wind-industry/

What is different about these vessels in the offshore wind industry?

The class societies feel that they can cover these vessels under existing rules sets. From the statutory perspective, (coastal state authorities and flag), there is a perception that guidelines need to be issued as to what statutory regulations should be applied. There isn't an appetite to produce new statutory regulations; it's looking at how to apply existing statutory codes and conventions.

What issues need special attention?

From the statutory perspective, it is the designation of personnel onboard. Currently in Chapter 1 of SOLAS, you have a definition of either crew or passengers, whereas the Special Purpose Ship (SPS) code also refers to "special personnel" but, in this scenario, does this mean special personnel for the vessel or for the construction of the wind farm? The designation of personnel is a big topic of conversation between the North European flag authorities at the moment, to the extent that the German flag authority in conjunction with CESA and ICS have submitted a proposal to the IMO (DE56-12).

What are they key areas of concern for class?

The key areas for class are to ensure that you identify all your critical locations such as:

- Crane pedestal integration
- Lay down area
- Structure of your jack-house integration, etc.

Once all of these areas are identified, you need to ascertain what loads and operational modes are applicable for that type of critical area. For example, if you have a crane pedestal, when it's operational you'll have to consider hook loads; if it is jacked up out of water you don't have to consider vessel motions. So it is critical to tie those two together and make sure your matrix for all of the critical locations, and all of the operational modes and loads, is correct.

What is LR doing in response to this?

LR recognises that navigating the existing rules to find out what applies can be a challenge. So they are developing guidance notes for both wind-farm service vessels and wind-turbine installation vessels, and will be incorporating some minor amendments into the current LR MOU rule updates. From the statutory perspective, LR is in close consultation with the flag states and can consult clients on this constantly-changing area.

To find out the latest information on this area, and for updates about the guidance notes, visit www.lr.org/renewables and follow on Twitter @LRRenewables.

LR's New Rules for Stern-first Ice-class Vessels

The first dedicated set of rules for stern-first ice-class vessels has just been published by Lloyd's Register, answering the demand for technical support as the industry continues to explore the potential of polar transportation routes and the new energy reserves in the far north. Growing commercial opportunities in the far north boost demand for customised shipping solutions.

The timely release of the rules comes as more and more ships are being ordered with options such as podded propulsion systems and azimuthing thrusters—products which can improve ice-breaking capability and reduce resistance—allowing them to navigate stern first through ice.

"These practical rules are answering a growing demand in the market and include the use of standard operational scenarios to provide designers with a basis for prescriptive rule applications which have been validated with designers and operators of these specialist ships," said Robert Tustin, Lloyd's Register's Technical Manager for New Construction in Asia.

Lloyd's Register has had a long involvement in the development of this class of ships. *Mastera* and *Tempera*—two 106 000 dwt "double-acting" tankers owned by Neste—were built to its class in 2002 and 2003 at Sumitomo's yard in Japan. The ships were deployed to the Baltic, where they often operate stern first in heavy ice conditions, independent of icebreakers.

Other tankers, such as Sovcomflot's *Mikhael Ulyanov* and *Kiril Lavrov*, were designed and built for operating stern first in ice in the Arctic. These ships, dual classed by Lloyd's Register and the Russian Maritime Register of Shipping, were designed to eventually shuttle crude from the Prirazlomnoye platform in the Pechora Sea to a floating storage and offloading unit moored off Murmansk.

The development of Lloyd's Register's new rules was supported and validated by leading ice-class tanker designers, key regulators and operators.

The interpretation of regulatory and other rule requirements—and validation of strength levels for the hull and propulsion units—were confirmed by a review of the current fleet of double-acting ships, ensuring that practical experience supported the development of the rules.

They offer the following key interpretations:

- The ship is considered as a bow-first and stern-first vessel for application of ice-class rule requirements for hull and machinery
- It is also considered as a stern-first ship for the application of navigation-related rules and regulations
- In other cases, the rule applies to bow-first ships only

The rules also include a framework for alternative-load scenarios when unusual operations are envisaged, as well as interpretations of international regulations and classification rules based upon industry precedents, said Tustin.

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 2012 (with exceptions noted) is as follows:

6 Jun	Jonathan Crossen, International Paints *Developments in Paints*
4 Jul	TBA IMarEST
1 Aug	TBA IMarEST
5 Sep	TBA RINA
3 Oct	Wärtsilä *Wartsila Scrubbing Technologies for Reduction of Different Air Emissions (NOx, SOx, CO and VOCs)*
6 Dec	SMIX Bash

Dry Dock Training Course

DM Consulting offers comprehensive dry dock training for all levels of personnel involved in dry docking ships and vessels. Attendees include

- Dock Masters
- Docking Officers
- Dry dock crews
- Engineers
- Naval Architects
- Port Engineers
- Program/Project Mangers
- Marine Surveyors
- Owners Representatives
- On-site Representatives
- Consultants
- Others involved/interested in the dry docking of ships and vessels

The course is presented through classroom lectures, student participation in projects and practical application exercises. The course addresses the deck-plate level of practical operation needed by the dock operator and the universally-accepted mathematical calculations required to carry out operations in accordance with established sound engineering practices. The course has accreditation with the Society of Naval Architects and Marine Engineers (SNAME) and the Royal Institution of Naval Architects (RINA). The course curriculum includes

- Dry docking terminology
- Calculations
- Vessel stability
- Dry dock planning
- Dry docking procedures
- Lay period
- Undocking procedures
- Incidents/accidents

More details of the course content are shown on the website www.drydocktraining.com/outline.html; click on the Course Outline chapters.

The course is presented by dockmaster Joe Stiglich and is scheduled for 21–24 January 2013 in Sydney, with the times and location to be advised.

For further details, contact Joe Stiglich at jstiglich@aol.com.

Contract Management for Ship Construction, Repair and Design

Fisher Maritime's widely-respected three-day training program, *Contract Management for Ship Construction, Repair and Design*, originally scheduled for Perth and Sydney in March had to be postponed and will now be held in Sydney only, between 12 and 14 June 2012.

This program is a lessons-learned one, not a theoretical course on contract management. It bears a lot of "scar tissue" from marine contractual disasters. It is designed for:

- Project Managers (Yards and Owners)
- Contract Managers and Specialists
- Newbuilding Shipyards, Repair Yards
- Fleet Managers
- General Managers of Shipyards
- Financial Managers (Yards and Owners)
- Ship Conversion Specialists
- Naval Architects, Marine Surveyors
- Federal, State, and Provincial Agencies
- Ferry Operators (Public and Private)
- Naval Shipyards
- Owner's Representatives
- On-Site Representatives
- Major Equipment Vendors
- Marine Superintendents
- Consultants and Attorneys

The presenter, Dr Kenneth Fisher, is recognised worldwide as the leading authority on the development and management of complex contracts and specifications for ship construction, conversion, repair, and design. He is author of the 2004 RINA publication, *Shipbuilding Specifications: Best Practices Guidelines*, and of the 2003 SNAME publication, *Shipbuilding Contracts and Specifications*. As an arbitrator, expert witness, consultant, and instructor for nearly 30 years, he brings clarity and organisation to an otherwise-complex set of management requirements unique to the maritime industry.

Course details and the registration form can be found at www.fishermaritime.com/sydneycoursejune2012.html.

RAN 100th Anniversary International Fleet Review

On 4 October 1913 the first Royal Australian fleet entered Sydney Harbor 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 September	RAN and International naval vessels rendezvous in Jervis bay
Wed 2 Oct	Briefing and preparations for review; vessels sail with VIPs and media on board
Thu 3	Tall ships (up to a dozen 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, contact CAPT Nick Bramwell at nick.bramwell@defence.gov.au.

Pacific 2013

The Pacific 2014 International Maritime Exposition and Congress has been brought forward by a few months to October 2013, in order to coincide with the 100th anniversary celebrations of the Royal Australian Navy.

The Pacific 2013 International Maritime Exposition and Congress will be held in Sydney at the Sydney Convention and Exhibition Centre from Tuesday 8 to Friday 11 October 2013. It will include:

- The International Maritime and Naval Exposition, organised by Maritime Australia Ltd, to be held from Tuesday 8 to Friday 11 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 Tuesday 8 to Thursday 11 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 Tuesday 8 to Thursday 11 October.

Pacific 2013 IMC

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

Deadline for submission of abstracts	4 March 2013
Authors notified of acceptance	8 April
Deadline for submission of refereed papers	3 June
Deadline for submission of non-refereed papers	15 July
Deadline for presenter registration	15 July
Deadline for early-bird registration	15 July

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 (when more information appears) 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 will be held, as usual, in early 2016.

GENERAL NEWS

Release of Cruise Ship Access Report

At the end of March the Minister for Defence, Stephen Smith, released the report of the independent review of the future use of the naval berths at Garden Island in Sydney (Fleet Base East) by visiting cruise ships. The review was led by Dr Allan Hawke.

The independent review assessed whether there is scope to enhance cruise ship access to Garden Island without adversely impacting on its priority national security role of supporting Navy maritime operations. The review focused on the opportunities for greater civil-military cooperation in the use of finite berthing resources for very large vessels in Sydney Harbour.

The review also assessed whether there is scope for a more flexible approach that balances the Navy's needs with cruise industry requirements to secure advanced berth bookings for cruise ships visiting Sydney Harbour.

The review found that current and future Navy capability requirements of Garden Island are essentially incompatible with cruise-ship access over the long-term, except on the existing basis, where a limited number of requests for berth bookings is considered by Navy based on extended notice and limited visits per year.

In February this year, *Queen Mary 2*, the biggest cruise liner to visit Australia, docked at Garden Island with the Navy's approval.

The review also found that provision of guaranteed shared access to existing berths at Garden Island cannot be achieved without adversely impacting on naval operations.

The review identified one possible option to meet the cruise industry's short-medium term requirement, involving the addition of a 'dolphin' berth (mooring posts) at the Overseas Passenger Terminal in Circular Quay, combined with a maximum one day stay alongside, and transfer of vessels

The World at the Athol Bay mooring in March
(Photo John Jeremy)

Typical of the modern cruise ships which cannot fit under the Sydney Harbour Bridge, the 92 000 gt *Costa Deliziosa* spent part of her receent visit to Sydney at the Athol Bay buoy waiting for the Overseas passenger Terminal to become available
(Photo John Jeremy)

Queen Mary 2 at the Overseas Passenger Terminal in Circular Quay in Sydney for the first time on 7 March. Recent improvements to mooring arrangements completed by the Sydney Ports Corporation made the move from Fleet Base East possible
(Photo John Jeremy)

requiring a two-day turnaround to the existing Athol Bay buoy. This could be enhanced further by construction of a more permanent dolphin berth close to the shoreline in Athol Bay.

The review indentified five longer-term options for enhanced cruise-ship access to Garden Island, all of which would involve significant investment:

- disperse cruise-ship support between the current Overseas Passenger Terminal, Athol Bay and Port Botany (this option is estimated to cost about $74 million);
- lease Fleet Base berths 1–5 to the Sydney Ports Corporation for cruise ship use and develop a replacement wharf for the Navy on the eastern side of Garden Island (this option is estimated to cost at least $342 million and the new wharf would be unlikely to be available before 2025);
- lease Fleet Base berths 1–5 to the cruise ship industry and develop berths at Glebe Island for the Navy (the cost of this option is estimated to be a minimum of $143 million);
- share Fleet Base berths 2–3 with the cruise industry, with Glebe Island and White Bay berths being made available to the Navy; and
- transfer Fleet Base berths 1–5 to the Sydney Ports Corporation with the Navy to transfer to new facilities outside of Sydney. In assessing this option, the review commissioned a scope and costing study using transfer of the basing of the Navy's amphibious and support ships to a new base in the Port of Newcastle as an example. Newcastle was used for this purpose, on the basis that existing port facilities could be acquired and developed for permanent Navy use as a less-costly option than development of a "green field" site. This option was considered to apply equally to any other Australian port considered strategically sound including, for example, Brisbane, Gladstone or Townsville. The review noted that in existing port locations, there are no readily available sites which could accommodate a new naval base without major expansion of port facilities which are currently fully committed to commercial shipping activity. Creation of "green field" port facilities would involve added development costs and greater environmental challenges. Excluding the cost of acquiring the necessary land and numerous indirect costs, such as additional Defence housing, personnel relocation costs or additional operational costs that might be borne by Defence due to separation from other Defence (Navy) shore-based technical-training and operational-support facilities located in the Sydney basin area and the industrial base, or any industry relocation costs and implications, this option is considered to cost at least $1003 million. It would be unlikely to be available before 2025 but the review noted that Newcastle is not, in any case, available as an option.

The review recommended that:

- the review's findings and recommendations be considered in the light of the Australian Defence Force Posture Review outcomes;

Pacific Jewel preparing to depart from the temporary passenger terminal in Darling Harbour. This excellent berth will become parkland in the next few years as part of the Barangaroo development (Photo John Jeremy)

One option proposed by the Hawke Report would require the construction of a substantial new wharf for navy ships on the east side of Garden Island
(Hawke Review Report p. 75)

- the review's findings and recommendations be considered in the light of the NSW Government Transport Infrastructure and Tourism reviews, expected in May 2012;
- inter-Governmental consultation should take place to ensure that any berthing access at Garden Island does not financially disadvantage the Commonwealth;
- should the Australian Government determine that the national interest includes offering use of part of Garden Island to assist the cruise industry's projected berthing requirements:
  - enhanced access should be contingent on agreement of legal instruments to effect transfer of assets and liabilities;
  - current procedures (described above) whereby the cruise industry provides advanced notice requests for berth access at Fleet Base East/Garden Island should be refined and formalised;
  - the Minister for Defence (through the Chief of Navy) should have the discretion to suspend all

non-Defence access to Garden Island when there is an urgent national requirement or significant security or public safety concern;

- proceeds arising from leasing arrangements should be hypothecated to Defence for offsetting Navy infrastructure enhancements and operating costs;
- consultation should occur between Defence, the NSW Government, cruise-industry representatives and the NSW Department of Roads and Maritime Services to address traffic impacts of cruise activity on the site;
- consultation would also be required on security and emergency management issues; and
- further community consultation should be conducted to understand the impact on local residents and to identify mitigation strategies preserving amenity and heritage values for both local residents and the general public.

The review noted that Defence's long-term national security task should not be surrendered to the seasonal commercial requirements of the cruise-ship industry.

In reaching its conclusions, the review took into account:

- the outcomes from the New South Wales Government-sponsored Passenger Cruise Terminal Steering Committee Part B report on infrastructure requirements and locations for a Cruise Passenger Terminal east of Sydney Harbour Bridge;
- current and future Navy requirements for facilities at Garden Island to meet current and future operational, repair and maintenance needs, including for the two Canberra-class LHDs and three Hobart-class air-warfare destroyers;
- the suitability of existing Garden Island facilities to support more-regular cruise-ship visits during peak periods and with the degree of advanced notice sought by the industry;
- the economic benefits of enhanced cruise-ship access to Sydney Harbour, and the economic contribution of the ongoing Navy presence in Sydney;
- options for alternative berthing, maintenance and support arrangements for naval vessels both within Sydney and other ports; and
- the costs, benefits and impact of the cruise industry investing in purpose-built facilities at Garden Island to enable enhanced use of the island by cruise ships.

The report of the Garden Island Review will be considered by Government in the context of the final report of the Force Posture Review. Both the Garden Island Review and the Force Posture Review report will feed into the next Defence White Paper.

The Garden Island review report can be found at: http://www.defence.gov.au/oscdf/CruiseShipAccessReview/default.htm

Final Defence Force Posture Review Released

On 3 May Prime Minister, Julia Gillard, and Minister for Defence, Stephen Smith, released the final report of the Defence Force Posture Review.

The report finds 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.

It finds that there are some weaknesses and risks associated with the capacity of Australian Defence Force (ADF) bases and training areas as well as our ability to sustain high-tempo operations in Northern Australia and our neighbourhood and region.

Release of the final report follows the Government's release of the interim report of the review on 30 January this year.

The Force Posture Review addresses the range of present and emerging global, regional and national strategic and security factors which require careful consideration for the future.

These strategic and security factors include:

- the rise of the Asia-Pacific as a region of global strategic significance;
- the rise of the Indian Ocean rim as a region of global strategic significance;
- the growth of military power-projection capabilities of countries in the Asia Pacific;
- the growing need for the provision of humanitarian assistance and disaster relief following extreme events in the Asia Pacific region; and
- energy-security and security issues associated with expanding offshore-resource exploitation in our north west and northern approaches.

The review also examined logistics support requirements, training areas for large-scale and joint training exercises,

demographic and economic factors, public communications strategies, and engagement with industry, particularly the minerals and petroleum resources industries in Australia's north and west.

The review concluded that the Australian Defence Force needs a force posture that 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.

This will be particularly important as the Australian Defence Force approaches a period of transition and subsequent drawdown in Afghanistan, as well as in East Timor and Solomon Islands.

The review identifies expanding maritime capabilities as significantly influencing Australia's future force posture. Joint amphibious capability is identified as having a transformational effect on Navy, Army and the ADF generally, driving force posture considerations.

In regard to the Navy, the review recommends that:

- Defence should develop a more comprehensive long-term master plan for meeting Navy's Force 2030 basing requirements, which also addresses the implications of increased US activities and presence in Australia.
- Defence should commence planning now on long-term options for establishing a supplementary east-coast fleet base at Brisbane for the future submarine and large amphibious ships. This work will complement the development of options for embarking forces on amphibious ships at Brisbane in the shorter term.
- Defence should proceed with its plans to homeport the air-warfare destroyers and LHDs at Fleet Base East in the short term but also develop additional options involving Brisbane and Fleet Base West.
- Defence should develop options to expand wharf capacity and support facilities at Fleet Base West to:

  (a) support major surface combatant capability and operations by:

  1. providing adequate infrastructure and facilities, including missile-loading and maintenance facilities, to homeport the future frigate class and forward deploy at least one air-warfare destroyer; and

  2. ensuring such facilities are also able to be used for deployments and operations in Southeast Asia and the Indian Ocean by US Navy major surface combatants and aircraft carriers;

  (b) support submarine capability and operations by:

  1. enabling Fleet Base West to continue as the primary submarine homeport when the expanded future submarine fleet enters service; and

  2. ensuring that such facilities are also able to be used by US Navy submarines.

  Defence should also monitor commercial dredging developments near Fleet Base West in consultation with the WA Government.
- Defence should plan to upgrade or expand bases to accommodate the OCV and replacement LCH, noting that the scale and cost of work will depend on the final size of the OCV and LCH, including:

  (a) upgrades or expansion of bases at Darwin and Cairns;

  (b) upgrades at HMAS *Waterhen* in Sydney; and

  (c) upgrades required at Fleet Base West to be able to support OCV mine countermeasures operations.

The review examined possible basing options in the north and north west of Australia and the possibility of arrangements which enhance access to commercial ports but considered that permanent Navy bases in the north west are not operationally necessary.

The review found that while Air Force bases are well-located, many currently lack the capacity to fully support new platforms, and some air bases in northern Australia face significant logistics constraints.

The review found that Defence should upgrade bases at Edinburgh, Learmonth, Pearce, Tindal and Townsville to enable unrestricted operations by KC-30 and P-8 aircraft and that Defence should upgrade Curtin, Learmonth, Tindal and Townsville, with Scherger as a lower priority, to support future combat-aircraft operations.

The review also identifies Defence's international engagement as a significant strategic asset.

The conclusions and recommendations of the final report are, in the main, longer-term options for consideration. No decisions have been made about individual proposals. Many of these options, including development of new facilities involve substantial additional investment.

The Force Posture Review report will now form part of the security and strategic considerations feeding into the 2013 Defence White Paper and decisions on Force Posture Review options will be made as part of the 2013 White Paper process.

The review was undertaken by the Department of Defence and overseen by an expert panel comprising two of Australia's leading national security experts, Dr Allan Hawke and Mr Ric Smith, both former Secretaries of the Department of Defence.

An unclassified version of the final report is available at www.defence.gov.au/oscdf/adf-posture-review/

Defence White Paper Brought Forward

On 3 May the Prime Minister, Julia Gillard, and the Defence Minister, Stephen Smith, announced that the Government will start work on a new Defence White Paper to be delivered in the first half of 2013.

They said that there have been a number of significant developments, internationally and domestically since the 2009 White Paper, which are influencing Australia's defence posture, future force structure and defence budget. These are most-appropriately addressed through a new White Paper. The Government remains committed to delivering the core capabilities identified in the 2009 White Paper and to delivering one of the most-capable defence forces in our region, with the people and equipment needed for the task. The Government is also committed to making strategic, risk-based decisions about Australia's long-term national security and defence needs.

This means that the Government needs to periodically and methodically review the future capability requirements of the

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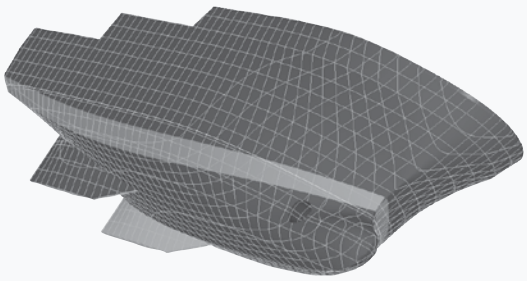

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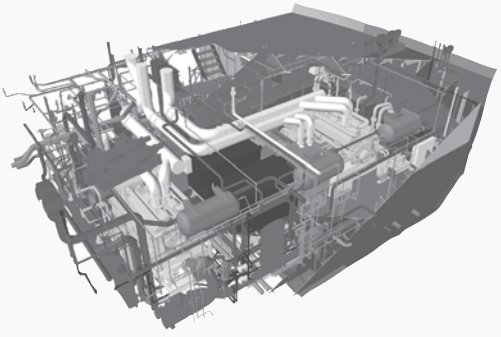

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Australian Defence Force to ensure that they are appropriate to changing circumstances. As outlined in the 2009 Defence White Paper, this process involves a new White Paper at intervals no greater than five years. On a five year timetable, the next paper is not due until this time in 2014. However, because of the significant developments internationally and domestically since the 2009 White Paper, the Government is bringing forward this schedule.

These developments include:

The Australian Defence Force's Operational Drawdown

Australia has committed to long-term support for Afghanistan but, as recently outlined by the Prime Minister, our training and mentoring forces in Afghanistan will be drawn down and returned to Australia in line with the ISAF transition strategy.

In addition, it is likely that the ADF's deployments in East Timor and Solomon Islands will potentially start to draw down during 2013.

These transitions will involve a major readjustment to ADF posture and Australia's defence priorities. The Government needs to carefully work through what impact this will have on the ADF.

The Australian Defence Force Posture Review (FPR)

The FPR assessed whether the Australian Defence Force is correctly positioned, geographically, to meet Australia's current and future strategic challenges.

It was the first review since work done in the mid 1980s by Professor Dibb for the then Defence Minister, Kim Beazley.

The FPR also addressed the range of present and emerging global, regional and national strategic and security factors which require careful consideration for the future.

The Ongoing Effects of the Global Financial Crisis

The 2009 Defence White Paper noted that the Global Financial Crisis (GFC) was the most serious global economic and financial crisis in decades, and that its strategic impacts were still unfolding. Since then, the GFC has continued to have a significant impact on the global economy.

Following the GFC, the defence forces of major developed countries have increased efficiencies and reduced their budgets, including the United States, the United Kingdom and Canada. Australia's 2009 Defence White Paper was completed before the unfolding of these events. Financial circumstances clearly present a real challenge to the 2013 White Paper.

Strategic Change in our Region

The Strategic change described in the 2009 White Paper has continued, particularly the shift of economic weight to our region.

Defence Reform

In 2011 the Department of Defence commenced the implementation of a wide-ranging reform program, including the areas of capability development, procurement and acquisition, the Defence budget and the strengthening of personal and institutional accountability.

Australian Defence Industry Skills

Australia needs to have the necessary skills and capacity in the Australian defence industry to support the future requirements of the Australian Defence Force, including building and sustaining new capabilities.

The 2013 White Paper will build on work already completed or underway since 2009, including:

The Defence Planning Guidance

The classified Defence Planning Guidance (DPG) is Defence's lead strategy document. It articulates the strategic priorities which guide Defence to produce the military outcomes sought by Government.

The DPG includes analysis of the future strategic environment, identifying the contingencies Australia might face in the bracketed timeframes of 0 to 5, 5 to 15, and 20 or more years.

The DPG is updated annually to set strategic guidance for force structure and capability development, corporate planning, resource planning, preparedness management and critical enabling functions.

The update to the 2011 DPG has been completed and will be considered by Government in the near future.

The Australian Force Structure Review

In the Defence White Paper 2009, the Government determined a development process for future White Papers, with Defence to prepare, prior to a White Paper, a Force Structure Review (FSR).

The FSR will provide costed force-structure options for use in developing the White Paper — assessing the equipment and capabilities which the ADF needs to deliver national security and defence priorities. Defence commenced its FSR in November 2011.

The Defence Capability Plan Review

Defence has completed a full review of the Defence Capability Plan (DCP) including an audit of the plan and the development of new frameworks and methodologies for its management.

The DCP Review was considered in the 2012–13 Budget process.

The Australian Force Posture Review

This review took into account

- the rise of the Asia-Pacific as a region of global strategic significance;
- the rise of the Indian Ocean rim as a region of global strategic significance;
- the growth of military power-projection capabilities of countries in the Asia Pacific;
- the growing need for the provision of humanitarian assistance and disaster relief following extreme events in the Asia Pacific region; and
- energy security and security issues associated with expanding offshore resource exploitation in our North West and Northern approaches.

The Defence Budget

The Government needs to ensure that Defence spending is calibrated against an up-to-date assessment of short- and longer-term priorities.

At the time of the 2011–12 Budget it was determined that there would be a $1.6 billion underspend for the 2010–11 financial year.

In this context, Defence has conducted a comprehensive stocktake of the Defence budgeting system, taking into account all budget processes, estimation methods and underlying budget assumptions.

This includes the way in which Defence's capital equipment budgets are formulated and managed, including the ongoing utility of contingency, slippage and over-programming.

The Minister for Defence has asked Dr Allan Hawke, Mr Ric Smith and Mr Paul Rizzo to form a Ministerial Advisory Group to assist in the development of the 2013 Defence White paper.

Dr Hawke and Mr Smith are both former Secretaries of the Department of Defence.

Mr Rizzo, a director of a number of major Australian corporations including the National Australia Bank and Mallesons Stephen Jacques and the Independent Chair of the Defence Audit and Risk Committee, led the development of the plan to address problems in the repair and management of the amphibious and support-ship fleet.

The Way Ahead for the Future Submarine

On 3 May the Prime Minister, Julia Gillard, the Minister for Defence, Stephen Smith, and the Minister for Defence Materiel, Jason Clare, announced that the Government would provide $214 million for the next stage of the Future Submarine Project.

This funding will go towards further detailed studies and analysis to inform the Government's decision on the design of Australia's next submarine.

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

The future submarine project will be the largest and most-complex Defence project ever undertaken by Australia. With this complexity comes risk and the Government intends to take a measured and careful approach to the early stages of planning and design. It is also considered essential to learn from experience with the Collins-class submarines to avoid repeating the mistakes of the past and minimise risks. This includes the maintenance and sustainment of the future submarines.

For these reasons the Government established a review into the sustainment of Australia's Collins-class submarines, led by Mr John Coles.

The Coles Review involves a detailed examination of complex engineering issues associated with submarine sustainment and support from international experts and companies in this field.

The Government is 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 combat systems and weapons;
- an evolved design which enhances the capabilities of existing off-the-shelf designs, including the Collins class; and
- an entirely new developmental submarine.

The Government has ruled out the option of a nuclear submarine.

Indicative Timeline for the Future Submarines

- 2012: The Government will make a decision on design and test facilities including the Land-based Propulsion Test Site and will receive the Future Submarine Industry Skills Plan.
- 2013: The Government will receive the results of the work announced on 3 May and will make a decision on the combat systems, torpedoes, sensors and other weapons systems.
- 2013/2014: On current planning, First Pass approval is scheduled for late 2013–early 2014.
- 2017: On current planning, Second Pass approval is scheduled for around 2017 with construction expected to begin following Second Pass approval.

The funding announced on 3 May will inform the Government's final decision on the design and workforce requirements for the future submarine and identify and address risks in this complex project.

These studies are in addition to the Government's announcement in December that it had approved the release of Requests for Information to three overseas submarine designers (DCNS, HDW and Navantia), and that Defence had entered into a contract with Babcock for a study into a land-based propulsion test site.

The studies announced on 3 May will be conducted across three broad areas:

- design studies;
- scientific and technological studies; and
- future Submarine Industry Skills Plan.

Design studies

Options for the Future Submarine range from a proven fully military off-the-shelf design through to a completely new submarine.

All options are being considered, other than nuclear propulsion, which the Government has ruled out.

These studies will be undertaken across four areas:

1. Military off-the-shelf design studies

These studies will be undertaken with three European shipbuilding companies:

- DCNS (France), designer of *Scorpene*
- HDW (Germany), designer of the Type 212 and Type 214 submarines
- Navantia (Spain), designer of the S-80 submarine

These studies will help inform the Government on the viability of a military off-the-shelf design and the modifications which would be required to meet specific Australian conditions.

2. Initial design studies for an updated Collins-class submarine

The Government will engage Swedish ship designer and builder Kockums to undertake initial design studies for an updated Collins-class submarine.

The updated design will build on the high level of capabilities of the existing Collins-class submarine design, address

challenges and obsolescence issues and provide capability enhancements. Kockums is the original designer of the Collins-class submarine.

3. Analysis of options

An expert submarine design firm will be engaged to conduct cost and capability trade-off analysis of all options.

These studies will model the technical and performance characteristics of different submarine designs against capability and cost considerations.

4. Capability modeling by the United States

At the Australia-United States Ministerial (AUSMIN) consultations in Melbourne in November 2010, Australia and the United States agreed that Australian-United States cooperation on submarine systems was strategically important for both countries.

The high level of submarine interoperability between Australia and the United States and our technical cooperation will extend into the future submarine acquisition program.

US companies Systems Performance and Analysis and Electric Boat will undertake capability modelling under a Foreign Military Sales case.

These companies will investigate the capability of an off-the-shelf option as well as an evolved-Collins option.

Scientific and Technological Studies

In addition to these design studies, scientific and technological studies will be conducted primarily by the Defence Science and Technology Organisation.

They will assist the development of requirements and provide technical advice to Government aimed at reducing risk in critical areas for the project.

These studies will cover areas including:

- propulsion and energy storage;
- signatures and stealth performance;
- combat systems; and
- hydrodynamics, propellers and pumpjets.

The scientific studies undertaken will deliver a range of reports and recommendations on the development of the future submarine helping to provide better options to the Government for decision.

Future Submarine Industry Skills Plan

In December the Minister for Defence and the Minister for Defence Materiel announced that the Defence Materiel Organisation would develop a Future Submarine Industry Skills Plan.

The Government has now released details of how that work will be undertaken.

The Future Submarine Industry Skills Plan will identify what is required to build and sustain the skills needed to successfully deliver Australia's future submarine capability.

The plan will be developed by a team be led by the Chief Executive Officer of the Defence Materiel Organisation, Warren King.

It will be supported by an Expert Industry Panel headed by David Mortimer, AO.

The Expert Industry Panel will include representatives of DMO, Navy, the Department of Industry, Innovation, Science, Research and Tertiary Education, Skills Australia, unions, the CEOs of the four principal Australian naval shipbuilding companies, ASC, Austal, BAE Systems and Forgacs Engineering, and the CEOs of the principal naval systems integration companies, Lockheed Martin, Raytheon, Boeing, Thales, Saab Systems and BAE Systems.

This group will consult widely with State Governments, Australian industry, industry associations, universities and other academic organisations to develop this plan.

The purpose of the group's study will be to design a unified plan for naval shipbuilding projects, education and training programs, and other actions that will sustain and grow the competence and proficiency of the Australian shipbuilding industry so that it can successfully deliver the future submarine project.

The broad objectives for this study are to:

- determine the type of skills required to successfully deliver the future submarine project;
- determine the size and profile of the workforce required to successfully deliver the future submarine project;
- determine the current capacity and capability of the Australian shipbuilding industry, in terms of skills and workforce;
- determine the current productivity of the Australian shipbuilding industry and establish comparable international benchmarks;
- analyse the naval shipbuilding projects currently in the Defence Capability Plan and calculate the effect that these projects will have on growth of the capacity and capability of the Australian shipbuilding industry;
- analyse current education and training programs, including apprenticeships, and calculate the effect that these programs will have on growth of the capacity and capability of the Australian shipbuilding industry;
- propose alternative scenarios for sequencing Defence projects which will better deliver the capacity and capability required to successfully deliver the future submarine project and propose improvements to the education and training programs which will better deliver the capacity and capability required;
- propose other actions required to deliver the capacity and capability, including industry productivity, required to successfully deliver the future submarine project; and
- propose management arrangement within Defence, particularly the DMO, for the ongoing management of a sustainable naval shipbuilding program.

Submarine Project Management

Given the central role of submarines in Australia's national security, the Secretary of the Department of Defence, Duncan Lewis, has recommended that a senior Defence position be dedicated to focussing exclusively on the oversight of all existing and future materiel-related submarine activities in the Department of Defence.

The Government has agreed to this course of action and has announced the appointment by the Secretary of David Gould as the General Manager of Submarines in the Department of Defence.

Mr Gould will work in the Defence Materiel Organisation and will take responsibility for all materiel-related aspects of submarine support across Defence. He will report to the Chief Executive Officer of DMO.

In addition to working closely with the Chief of Navy, Mr Gould will work across Government and industry as a project integrator to pull together the remediation and support of our existing submarine fleet and the project to replace our existing Collins-class submarines.

As a result of Mr Gould's appointment, and on advice from the Secretary, the previously-announced position of Associate Secretary Capability will not be progressed.

Austal Awarded Construction Contract for JHSV 8 and 9

In February the US Navy exercised contract options funding the construction of the eighth and ninth Joint High Speed Vessel (JHSV) as part of a ten-ship program potentially worth over $US1.6 billion. The construction contract for these vessels is valued at approximately $US321.7 million.

Austal USA's President and Chief Operating Officer, Joe Rella, commented "The Navy's growing confidence in Austal and the JHSV program becomes more evident with each new contract award. Austal will continue to reward our customer with improved efficiency, evidenced in our continued on-time delivery of high-quality, affordable ships."

As prime contractor, Austal was awarded the construction contract for the first 103 m JHSV in November 2008, with options for nine additional vessels between FY09 and FY13. The Austal JHSV team includes platform systems engineering agent, General Dynamics Advanced Information Systems, who is responsible for the design, integration and test of the ship's mission systems, including internal and external communications, electronic navigation, and aviation and armament systems.

Austal received authorization from the Navy to start construction on the first vessel of the contract, USNS *Spearhead* (JHSV 1), in December 2009 after completing the rigorous design in a 12-month period. USNS *Spearhead* recently began builder's sea trials. *Choctaw County* (JHSV 2) is taking shape in Austal's final assembly bay and construction of JHSV 3 is well underway. Her keel was officially laid on 3 May.

Austal USA employs over 2600 highly-qualified shipbuilders, engineers and support staff and is steadily growing towards 4000 employees. Austal also recently launched a second Independence-variant 127 m Littoral Combat Ship (LCS) for the US Navy, *Coronado* (LCS 4), which is preparing for builder's trials. As prime contractor, Austal received a US Navy contract for construction of up to an additional 10 Littoral Combat Ships, including *Jackson* (LCS 6) and *Montgomery* (LCS 8), to be appropriated in the following five years, with a total value in excess of $US3.5 billion. Once commissioned, these 10 ships will join the Austal-built USS *Independence* (LCS 2) which was commissioned in January 2010.

USS *Independence* (LCS 2) arriving at her home port of San Diego for the first time on 2 May
(US Navy photo)

The first module for JHSV 3 at Austal's US shipyard
(Photo courtesy Austal)

More AWD Blocks Shipped from Williamstown

Two more keel blocks constructed by BAE Systems for the air-warfare destroyer (AWD) project were shipped to the ASC facility in Osborne, South Australia, at the end of February.

Each of these blocks has a mass of approximately 100 t and is approximately 14 m long, 17 m wide and 5 m high. Both of the blocks left BAE Systems Williamstown shipyard on 27 February by barge.

BAE Systems Director of Maritime, Bill Saltzer, said the delivery brought the total number of blocks delivered to ASC to five (the first three having been delivered during 2011) and marked another significant milestone achieved on this important project.

"Construction of another six blocks is already underway in Williamstown, with two more to be delivered in a couple of months and the other four scheduled for completion later this year," he said.

Mr Saltzer congratulated the BAE Systems staff for achieving further success on this project.

The five blocks now delivered to ASC will form a large part of the keel of the first ship, HMAS *Hobart*.

Block Allocation for Third AWD

On 9 March the Minister for Defence, Stephen Smith, and the Minister for Defence Materiel, Jason Clare, announced the allocation of construction work for the third ship of the $8 billion air-warfare destroyer (AWD) project.

The allocation of block construction work for Ship 3 is as follows:

- Forgacs (Newcastle) — 15 blocks;
- ASC (Adelaide) — eight blocks;
- Navantia (Spain) — five blocks; and
- BAE Systems (Melbourne) — two blocks.

This means that the four shipyards will construct the same blocks for Ship 3 that they are constructing for Ship 2. The construction arrangements for block structure and block pre-outfit are:

- Ship 1: BAE Systems 7, Forgacs 14, ASC 9
- Ship 2: BAE Systems 2, Forgacs 15, ASC 8, Navantia 5
- Ship 3: BAE Systems 2, Forgacs 15, ASC 8, Navantia 5

Getting the same shipyards to build the same blocks for Ships 2 and 3 will enable the AWD Project to take advantage of lessons the shipyards have learnt and the experience they have gained from building the same blocks.

The AWD project involves the construction of 90 separate steel blocks being built at four shipyards in Adelaide (ASC), Melbourne (BAE Systems), Newcastle (Forgacs) and Spain (Navantia) as well as the three sonar block assemblies being built in Spain and the United Kingdom.

In May last year the Government announced the reallocation of 18 blocks for AWD Ships 1 and 2. Thirteen blocks were divided between Forgacs, ASC and BAE with five allocated to Navantia.

The reallocation of work for Ship 3 means that overall division of block construction across the project is:

- Forgacs — 44 blocks;
- ASC — 25 blocks;
- BAE Systems — 11 blocks; and
- Navantia — 10 blocks.

Preferred Tenderer for Anzac-class Frigate Maintenance Announced

It was announced on 29 February that a $300 million maintenance and repair contract for the Anzac-class frigates will be negotiated with Naval Ship Management Australia, following their selection as preferred tenderer.

The Minister for Defence Materiel, Senator Kim Carr, said that the new five-year contract was expected to provide better outcomes for industry and more effective, value-for-money outcomes for the Navy.

"In June of last year my predecessor, Minister Jason Clare, announced the Government's intention to reform the naval ship repair sector — commencing with the release of the tender for the repair and maintenance of the Navy's eight Anzac-class frigates," Senator Carr said.

"I am pleased to announce the outcome of the tender evaluation. I congratulate Naval Ship Management Australia, a joint venture of Babcock Australia and United Group Infrastructure, for being selected as the preferred tenderer."

Senator Carr said that the announcement follows extensive consultation with industry on a new approach to contracts for repair and maintenance work.

"In contrast to the previous arrangements which required every new maintenance activity to be individually contracted out, the grouping of ship repair and maintenance tasks offers the potential for significant cost savings.

"These savings are achieved through reductions in contracting activity, greater ability to forecast work effort, and productivity gains through greater investment in workforce skills and infrastructure.

"This initiative will provide industry with the predictability, certainty and stability that it needs to achieve efficiencies and provide job security for, and investment in, its workforce.

"This new contracting approach is good for industry, it is good for job security and development, it is good for Navy, and it is good for Australian taxpayers who rightly demand maximum efficiency from every dollar spent on Australia's defence."

Contract negotiations are expected to be finalised by June 2012.

HMAS *Choules* passes first capability test

The Royal Australian Navy's new amphibious ship, HMAS *Choules,* has successfully completed her first major amphibious training tasks.

The Navy and Army came together during March for the amphibious exercises Squadex and Sea Lion.

Exercise Squadex provided practice for drivers of Army and Navy landing craft along with a variety of vehicle types as they drove on and off HMAS *Choules.*

HMAS *Choules* is significantly larger than the amphibious ships she replaced and gives the ADF new capabilities such as a floating dock.

The internal docking facility (or well dock) can be flooded to a depth of up to 3 m so that landing craft and the ship's own landing barges can actually drive inside the hull while the ship is at sea, taking on their cargo of vehicles and people in safe and controlled conditions.

Army Blackhawk helicopter pilots from 5 Aviation Regiment have also put the ship to the test, flying constant sorties to confirm their deck-landing qualifications and to practice cargo and personnel transfers.

For exercise Sea Lion, HMAS *Choules* was joined by the New Zealand amphibious ship, HMNZS *Canterbury*, Australian Army personnel from Townsville's 3rd Brigade, and planning staff from all three services around Australia. This exercise focussed on ensuring the ADF is prepared for a humanitarian assistance and disaster relief incident in our region.

HMAS *Choules'* Commanding Officer, CMDR John Cowan, said that *Choules* had the capacity to conduct simultaneous landing-craft and helicopter operations, day and night, to support humanitarian and disaster relief operations.

An LCM 8 landing craft approaching the stern door of HMAS *Choules* to berth in her flooded dock well
(RAN photograph)

"Using *Choules'* well dock to move personnel and equipment ashore allows a significant increase in the speed of transfer compared with the Navy's previous Landing Platform Amphibious ships," Commander Cowan said.

Choules has a crew of 158 officers and sailors, including a permanently-embarked Ships Army Department of 22. The ship can accommodate two large helicopters, 150 light trucks and 350 troops.

The LCM 8 entering HMAS *Choules* dock well
(RAN photograph)

The LCM 8 beached in HMAS *Choules*
(RAN photograph)

Loading a container into the LCM 8 in HMAS *Choules*
(RAN photograph)

OSV for Humanitarian and Distaster Relief

On 19 March the Minister for Defence, Stephen Smith, and Minister for Defence Materiel, Jason Clare, announced that the Government had agreed to purchase the Offshore Support Vessel, MSV *Skandi Bergen.*

Skandi Bergen will add to the Royal Australian Navy's current amphibious ships, HMAS *Choules* and HMAS *Tobruk*. The 6500 t ship is 105 m long and 21 m wide. She has accommodation for up to 100 people, more than 1000 m^2 of deck area, and a helipad.

The purchase of *Skandi Bergen* — at a cost of less than $130 million — will ensure that Defence has the humanitarian and disaster relief capability required between now and the arrival of the two new Landing Helicopter Dock (LHD) ships in the middle of the decade.

She will primarily be used to transport troops and supplies in support of humanitarian and disaster relief operations domestically and in the region.

The purchase of this vessel will also provide a long-term capability for Customs and Border Protection. After Defence introduces the LHDs into service, the vessel will be trans-

ACV *Ocean Protector*, sister ship of *Skandi Bergen*
(Photo courtesy Australian Customs and Border Protection)

ferred to Customs and Border Protection.

Skandi Bergen will be able to undertake patrols in the Southern Ocean providing surveillance, detection and apprehension of any vessels operating illegally. The vessel is able to operate in sub-Antarctic weather conditions.

The commercial off-the-shelf vessel will require minimal modifications and will enter service in the middle of the year and will be operated under a civilian crewing arrangement.

Skandi Bergen is the sister ship of ACV *Ocean Protector*, currently operated by Customs and Border Protection.

Action taken since Cyclone Yasi

When Cyclone Yasi hit North Queensland in February early last year, Defence did not have any amphibious ships available to assist. Since that time the Government has taken a number of steps to rectify the problem with the Navy's amphibious fleet.

First, in April last year, the Government purchased RFA *Largs Bay* from the British Government. In December she was officially commissioned into the Royal Australian Navy as the *HMAS Choules*.

Second, work was conducted on HMAS *Tobruk* to return her to sea.

Third, in order to maintain the Navy's amphibious capability, ships were leased to supplement the existing capability. The subsea operations vessel, *Windermere,* was leased to provide extra support during the cyclone season.

Fourth, to ensure such a gap in capability does not happen again, the Government also commissioned Mr Paul Rizzo to develop a plan to improve the maintenance and sustainment of the naval fleet. The recommendations from the Rizzo report are now being implemented.

Fifth, in December last year, Minister Smith and Minister Clare announced that they would pursue the purchase of an additional ship to be used by Navy, particularly for humanitarian and disaster relief situations.

Current Amphibious Capability

The Royal Australian Navy currently has the following amphibious capability:

- HMAS *Choules;*
- HMAS *Tobruk;*
- Landing Craft Heavy vessels; and
- HMNZS *Canterbury* — under Australia's agreement with New Zealand she could be made available as part of the joint Pacific-focussed Ready Response Force, subject to any operational requirements in New Zealand.

New Sydney Ferries Operator Announced

On 3 May the NSW Minister for Transport, Gladys Berejiklian, announced that Harbour City Ferries has been awarded the contract to operate Sydney Ferries from late July 2012.

Under the seven-year franchise contract, the NSW Government retain ownership of Sydney Ferries' vessels and the Balmain Shipyard, and will remain in control over fares and setting service levels for the new operator.

The Minister said that a key task for Harbour City Ferries will be to improve customer experience for the 14 million passengers who use ferries each year, while at the same time offering taxpayers value for money.

Harbour City Ferries is a joint partnership between leading transport operators Transfield Services and Veolia Transdev Australia who, between them, employ around 146 000 staff world-wide in the maritime, rail and road transportation industries.

Harbour City Ferries competed with an experienced field of local and international transport operators, and was selected based on their approaches to customer experience, safety, operations, maintenance and management of the Sydney Ferries workforce.

"Importantly for customers, the colours of the existing Sydney Ferries fleet will be retained and so will the name 'Sydney Ferries'. Existing services and fares will continue as normal as the operator focuses on improving services for customers."

Sydney Ferries has a fleet of 28 ferries and three chartered vessels travelling from Manly to Watsons Bay and Parramatta.

USNS *Spearhead* completes Builder's Sea Trials

USNS *Spearhead* (JHSV 1), the innovative high-speed catamaran transport ship under construction by shipbuilder Austal in Mobile, Alabama, successfully completed builder's sea trials on 19 April in the Gulf of Mexico. The trials encompassed over 50 demonstration events which enabled the shipbuilder to rigorously test the ship and all of her systems in preparation for final inspection by the United States Navy before delivery.

Notable achievements during the trials included a demonstration of major systems along with first-of-class standardisation and manoeuvrability trials, reaching a top speed in excess of 35 kn.

A series of high-speed ahead and astern manoeuvres in the Gulf of Mexico demonstrated the effectiveness of the ship's four steerable waterjets. In the course of repeated high-speed turns the ship demonstrated the stability and agility of the catamaran hullform, with the JHSV exhibiting virtually no heeling motions throughout the radical turns.

Upon returning from the full-power trial, Joe Rella, President and Chief Operating Officer of Austal USA, remarked: "The successful first run trials for this prototype vessel validates the quality and reliability of Austal's shipbuilding know-how. I have never witnessed a more problem-free builder's sea trial than USNS *Spearhead*'s. The global Austal organisation successfully participated in the design, procurement, and production of this ship with a great outcome."

USNS *Spearhead* on trials
(Photo courtesy Austal)

Skirmish from Norman R. Wright & Sons

Norman R. Wright & Sons (Qld), with more than 90 years of dedicated pilot-boat design and construction, completed and delivered *Skirmish* to Brisbane Marine Pilots in early April for their operations servicing the Port of Brisbane. *Skirmish* is the most-recently completed of the current 14.2 m pilot vessel series, with a further two vessels under construction for support of alternative Australian pilotage services.

The hull is constructed of solid FRP layup, while the deck and superstructure are FRP foam-cored, and the interior fit-out is an FRP infusion of both solid and cored panels.

The photograph of *Skirmish* coming through a wave, shortly after delivery to the Mooloolaba Pilot Boat Station, clearly shows the small amount of spray generated and the ease with

Skirmish in operation
(Photo courtesy Nigel Rose)

which the vessel passes through a head sea. The comment of the Brisbane Marine Pilot's Senior Coxswain, that "the landing after this was very gentle" is also noteworthy. The novel two-chine hullform achieves a longer waterline and finer entry, providing improved performance and seakeeping without increasing hull length, whilst the propellers, being installed in tunnels, are better protected for operations in the shallow waters of the bar and provide an improved shaft-line angle. *Skirmish* is purposely fitted with a much-larger searchlight than usual and, mounted to this, there is a thermal-imaging camera, because *Skirmish* also acts as a standby search-and-rescue vessel and is on call to support other services when their vessels cannot leave port due to sea conditions on the bar. *Skirmish*, already being fitted with a fully-developed pilot-recovery system and aft manoeuvring station, is well suited to recovering people in distress from the sea, and these procedures are regularly practised by pilots and boat crews.

During builder's and acceptance trials, *Skirmish* confirmed the requisite level of predictability and reliability in manoeuvring, irrespective of the wave direction encountered, demonstrating an ease in coming alongside and departing from a ship travelling at 15 kn and was unaffected by the ship's wake. This was particularly notable when *Skirmish* travelled alongside the ship, maintaining a gap of about 300 mm with ease and with no evidence of being sucked in against the ship's side. Placed alongside for a time typical for the transfer of a pilot, on departing she turned away cleanly and without fuss. Also demonstrated during trials and delivery was how truly she tracked in a hands-off situation; irrespective of the direction of the waves encountered. *Skirmish* could easily maintain a course without any helm correction for minutes at a time in seas which, during delivery, were of about 1.5 m significant wave height. The natural course-keeping ability of the vessel was so pronounced that, at one point, those on board asked Bill Wright (who was skippering during trials and delivery), whether the auto-pilot had actually been engaged? And it had not!

As per standard practice of Norman R. Wright & Sons, the design for the 14.2 m pilot vessels was thoroughly tank tested to confirm performance predictions at the Australian Maritime College's facility in Launceston. The Norman R. Wright-designed pilot vessels are often operated in hazardous sea states, particularly those of the Brisbane Marine Pilot's Boat Station, Mooloolaba, where pilot vessels routinely operate over a shallow bar, night and day, in often substantial and breaking seas. A further model was therefore built and formal roll-over and self-righting experiments were performed and data collected and analysed at the AMC, and confirmed *Skirmish*'s self-righting characteristics.

In compliance with AMSA's Marine Order 54/5, these new pilot vessels have optimally clear fore and side decks, and incorporate robust resilient deck-edge fenders, with the side-deck bollards pocketed into the deckhouse sides. Again, in accordance with the AMSA requirements and to reduce fatigue and maximise crew and passenger comfort, the deckhouse itself is resiliently mounted, reducing both dynamic shocks and sound transmission to the deckhouse interior. Brisbane Marine Pilots have since confirmed the high regard in which they hold this vessel's performance and seakeeping ability, and the minimal vibration and sound levels experienced in the deckhouse. In combination with the reduced accelerations of this hullform which the pilots have observed, in this new vessel they now arrive at, and board a ship, considerably more relaxed and fresh than was previously the case. *Skirmish*, being the sixth pilot vessel built for Brisbane Marine Pilots, demonstrates Norman R. Wright & Son's continuing development of the type.

During trials, particular attention was paid to measuring and documenting sound levels inside the deckhouse and these were measured as 71 dB(A) at 23 kn and 68 dB(A)at 20 kn, with the various recordings considered a very successful outcome throughout the vessel's operational range.

Recommended viewing is video footage of the Norman R. Wright & Sons-designed-and-built pilot vessels of the earlier 14 m and 14.5 m series, operated by Brisbane Marine Pilots over the bar from the Mooloolaba Pilot Boat Station. Given that Brisbane Marine Pilots routinely operate their vessels from the Mooloolaba Pilot Boat Station, day and night under these conditions, this footage clearly demonstrates the degree of confidence the boat crews and pilots have in these vessels.

www.youtube.com/watch?NR=1&feature=endscreen&v=fFf0n445PtE (http://www.youtube.com/watch?v=NMoUNCfPvc4)

Principal particulars of *Skirmish* are

Length OA		14.2 m
Length WL		13.16m
Beam		4.8 m
Draught		1.127 m
Displacement		20.66 t at DWL
		22.24 t in departure condition
Fuel oil		2500 L
Fresh water		150 L
Main engines		2×Cummins QMS11
		each 339 kW
Gearboxes		ZF 325-1A
Reduction ratio		1.73:1
Propellers		737686 mm 4 blades
Generator		Onan 6.0 MDKBJ/94278
Steering system		Hydraulic
Trim tabs		Humphree interceptors
Liferafts		2×Zodiac 6-person canister inflatable
Speed	(maximum)	22.9 kn in departure condition
	(cruising)	20.9 kn in departure condition

Classification	NSCV 2C Restricted Offshore (2 crew + 10 pax) DNV plan certification HSLC R1

Nigel Rose

Front Runner from Alloy Boats (Malaysia)

Alloy Boats (Malaysia) has delivered a 10 m landing craft, *Front-Runner*, to Frontier Resources Ltd for use as a supply vessel in its mining operations in Papua New Guinea. The customer operates in remote locations with little or no road access, and will use the landing craft to ferry crew and supplies to its exploration sites. The vessel will also be used to tow a 23 m steel catamaran barge which is currently being built at Alloy Boats in sections for export and final assembly in PNG. The steel barge will carry heavy machinery.

Front-Runner shows her paces
(Photo courtesy Greg Cox)

Front-Runner on the beach
(Photo courtesy Greg Cox)

The landing craft design was initially constrained by the requirement for a hull length less than 10 m, above which class certification was required. The ramp is wide enough at 1.4 m to take a standard pallet carrying up to 500 kg and the deck structure is good for 1 t/m^2 loading. There are also two under-deck cargo spaces accessed by flush watertight hatches. The cabin interior can be fully dismantled to remove the engines through a large soft patch in the aft cabin bulkhead.

Sea trials were a happy event with the vessel slightly underweight and achieving 3 kn over the promised speed, with a customer full of praise for what must be the bargain of a lifetime. There is the option of one or two more vessels.

Principal particulars of the new vessel are

Length OA	11.05 m
Length hull	9.99 m
Length WL	9.00 m
Breadth moulded	3.30 m
Depth moulded	1.20 m
Draft	0.60 m
Displacement	6.88 t lightship 10.62 t full load
Crew	8 maximum
Fuel oil	860 L
Fresh water	100 L
Main engines	2×John Deere 6068 SMF50 each 199 kw at 2500 rpm
Gearboxes	2×ZF 280, reduction ratio 1:1
Waterjets	2×Doen DJ110Z Axial Flow each 280 mm diameter
Speed	31 kn at MCR no cargo

Greg Cox

Kilimanjaro IV from Incat Crowther

Incat Crowther has secured a contract to design a 45 m catamaran ferry for Coastal Fast Ferries in Tanzania, and this will be the fourth vessel to be designed by Incat Crowther for the operator.

Following the launch of *Kilimanjaro III* last year, Coastal Fast Ferries has continued to expand its operation. The extension of services to the island of Pemba with *Kilimanjaro III* has been so successful that the operator immediately considered how a fourth vessel could be used to gain the most out of the operation. Following a development process involving close cooperation between builder, operator and designer, a 45 m, 656-passegner quad-jet vessel was agreed upon. To be named *Kilimanjaro IV*, the new vessel will offer the operator a good balance of speed, passenger capacity and efficiency.

The 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 92 seats. All three of these cabins have their own independent boarding ramps on both sides of the vessel. Additional boarding is provided on the upper deck aft. Exterior economy-class seating is provided on the upper deck aft (130 seats) and on the roof deck (90 seats).

In addition to the increased passenger capacity, the vessel is notable for its large main-deck luggage room, capable of

Profile of *Kilimanjaro IV*
(Image courtesy Incat Crowther)

carrying 32 suitcase carts. This room also gives the operator freight-transfer capacity. Crew accommodation is provided in the hulls, by way of four twin cabins and a bathroom.

The vessel will be powered by a quartet of Cummins KTA 50 M2 main engines, giving commonality with the earlier vessels. Propulsion will be through Hamilton HM651 waterjets. The vessel will have a service speed of 34 kn, with a maximum speed of 36 kn.

Kilimanjaro IV demonstrates the expertise and experience which Incat Crowther brings to operators, assisting them in developing an efficient and profitable vessel.

Principal particulars of *Kilmanjaro IV* are

Length OA	44.7 m
Length WL	42.9 m
Beam OA	11.5 m
Depth	3.9 m
Draft (hull)	1.1 m
Passengers	656
Crew	8
Fuel oil	20 000 L
Fresh water	2000 L
Sullage	3000 L
Main engines	4×Cummins KTA 50 M2 each 1342 kW @ 1900 rpm
Gearboxes	4×ZF 7600 NR2H
Propulsion	4 Hamilton HM651 waterjets
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	USL Code Class 1C

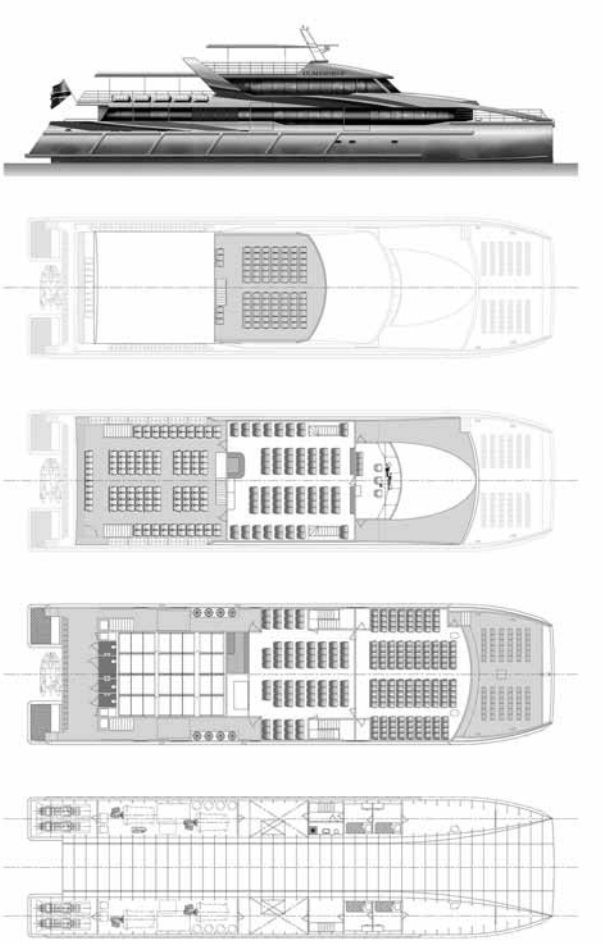
Riverside Avalon from Incat Crowther

Incat Crowther has announced the launch of a 24 m catamaran ferry constructed by Marine Engineering Consultants. Based on the successful *Fantasea Sunrise* launched in 2011, *Riverside Avalon* is the first of three vessels contracted by Riverside Marine to ferry construction workers to the QCLNG project on Curtis Island.

As delivered, *Riverside Avalon* carries 246 passengers on two decks, with seats arranged in forward-facing rows. Three toilets, including one for the disabled, are located on the main deck. An additional toilet is located on the upper deck.

Vessel boarding is via folding ramps amidships and aft on both sides. These ramps are designed to interact with the ferry terminal pontoons in Gladstone and on Curtis Island. These ramps allow much faster turn-around times and ease of berthing operations for the crew.

This vessel has an array of features which are designed to give the vessel a second life upon conclusion of operation at the QCLNG plant. *Riverside Avalon* features large aft swim platforms and additional support structure for an offshore rescue boat or for a reef-transfer vessel. Additional sullage tanks are fitted to the hulls to facilitate waste pump-out from reef pontoons. As delivered, *Riverside Avalon* is in USL Code/NSCV 2010 survey for Class 1D, but has been



General arrangement of *Kilimanjaro IV*
(Drawing courtesy Incat Crowther)

Riverside Avalon shows her paces
(Photo courtesy Incat Crowther)

designed to be easily transferred to USL Code/NSCV survey for Class 1C for its second life. A second-life seating layout has also been developed, which will feature lounges and booth seating.

Riverside Avalon is powered by a pair of Yanmar 6AYM-WET main engines, producing 610 kW @ 1900 rpm. On her recent sea trial, *Riverside Avalon* easily achieved her governed service speed of 25 kn. Propellers were selected following studies which showed that this was the most efficient propulsion package for the vessel at a service speed of 25 kn. Skegs have been fitted which have been specifically designed to protect marine life in the sensitive Gladstone environment.

Riverside Avalon not only provides the core Incat Crowther values of efficiency and robustness in her first life, but also possesses versatility which will add value for the operator throughout her ongoing life.

Principal particulars of *Riverside* Avalon are

Length OA	24.0 m
Length WL	23.8 m
Beam OA	8.5 m
Depth	2.75 m
Draft (hull)	1.1 m
(propellers)	1.7 m
Passengers	246
Crew	3
Fuel oil	6000 L
Fresh water	500 L
Sullage	500 L
Main Engines	2×Yanmar 6AYM-WET each 610 kW @ 1900 rpm
Propulsion	2×propellers
Speed (service)	26 kn
(maximum)	28 kn
Construction	Marine-grade aluminium
Flag	Australia
Class/Survey	NSCV/USL Code Class 1D (as delivered) NSCV/USL Code Class 1C (second life)

Xun Long 5 from Incat Crowther

Incat Crowther has announced the launch of *Xun Long 5*, the first of two vessels to be built by AFAI Southern shipyard for Xunlong Shipping Co. The contract to design these two vessels was won in a tight competitive tender process, and Incat Crowther is proud of the support offered to AFAI Southern to assist them to secure this contract.

The 34 m long, 188 passenger vessel features a mix of passenger classes over two decks. The main deck seats 154 economy class passengers. The forward end of the main deck cabin houses a kiosk, forward of which is a crew room. Three toilets are located aft on this deck, as is a large electrical room. The upper deck seats 40 in booths with tables, as well as a lounge that seats 6. There is an 8-passenger VIP room aft and an additional toilet. Four large luggage containers are accommodated on the aft upper deck, and there are stairs to the roof deck. The raised wheelhouse offers excellent visibility over the foredeck, with direct access to external

Xun Long 5 ready for launch
(Photo courtesy Incat Crowther)

Xun Long 5 on the water
(Photo courtesy Incat Crowther)

wing control stations for easier and safer berthing operations.

Xun Long 5 is powered by a pair of MTU 16V2000 M70 main engines. These engines drive through a pair of ZF4540 gearboxes to MJP 550DD waterjets. On recent sea trials, *Xun Long 5* performed well, achieving its contracted loaded service speed of 28 kn. The vessel has a top speed of 30 kn.

The vessel is in survey to China's CCS rules.

Incat Crowther's attention to clients' needs is demonstrated by *Xun Long 5*, a vessel tailored perfectly for Xun Long Shipping Co.

Principal particulars of *Xun Long 5* are

Length OA	34.0 m
Length Wl	30.6 m
Beam OA	8.5 m
Depth	3.05 m
Passengers	188
Crew	8
Fuel oil	6000 L
Fresh water	1000 L
Sullage	2000 L
Main engines	2×MTU 16V 2000 M70 each 1050 kW @ 2100 rpm
Gearboxes	2×ZF 4540
Waterjets	2×MJP 550DD
Generators	2×Caterpillar C4.4 each 86 kW 50Hz
Speed (service)	28 kn
(maximum)	30 kn
Construction	Marine-grade aluminium
Class/Survey	CCS ✠CSA Catamaran HSC Passenger A Coastal Service Restriction ✠CSM
Flag	China

Freedom Sovereign from Incat Crowther

Incat Crowther has announced the launch of 24 m catamaran ferry *Freedom Sovereign*. Launched by Aluminium Marine in Queensland, Freedom Sovereign is a near-sister ship to *Fantasea Sunrise*, launched last year. *Freedom Sovereign* has been delivered to Freedom Fast Cats, who have had considerable success with *Freedom Flyer* (built 1980) and *Freedom Monarch* (built 2010), both designed by Incat Crowther.

Freedom Sovereign is configured to carry 195 passengers

over two decks. The main passenger cabin seats 121 passengers, arranged in booths with tables. There is a large bar and kiosk at the aft end of the cabin. Two toilets are located aft on the main deck, one of which is wheelchair accessible. The upper deck consists of a lounge space, slightly smaller than that of *Fantasea Sunrise*, which seats 20 passengers. Two additional toilets are provided on this deck, and there are 54 exterior seats.

Loading is facilitated by aft side gates and midship boarding doors on the main deck. There is also a hydraulically-operated telescopic ramp mounted on the foredeck. This allows Freedom Fast Cats to operate the vessel to beaches without infrastructure.

Powered by a pair of Yanmar 6ATM-GTE engines, *Freedom Sovereign* recorded a loaded speed of 24 kn. The vessel has a top speed over 27 kn. In addition to its regular service tanks, the vessel also features transfer tanks totalling 2100 L, which are fitted to allow for transferring sullage in future operations.

Incat Crowther believes *Freedom Sovereign* to be a prime example of the long-term relationships which Incat Crowther builds with its clients. In *Freedom Sovereign*, Freedom Fast Cats has gained a rugged, efficient and dependable vessel.

Principal particulars of *Freedom Sovereign* are

Length OA	24.0 m
Length WL	23.8 m
Beam OA	8.5 m
Depth	2.75 m
Draft (hull)	1.10 m
(propellers)	1.70 m
Passengers	195
Crew	5
Fuel oil	5100 L
Fresh water	1050 L
Sullage	2100 L
Main engines	2×Yanmar 6AYM-GTE each 618 kW @ 1900 rpm
Propulsion	Propellers
Speed (service)	24 kn
(maximum)	27 kn
Construction	Marine-grade aluminium
Flag	Australia
Class/Survey	NSCV Class 1C

Freedom Sovereign on trials
(Photo courtesy Incat Crowther)

Outer Limit from Incat Crowther

Incat Crowther has announced the launch of *Outer Limit*, a 35 m catamaran workboat for Offshore Unlimited. Launched by Richardson Devine Marine Constructions, *Outer Limit* is the third vessel for the operator after *Unlimited* was launched in 2008 and *Limitless* in 2010.

The vessel will be able to carry 125 t deadweight, with capacity for up to 56 passengers on day operations and 32 berths for overnight operations. Drawing on operational experience from *Unlimited* and *Limitless*, *Outer Limit* features numerous work spaces, with desks in every cabin and an upper-deck workspace with 14 seats. This workspace will be fitted with direct wireways to the aft deck to allow for quick installation and configuration of deck-mounted equipment, whilst an adjacent bathroom improves functionality.

Two large cabins on the upper deck feature half-height glass bulkheads with blinds to allow interaction between the workstations and the helm.

The main-deck cabin houses a wet room with lockers and bathroom, lounge, galley, mess, medical room and six cabins. A pair of these cabins will be able to be joined by retracting a dividing wall, creating a large four-berth cabin.

The vessel's hulls house a further six cabins, four of which also feature a sliding joining partition. In addition to these cabins, the hulls house refrigerator and freezer rooms, as well as service and storage spaces which offer increased range and operational flexibility.

The aft working deck features over 160 m^2 of work space—enough to accommodate a quartet of 20 ft containers. A Heila HLM 35-4S deck crane is fitted with remote control. A moon-pool is also fitted and there are mounts for a removable luffing A-frame with 20 t capacity.

The vessel is powered by a pair of Caterpillar C32 ACERT main engines, each producing 1193 kW. Propulsion is by a pair of five-bladed propellers. In recent trials, *Outer Limit* achieved a loaded speed in excess of 22 kn. Service speed will be 20 kn and the range will be 1800 n miles. Manoeuvring is enhanced by a pair of Wesmar bow thrusters.

Incat Crowther is proud of its on-going collaboration with RDMC and Offshore Unlimited, which has resulted in a third progressive utility vessel, offering the operator even greater revenue-earning potential.

Outer Limit shows her paces on the Derwent
(Photo courtesy Incat Crowther)

Principal particulars of *Outer Limit* are

Length OA	35.00 m
Length WL	34.44 m
Beam OA	11.50 m
Depth	3.90 m
Draft (skeg)	2.23 m
Passengers	56 (day) 32 (berthed)
Aft deck area	160 m^2
Deadweight	125 t
Fuel oil	37 000 L
Fresh water	2000 L
Sullage	6000 L
Main engines	2×Caterpillar C32 ACERT each 1193 kW @ 2300 rpm
Propulsors	2×five-bladed propellers
Speed (maximum)	22 kn
(service)	20 kn
Generators	2×Caterpillar C9 200 kWe
Construction	Marine-grade aluminium
Flag	Australia
Class/Survey	NSCV Class 2A/1B

48 m Monohull Fast Supply Vessels from Incat Crowther

Incat Crowther has been awarded a contract to design a fleet of 48 m monohull fast supply vessels (FSVs). In a significant order that demonstrates market confidence in Incat Crowther's offshore expertise, a total of twelve of these vessels will be built by ETP Engenharia LTDA, which has also recently delivered a pair of Incat Crowther 36 m monohull crewboats meeting the Petrobras P2 vessel specification. Six of the new FSVs will be owned by Baru Offshore Navegação, which is a Brazilian subsidiary of Intertug SA, and the other six FSVs will be owned by Senior Navegação.

Starboard bow of 48 m monohull fast supply vessels
(Image courtesy Incat Crowther)

These workhorses will be operating in Brazil for Petrobras and have been optimised to comply with the UT4000 fast supply vessel specification. Ship's fuel capacity will be in excess of 40 0000 L, whilst each will carry a cargo fuel load of 90 000 L. The vessels will also be able to carry 90 000 L of cargo fresh water.

The vessel is dominated by an extensive aft deck of 225 m^2 of usable area. The aft deck will be planked with hardwood and protected by study cargo rails.

An additional 30 m^2 of cargo area is provided inside the main-deck cabin, allowing for the carriage of items out of the elements, such as food and other supplies. A small meeting room for six personnel is also housed in the main-deck cabin, as are facilities of a wet room and laundry.

The upper-deck wheelhouse includes an aft-facing control station, allowing for safe and efficient manoeuvring.

Below decks are six cabins accommodating 11 crew, as well as a mess, galley and bathrooms.

Each vessel will be powered by a quartet of Cummins QSK 50 main engines, each rated at 1342 kW @ 1800 rpm. Fixed-pitched propellers have been selected for propulsion, giving the vessel a service speed of 21 kn. Two 112 kW electric bow-thrusters will enhance manoeuvrability.

Incat Crowther's extensive experience in the offshore supply field will insure these vessels for a fleet of class-leading vessels which will be rugged, efficient and profitable.

Principal particulars of the new vessels are

Length OA	48.0 m
Length WL	46.1 m
Beam OA	9.5 m
Depth	4.25 m
Draft (hull)	1.7 m
(propellers)	2.1 m
Crew	11
Deck area	225 m^2
Deck loading	3.0 t/m^2 maximum
Ship's fuel	44 600 L
Ship's fresh water	9000 L
Cargo fuel	90 600 L
Cargo fresh water	91 000 L
Main engines	4×Cummins QSK 50 each 1342 kW @ 1800rpm
Propulsion	4×5-bladed propellers
Generators	2×Cummins QSM 11 each 280 kWe
Speed (maximum)	25 kn
(service)	21 kn
Construction	Marine-grade aluminum
Flag	Brazil
Notation	✠1A1 HSLC (BRA) R1 Service 2 E0

Two 55 m Catamaran Crew Boats from Incat Crowther

Two Incat Crowther 55 m catamaran crew boats, to be named *SEACOR Lynx* and *SEACOR Leopard*, are under construction at Gulf Craft LLC in Louisiana, USA. The vessels' operator, SEACOR Marine, is a progressive company which pioneered the use of fast catamarans in the offshore industry with the commissioning of *SEACOR Cheetah* in January 2008, and *SEACOR Cougar* in April 2009. The operator intends to push the boundaries even further with these larger, faster vessels, by offering increased capacity and comfort.

The vessels will each be powered by four MTU 16V4000 M73L main engines, which will drive Hamilton HT-810 waterjets. The vessels will have the capacity to reach speeds in excess of 46 kn.

Extensive seakeeping studies were performed to develop a design which not only improved passenger comfort, but also increased operational efficiency. The result is a vessel which reduces motions by an average of 20%, with vertical accelerations reduced by 40%.

As with *Cheetah* and *Cougar*, the cargo deck is lined with hardwood inserts, and protected by heavy-duty cargo rails at the sides. An optional landing rig for surfer-class vessels can be fitted amidships. The vessels will have the capacity to carry 150 t of deck cargo.

The combination of four reversing jets and two retractable azimuthing thrusters, coupled with a Kongsberg control system, provides the vessels with dynamic positioning in a wide operating area. The vessels will have DP3 capability.

The main-deck passenger cabin seats 150 at an increased pitch, whilst comfort is enhanced with increased luggage space and additional toilets. The main passenger cabin also houses a snack bar. The upper-deck wheelhouse features forward and aft control stations. Outside are fire monitors and a rescue boat. As well as excellent forward and aft visibility, direct stairs are provided to the foredeck for quick and safe mooring operations. The hulls accommodate 14 crew in a mix of officer and non-rating cabins. The port hull features galley and mess facilities.

Incat Crowther is proud of the relationship with SEACOR Marine, who is proving an ideal partner in progressive, forward-thinking vessel design. It is anticipated that these new crew boats will further push the boundaries and enhance the services offered by SEACOR Marine.

Principal particulars of the new vessels are

Length OA	57.9 m
Length WL	53.6m
Beam OA	12.5 m
Depth	4.4 m
Draft (hull)	1.7 m
Passengers	150
Crew	14
Deck capacity	150 t
Deck loading (max)	2.6 t/m^2
Fuel oil	87 820 L
Fresh water	16 650 L
Sullage	2650 L
Main engines	4×MTU 16V4000 M73L each 2880 kW @ 2050rpm
Propulsion	4×Hamilton HT-810 water jets
Generators	2×Cummins QSM11 each 290 ekW
DP Capability	DP-3
Speed (maximum)	46 kn
Construction	Marine-grade aluminium
Flag	Marshall Islands
Class/Survey	ABS ✠ A1 HSC Crewboat ✠ AMS DPS-3 (Fire Fighting Capability)

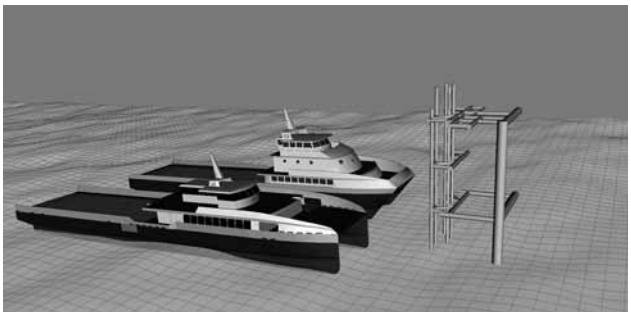
Stewart Marler

SEACOR Cheetah on trials
(Photo courtesy Incat Crowther)

Starboard bow of 55 m catamaran crewboats
(Image courtesy Incat Crowther)

Starboard quarter of 55 m catamaran crewboats
(Image courtesy Incat Crowther)

Main deck structure of 58m catamaran crew Boat under construction at Gulf Craft
(Image courtesy Incat Crowther)



Seakeeping comparison study of 58 m and 50 m catamaran crew boats
(Image courtesy Incat Crowther)

Cruising

The summer season wound down through autumn, with visits by *Queen Mary 2, Costa Deliziosa, Regatta, Sea Princess, Seven Seas Voyager, Oriana, Pacific Jewel, Saga Ruby, Amsterdam, Pacific Princess, Queen Elizabeth* and *Volendam* in late February; *Pacific Pearl, The World, Sun Princess, Sea Princess, Pacific Jewel, Celebrity Century, Black Watch, Queen Mary 2, Arcadia, Volendam, Dawn Princess, Ocean Princess, Radiance of the Seas* and *Regatta* in March; *Radiance of the Seas, Pacific Pearl, Pacific Jewel, Volendam, Sun Princess, Rhapsody of the Seas, Dawn Princess and Sea Princess* in April; and *Pacific Jewel, Pacific Pearl, Sun Princess* and *Dawn Princess* in May.

Pacific Jewel and *Pacific Pearl* are the only two vessels scheduled for cruises over the winter months until *Dawn Princess* arrives on 10 October to begin the arrivals heralding the next summer season.

Phil Helmore

Volendam departing Sydney
(Photo John Jeremy)

Capsize and Sinking of PNG Ferry Rabaul Queen

This vessel rapidly capsized and sank off Finschhafen soon after daybreak on Thursday 2 February while on the final leg of a voyage from Buka to Lae via Rabaul and Kimbe. Of the 350 or more passengers on board for this leg of the voyage, over 100 were lost or are missing.

A preliminary inquiry was conducted on behalf of the PNG National Maritime Safety Authority.

Following this, the Prime Minister of PNG established a Commission of Inquiry headed by Mr Justice Warwick Andrew, who previously presided over the *Princess Ashika* inquiry in Tonga.

The Inquiry plans to hear evidence in Port Moresby, Lae, Kokopo (near Rabaul), Buka, Kimbe and, finally, again in Port Moresby. It is scheduled to report to Prime Minister O'Neill no later than 30 June 2012.

Further information, including transcripts of hearings, can be obtained at www.mvrabaulqueen.com.

NAVY DOCKINGS IN WESTERN AUSTRALIA

HMAS *Toowoomba* in the floating dock with the SMPTs in position
(Photo Hugh Hyland)

A description of the new Common User Facility (CUF) at Henderson, WA, and the first docking of a submarine there, appeared in an earlier edition of *The ANA*.

From February to March 2012, HMAS *Toowoomba* was the first frigate to be docked using the floating dock at the CUF, under refit by UGL.

On 1 February the floating dock was moved by hawsers to the deep-sink pocket, which had recently been extended closer to the wharf, and ballasted down. Displacing over 3000 t, the ship entered the dock and was lifted from the water. The dock was then moved back to the wharf and ballasted in conjunction with four powerful vertical hydraulic rams so that the level of its central roadway aligned with the level of the roadway ashore.

Three rows of Self Propelled Modular Transporters (SPMTs), with four diesel/hydraulic power packs, were driven under the cradle and hydraulically and electronically linked together. Using a one-man control, the SPMTs lifted the cradle and ship, and transported them ashore where they were placed on the hardstand.

The operation took about eight hours to complete. A video of the operation can be found at www.ugllimited.com/templates/videos/anzacclasscradle/anzacclasscradle.htm

Hugh Hyland

HMAS *Toowoomba* ashore. Note how the docking cradle is supported by the SMPTs. The submarine HMAS *Waller* is in the ASC facility in the background and HMAS *Farncomb* was nearby at the adjacent BAE Systems shiplift
(Photo Hugh Hyland)

From Cargo Ships to Skimboards − What Happens to the Wave Resistance Hump in Shallow Water?

Tim Gourlay
Centre for Marine Science and Technology
Curtin University

Introduction: Deep and Shallow Water

Most naval architects are aware of the wave resistance hump which occurs on surface vessels in deep water at a Froude number (based on waterline length) of around $F_n = 0.5$. "Deep water" can be considered to be a depth of 50% of the ship's waterline length or greater. The wave resistance curve has marked changes in gradient near this "hump speed", while the wave resistance coefficient has a pronounced maximum, as shown in Figure 1.

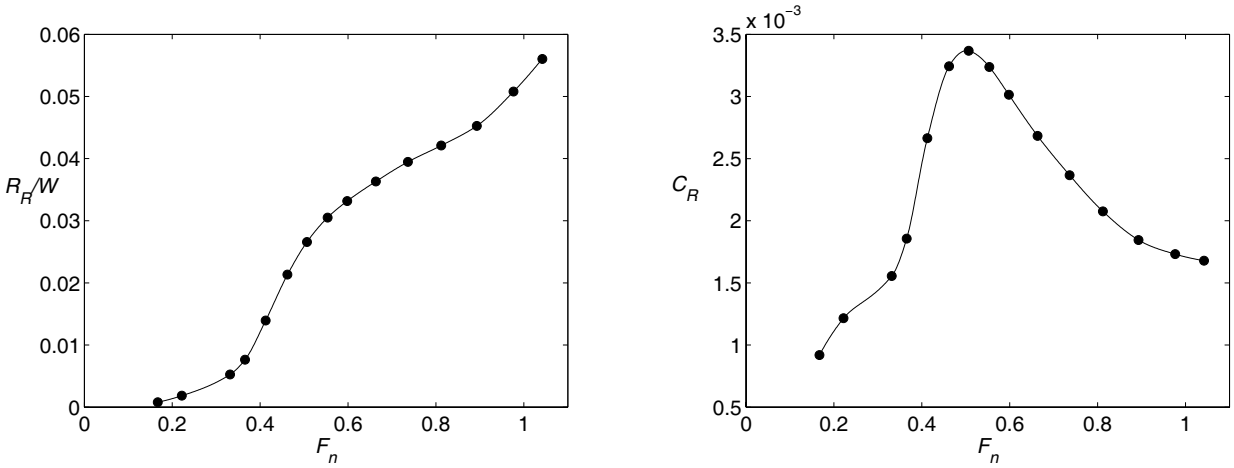


Figure 1: (a) non-dimensional residuary resistance, and (b) residuary resistance coefficient, measured for a Taylor B5 hull model in deep water (from Graff et al. 1964)

In Figure 1 and throughout this article, we shall draw upon the model test results of Graff et al. (1964), which remain one of the defining sets of experimental wave resistance results in varying water depth. These tests were undertaken in the Duisburg towing tank in Germany. This towing tank has a width of 10.1 m, sufficient to minimise blockage effects near $F_{nh} = 1.0$ for the 3 m model size used. Results in narrower tanks are invariably subject to blockage effects near $F_{nh} = 1.0$, causing production of forward-propagating solitons over a wide range of speeds, and markedly different results to what would be experienced in open water (Chen 1999). The full length of the tank was also needed to minimise starting transients.

The hull referred to here is a Taylor standard series model B5, which is a transom-stern destroyer-type hull, the lines plan of which is given in Graff et al. (1964). Tests were done up to and above $F_n = 1.0$, although speeds above $F_n = 0.6$ would be unrealistic for a destroyer in practice. The residuary resistance was defined as the total measured resistance, minus the estimated frictional resistance (based on the Schoenherr formulation, van Manen and van Oossanen 1988). Attempts to calculate a form factor showed that this was very small for these hulls and, due to the measurement uncertainty, a form factor was not included. The residuary resistance coefficient is assumed to be equal to the full-scale value at the same Froude number, and consists essentially of wave-making resistance.

As well as the deep-water "hump speed", another, more severe, wave resistance hump occurs in very shallow water. "Very shallow water" can be taken to be 15% of the ship's waterline length or less. Figure 2 shows the residuary resistance for a Taylor B5 hull in very shallow water.

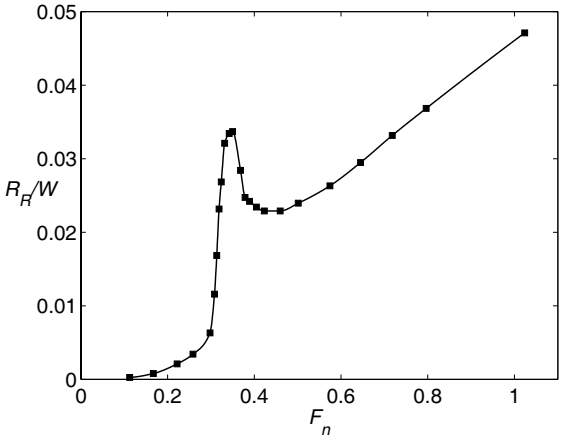


Figure 2: Measured residuary resistance for a Taylor B5 standard series destroyer hull model at h/L = 0.125 (from Graff et al. 1964)

We see that the wave resistance has a well-defined peak at a lower speed than the deep-water hump speed. This peak occurs at a speed which depends on the water depth, rather than the ship length, i.e. at a depth-based Froude number $F_{nh} = 1.0$.

Nomenclature

C_R	residuary resistance coefficient, = $R_R / \left(\frac{1}{2}\rho U^2 S\right)$
F_{nh}	depth-based Froude number, = $U/\sqrt{gh}$
F_n	length-based Froude number, = $U/\sqrt{gL}$
g	acceleration due to gravity, = 9.81m/s^2
h	water depth (m)
L	ship waterline length (m)
R_R	residuary resistance (N)
S	wetted surface area (m^2)
U	ship speed through water (m/s)
W	ship weight (N)
ρ	water density (kg/m^3)

Wave Resistance in Intermediate Water Depths

We shall now look at the problem of intermediate water depth (i.e. not "very shallow" and not "deep"). Figure 3 shows the residuary resistance of the Taylor B5 hull in a range of water depths, from deep to very shallow.

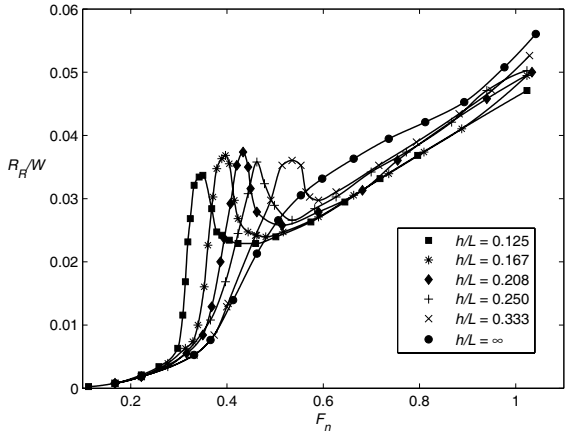


Figure 3: Residuary resistance measured for a Taylor B5 hull model in different water depths (from Graff et al. 1964)

We see that, as the depth decreases below half the waterline length, the "hump" which occurs in deep water at $F_n = 0.5$ becomes a defined local "peak" which occurs at a lower and lower speed as the depth decreases. Also of note is the decreased wave resistance at high speeds, as compared to the deep-water value. Since the frictional resistance is assumed independent of water depth, the total resistance is also smaller in finite water depth than in deep water at high speeds. This fact is commonly observed for high-speed displacement ships which can pass through the shallow-water resistance hump, as they are able to achieve higher top speeds in shallow water than in deep water.

We can consider the finite-depth wave resistance as the deep-water wave resistance, plus a finite-depth correction. This finite-depth correction is shown in Figure 4.

The finite-depth correction has a peak at a speed which depends on the water depth. In fact, if we plot against F_{nh} as in Figure 5, we see that in each case the peak occurs at approximately the shallow-water critical speed $F_{nh} = 1.0$.

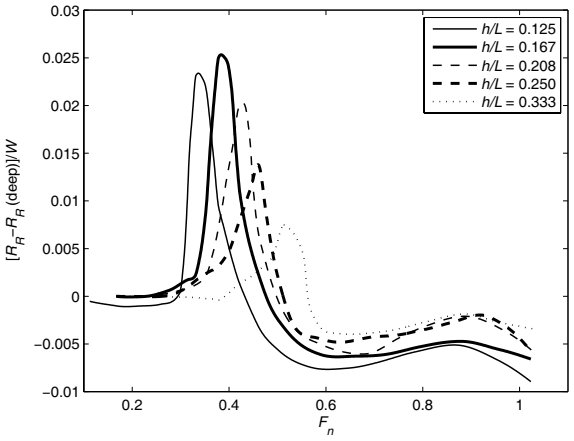


Figure 4: Residuary resistance increase over deep-water values, measured for a Taylor B5 hull model in different water depths (from Graff et al. 1964)

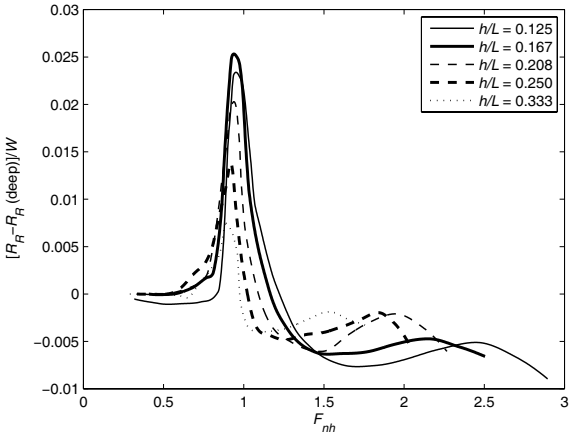


Figure 5: Residuary resistance increase over deep-water values, measured for a Taylor B5 hull model in different water depths (from Graff et al. 1964)

Note that the magnitude of the shallow-water wave resistance peak tends to increase as the depth decreases. This fact is borne out in slender-body flow field calculations (Tuck and Taylor 1970, Tuck et al. 2000, Gourlay and Tuck 2001), which show that the finite-depth correction dominates the deep water wave resistance near $F_{nh} = 1.0$ in shallow water.

Frictional Resistance

The residuary resistance quoted in Graff et al. (1964) is found by subtracting the Schoenherr frictional resistance estimate (which is independent of water depth) from the total resistance. In practice, the frictional resistance will change as the water depth changes. At speeds below $F_{nh} = 1.0$, decreasing the water depth has the effect of increasing the local flow velocities past the hull, and hence increasing the frictional resistance (Schlichting 1934, Harvald 1983).

Therefore the breakdown of measured resistance into frictional and residuary components cannot be expected to be accurate when using a depth-independent formulation such as the Schoenherr method. However the advantage of having done this in the Graff et al. (1964) experiments is that the effect of water depth on total resistance can be easily inferred from the residuary resistance values given.

Other Hull Types

The preceding discussion centres on experimental results for a destroyer-type hull, which is a high-speed displacement vessel. For large cargo ships, the wave resistance curve would also look similar to Figure 3. However these ships typically cannot reach the deep-water hump speed of $F_n = 0.5$, so would never pass the finite-depth wave resistance peak. The effect of shallow water for them is simply to steepen the wave resistance curve at a lower speed and, hence, decrease their top speed accordingly. The speed loss that occurs on entering shallow water is well understood by cargo ship captains.

For planing vessels, hydrodynamic lift is minimal below $F_n = 0.5$, so the shallow-water effects described for displacement vessels will apply equally to planing vessels in this range. At higher planing speeds, the wave resistance and total resistance are less in shallow water than in deep water (Toro 1969).

Extreme Shallow Water

Watching a skimboard being ridden in 1−2 cm of water is an excellent demonstration of the high lift and low drag which accompanies planing vessels at very shallow depths. Towing a child on a boogie board at water depths down to 1−2 cm also demonstrates this effect clearly.

The extreme shallow water problem is analogous to that of a wing in ground effect: the skimboard glides in the same way that a seabird glides close to the ocean surface. Comparisons can also be drawn with the large loads supported by industrial bearings at small clearances, according to lubrication theory. Tuck and Dixon (1989) developed a simplified extreme-shallow-water planing theory, which showed that only very small angles of attack, and hence small drag coefficients, are required to give large lift. Only minimal waves and hence minimal wave resistance are produced in this case.

For sailing speed records, the World Sailing Speed Record Council has recognized the potential advantages of extremely shallow water, requiring a minimum depth of 10 cm, or half the waterline beam, for a valid record attempt. The location of the current speed record, Lüderitz Canal, has not taken full advantage of this rule, instead keeping the depth at 1m for safety in the event of crashes.

Conclusions

- In deep water (water depth greater than half the shiplength), surface vessels have a small change of gradient ("hump") in the wave resistance curve at a Froude *length* number of 0.5.
- In very shallow water (water depth less than 15% of the shiplength), surface vessels have a large local maximum in the wave resistance curve at a Froude *depth* number of 1.0.
- In intermediate water depths, the wave resistance curve is a combination of the deep-water curve and a finite-depth correction. This correction has a local maximum at a Froude *depth* number of 1.0, and becomes increasingly important as the water depth decreases.
- For vessels which can pass through the shallow-water wave resistance peak, the high-speed wave resistance in shallow water is less than in deep water.

Acknowledgements

The author wishes to thank his nephew, Angus Paterson, for helping with some extreme shallow water experiments and Kim Klaka for providing useful suggestions on the article.

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EDUCATION NEWS

Australian Maritime College

Higher Degree by Research Completions and Increase in Numbers for 2012

Already in 2012 we have seen the completion of one PhD and one MPhil in maritime engineering at the AMC. Due to a considerable drive to increase the quality and number of higher-degree research students in maritime engineering we should see up to four more students graduate this year, and up to 10 students start on the long road to higher degree qualifications. As the Graduate Research Coordinator, I would like to say huge congratulations on years of hard work. Following are the titles and abstracts of the two recent graduands.

Suzanne Hutchison, Doctor of Philosophy — *Numerical Modelling of Hydrofoil Fluid-Structure Interaction*

Marine propellers operate in unsteady non-uniform wake regions generated by the hull and control surfaces subjecting the propeller to unsteady loading. Hydroelastic tailoring of propeller blades is a method to reduce unsteady loading as a propeller blade passes through a wake deficit. This project sought to gain greater insight into the effect of hydroelastic tailoring on a propeller by simplifying the problem into a single hydrofoil with a sinusoidal pitch oscillation. In this study, a hydrofoil with a NACA 0009 section and a trapezoidal planform area was used to investigate bending hydroelastic effects numerically using fluid-structure interaction modelling. The complexity of the numerical model was varied in a systematic manner, starting with a two-dimensional foil through to a three-dimensional two-way coupled fluid-structure interaction simulation. The commercial package ANSYS was used with CFX for computational fluid dynamics and ANSYS mechanical for the structural simulation.

In this study ANSYS was demonstrated to be a suitable tool to simulate fluid-structure interaction in the case of an oscillating hydrofoil in pure pitch. The computational fluid dynamics results were validated in two-dimensions using using published experimental results for NACA 0012 and 0015 sections for both static and dynamic cases. In three-dimensions, both stainless steel and aluminium, were investigated in addition to the rigid (uncoupled) case. This study varied independent parameters including Reynolds number, reduced frequency, amplitude of pitch oscillation and the mean incidence controlling the hydrofoil response.

Comparison of static one-way and two-way coupled results showed that there are small but apparent differences between predicted bending deformations. However, bending deformations were shown to virtually have no effect on forces and moments, at least up to moderate incidences. Rigid three-dimensional lift and moment predictions showed similar behaviour to both the two-dimensional unsteady viscous predictions and classical linear inviscid theory for cases of zero mean incidence. In particular, lift and moment varied linearly with amplitude of oscillation for all reduced frequencies. The lift and moment amplitude minima occurred at reduced frequencies of about 0.6 and 0.7 respectively for both two- and three-dimensional predictions; However, in the three-dimensional case the amplitudes, relative to the lift and moment at static incidence were reduced. For a four degrees mean incidence, the amplitudes of the lift and moment minima were significantly reduced for two and three-dimensional predictions compared with the zero degree mean incidence case. Above a reduced frequency of one, for four degrees mean incidence, the rigid three-dimensional lift and moment amplitude predictions no longer varied linearly with incidence amplitude. The dynamic coupled analysis typically showed bending de- formations to be similar to those for static predictions at a zero mean incidence but to be reduced for a four degree mean incidence at maximum incidence. Lift and moment for the dynamic coupled cases were only slightly influenced for reduced frequencies less than one, depending on material properties and Reynolds number. For a reduced frequency greater than one the lift and moment showed a slight increase and vary non-linearly with the incidence amplitude.

Bruce Cartwright, Master of Philosophy — *The Study of Ship Motions in Regular Waves using a Mesh-Free Numerical Method*

Mesh-free methods are becoming popular in the maritime engineering fields for their ability to handle non-benign fluid flows. Predictions of ship motions made using mesh-free methods need to be validated for benign conditions, such as regular waves, before progressing to non-benign conditions. This project aimed to validate the response of a ship in regular waves by the smoothed particle hydrodynamics (SPH) mesh-free method.

Specifically, the SPH technique uses a set of interpolation points, designated SPH particles, located at nodes which track the centre of discrete fluid volumes with time. As part of this research a set of simple rules was established to locate the free surface of the fluid based on the location of the SPH particles. These simple rules were then used to validate the hydrostatics of a ship floating in the fluid, identifying the vertical location of the water line to be 0.22% of the design waterline length.

The propagation of regular waves in SPH has historically been problematic, resulting in diminishing wave height with propagation distance. In this study, non-diminishing deep-water regular waves were generated in a shallow tank by moving segments of the floor in prescribed orbital motions, a technique developed by the researcher and hereafter called the moving-floor technique. The resulting waves showed no discernible loss in wave height with propagation distance, and were computationally more efficient than modelling a full-depth tank.

The pitch and heave transfer functions for a round-bilge high-speed displacement hull form at Froude numbers of 0.25 and 0.5 were predicted using waves in SPH developed by the moving-floor technique. These predictions were compared to transfer functions obtained from experiments in a towing tank.

The outcomes of this research demonstrated that, with some refinement, the SPH technique should be capable of accurately predicting the motions of a ship in regular waves. It is hoped that this work will serve as a stepping stone to exploit the flexibility of the SPH technique to analyse any

shape of hull, to be applied to non-linear waves, and to be coupled with a structural solver.

Jonathan Binns

University of New South Wales

Undergraduate News

Graduation

At the graduation ceremony on 13 March, the following graduated with degrees in naval architecture:

Nathan Gale	Honours Class 2 Division 1
Geordie Grant	Honours Class 1
Zensho Heshiki	Honours Class 1
Adrian Phua	Honours Class 1
Malinda Wickramaarachchi	Honours Class 2 Division 1
Jiayu Zhang	

Nathan Gale, Malinda Wickramaarachchi and Jiayu Zhang
at UNSW Graduation Ceremony on 13 March
(Photo Phil Helmore)

Prize-giving Ceremony

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

The Royal Institution of Naval Architects (New South Wales Section) Prize 1 for the best performance by a student in Year 1 of the naval architecture degree program to Muhammad Syahmi Hashim.

The Royal Institution of Naval Architects (New South Wales Section) Prize 2 for the best performance by a student in Year 2 of the naval architecture degree program to Georgia McLinden.

The Royal Institution of Naval Architects (New South Wales Section) Prize 3 for the best performance by a student in Year 3 of the naval architecture degree program to William Birdsall.

The Royal Institution of Naval Architects (Australian Division) Prize for the best ship design project by a student in the final year to Geordie Grant for his design of a 33 m aluminium catamaran fast ferry carrying 210 passengers on voyages from Perth Water to Rottnest Island and return.

The David Carment Memorial Prize and Medal for the best overall performance by a student in the final year of the naval architecture degree program to Adrian Phua.

Congratulations to all on their fine performances!

Graham Taylor (Chair, RINA NSW Section), Muhammad Syahmi Hashim and Prof. Anne Simmons (Head of School)
at School Prize-giving ceremony on 13 March
(Photo Phil Helmore)

Graham Taylor, Georgia McLinden and Anne Simmons
at School Prize-giving ceremony on 13 March
(Photo Phil Helmore)

Graham Taylor, William Birdsall and Anne Simmons
at School Prize-giving ceremony on 13 March
(Photo Phil Helmore)

Graduates Employed

Our 2012 graduates are now employed as follows:

Nathan Gale	Centre for Maritime Engineering, Defence Materiel Organisation, Sydney
Geordie Grant	Royal Australian Navy, HMAS *Cerberus*, Westernport, Vic.
Zensho Heshiki	Burness Corlett Three Quays, Sydney
Adrian Phua	Evaluating opportunities
Malinda Wickramaarachchi	Sofraco Engineering, Sydney
Jiayu Zhang	Evaluating opportunities

Phil Helmore, Adrian Phua and Anne Simmons at School Prize-giving ceremony on 13 March (Photo Phil Helmore)

Student–Staff Get-together

The naval architecture students and staff held a get-together on Thursday 15 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 and soft-drink were provided and, after a slow start, conversation was flowing pretty freely an hour later! This year we have ten students in the third year and about seven in fourth year (one expecting to complete in mid-year), many of whom attended, along with five staff members including Prof. Anne Simmons, the Head of School, who is an honorary naval architect. A broad mix, and some wide-ranging discussions ensued.

Thesis Projects

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

Automated Drawing of Marine Screw Propellers

Previous theses have investigated automating the drawing of MARIN B-Series propellers from the design data using Pro/Engineer and Catia. However, both of these are full 3D modelling packages, whereas AutoCAD, which is mostly used by the Australian marine industry, is not. Dane Fowler is investigating automation of the drawing in AutoCAD, and checking the calculation of the mass and polar moment of inertia of the propeller.

Inclining Experiment

The Sydney Heritage Fleet has recently acquired two of the 50 ft (15.24 m) harbour tugs, *Bronzewing* (501) and *Currawong* (502), which were designed and built in the late 1960s by Stannards at Berry's Bay for the Royal Australian Navy.

Sydney Heritage Fleet provided access to *Bronzewing* for the naval architecture students in Year 3 to conduct an inclining experiment at Rozelle Bay on 2 May. The students conducted the experiment with the guidance of lecturer Mr Phil Helmore with surveyor Mr Mori Flapan. The day turned out perfect for an inclining, with almost no wind, and a glassy-calm sea. The operation included a check of the permanent ballast on board. The theory of stability is fascinating, but seeing it in practice at an inclining makes it come to life for the students.

Review of Programs

The School of Mechanical and Manufacturing Engineering has begun a review of the five degree programs offered: Aerospace Engineering, Manufacturing Engineering and Management, Mechanical Engineering, Mechatronic Engineering, and Naval Architecture.

The review is being conducted by former Dean of Engineering at the University of Queensland, Em/Prof.

Year 3 naval architecture students with Phil Helmore on board *Bronzewing* at the inclining experiment (Photo Mori Flapan)

John Simmons, and former staff member at UNSW, Dr Nathan Kinkaid.

Watch this space!

Post-graduate and Other News

Promotions

Drs Ganga Prusty, Tracie Barber and Nicole Kessissoglou have been promoted to the rank of Associate Professor. Congratulations all!

TKC Redevelopment

The Kensington Colleges, Basser, Goldstein and Baxter, built in 1959, 1964 and 1966 respectively and much loved as a home away from home for generations of UNSW students, have commenced a major two-year re-development. This is part of the overall UNSW strategy to increase the amount of accommodation available to students on campus to cope with increased demand from local, rural and overseas students.

Basser and Goldstein Colleges have recently been demolished, but the Goldstein Dining Hall (which won the Sulman Award for Architecture in 1965) has been retained, and Baxter College provides an interim home for the each of the three colleges (with reduced numbers of students). Baxter College will be demolished at the completion of construction, and form part of a "green" corridor running all the way down to Gate 2 (near the UniGym).

The new Basser, Goldstein and Baxter Colleges, together with a new Seniors' Hall and a new Islamic College (catering specifically but not exclusively for the living needs of Islamic students) will be built on the footprint previously occupied by Basser and Goldstein Colleges.

Further details of the re-development can be found on the web at www.kensingtoncolleges.unsw.edu.au/tkc_redevelopment/index.html

Engineering Annual Dinner

The year of graduation is taken as the year in which your testamur was awarded. For most graduates, this is usually in the year following that in which their last coursework requirements were completed. For example, if you completed your coursework requirements at the final exams in November 2011, then you would expect to graduate in April 2012, and 2012 would be the year of your graduation.

The Engineering Annual Dinner for 2012 will be held on Friday 3 August 2012 at 1830 in Leighton Hall, Scientia Building, for the graduates of 1962, 1972, 1982, 1992 and 2002. So, if you graduated with Nick Hutchins (2002), Graeme Mugavin (1992), Grahame Parker (1982), or Geoffrey Scott (1972), then you should be dusting off the tux or cocktail dress, polishing your shoes and asking your partner to keep that evening free.

The 1972 class is distinguished by being UNSW's seventh graduating class of naval architects, the first having been Brian Robson by himself in 1963.

For further information, please contact Effy Ofidis on (02) 9385 7324, email invitations@eng.unsw.edu.au, or check www.eng.unsw.edu.au/info-about/news-events/events, and click on Coming Events, set the date to 2012 Aug, and click Apply.

Phil Helmore

AMSA Announces New Domestic Vessel Division

From 1 November 2012, a Domestic Vessel Division (DVD) will be created within the Australian Maritime Safety Authority (AMSA) to operate the National System. This initiative follows the Council of Australian Government's (COAG)'s signing of an Intergovernmental Agreement in August 2011 which provides for AMSA becoming the National Regulator of all domestic commercial vessels and their crews, and the implementation of a National System from 1 January 2013.

"This is an exciting initiative which embraces AMSA's new regulatory responsibilities as defined by COAG", AMSA's CEO, Graham Peachey, commented. "It also represents a new chapter in the history of our organisation. From next year, AMSA will be increasing its regulatory scope by approximately 30 000 domestic vessels, over 100 000 stakeholders and, of course, stewardship of a new National Law. As you can imagine, the work that needs to be done to ensure the successful implementation of the new System is vast.

"In practical terms, being a National Regulator means providing for the development, maintenance, monitoring and enforcement of a range of national standards for commercial vessels; a national compliance and enforcement system which can be consistently applied to all commercial vessels; and a national data solution for the management of commercial vessels linking ownership, vessel details, inspection and survey history, incidents, seafarer qualifications and operators for improved risk-management and compliance monitoring. These are big tasks, big pieces of work which involve the support, skills and commitment of many AMSA people around the country in addition to state and territory maritime colleagues.

"However, while the National System will be implemented by a combination of AMSA staff and the staff of maritime jurisdictions undertaking the role of the National Regulator, the DVD will co-ordinate and be responsible for the operation of the National System within AMSA."

For further information contact Richard Wallace at richard.wallace@amsa.gov.au.

Public Consultation on the National Law Bill Closed

Public consultation on the exposure draft of the Marine Safety (Domestic Commercial Vessel) National Law Bill 2012 has now closed. However, source documents and additional information are still available at the National System website, www.nationalsystem.amsa.gov.au.

In total there were 14 formal submissions received during the consultation period. AMSA is in the process of assessing these submissions and preparing a report to inform the finalisation of the Bill. This report will be published on the National System website.

The Marine Safety (Domestic Commercial Vessel) National Law Bill 2012 is proposed to be introduced to Commonwealth Parliament in May 2012.

National System for Commercial Vessel Safety, *Stakeholder Bulletin,* March 2012

Draft Legislation of Interest to Australian Naval Architects

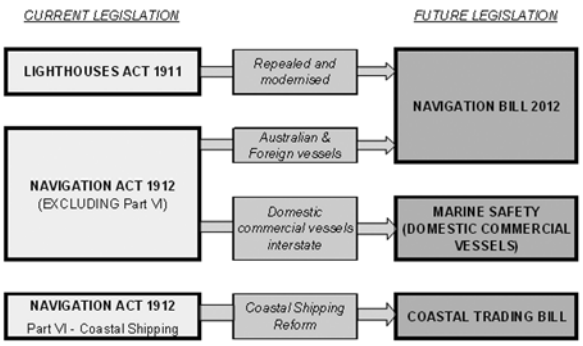
Tony Armstrong

Our bureaucrats have been working late into the night over the past few months to produce a whole raft of draft legislation promised by our politicians. There has been so much going on that I thought that it would be useful to attempt to explain it in simple terms, paraphrasing the latest available information from the Department of Infrastructure and AMSA. There are three initiatives, all different but all interlinked in that they affect the safety and operation of shipping within Australia. Of key interest to naval architects is the move towards a single national jurisdiction rather than the individual state and territory requirements, in an effort to define a uniform safety standard.

Revision of the Navigation Act 1912

The existing Navigation Act was written in the same year in which *Titanic* sailed. It has been amended many times and consequently now lacks cohesion. The Navigation Act has been re-drafted and amended as indicated in the diagram to incorporate the Lighthouses Act 1911, and Part VI has been moved to a dedicated new Coastal Trading Bill. The new Bill now only covers international Australian-owned and foreign-flagged vessels. Domestic commercial vessels will be covered by a new national law as discussed further under the heading *Domestic Commercial Vessels* below. The draft Navigation Bill can be downloaded from: www.infrastructure.gov.au/maritime/paper/files/Exposure_Draft_Navigation_Bill_2012.pdf. Be aware that it is subject to change, and is 269 pages long. The associated discussion paper can be found at: www.infrastructure.gov.au/maritime/paper/files/Exposure_Draft_Stakeholder_discussion_paper.pdf.

The public consultation phase of the draft Bill has now closed.



Changes to the Navigation Act

Domestic Commercial Vessels

The Council of Australian Governments has implemented a decision made in August 2011 to establish AMSA as the single national regulator for domestic commercial-vessel safety in Australia. The Intergovernmental Agreement, signed by the Commonwealth and all State Governments, can be downloaded from http://www.coag.gov.au/coag_meeting_outcomes/2011-08-19/docs/Maritime_IGA-19August2011.pdf. AMSA has consequently now set up a Domestic Vessel Division.

The outcome of the Agreement is that there will be a single national jurisdiction. It will be implemented nationally through separate legislation in each jurisdiction which will ensure that standards, rules and subordinate legislation are applied consistently around the country.

The national law will apply the National Standard for Commercial Vessels (NSCV) throughout Australia.

AMSA is proposing to delegate survey functions to state and territory maritime safety authorities, so from a survey point-of-view there may be little, if any, administrative change.

The draft of the Marine Safety (Domestic Commercial Vessel) National Law Bill 2012 can be downloaded from

www.infrastructure.gov.au/maritime/safety/files/2012_03_02_National_Law_Exposure_Draft_B10CN272_v73.pdf.

Public comment was invited on the current draft and the consultation period closed on 29 February. The various Transport Ministers have not yet formally agreed to the proposed National Law Bill.

Shipping Reform

Late last year the Commonwealth Government announced a reform agenda entitled *Stronger Shipping for a Stronger Economy* aimed at revitalising our coastal and international shipping trade. There are five Bills being drafted, covering

- the broad areas of: tax concessions and tax exemptions;
- a new Australian international shipping register; and
- establishment of a new regulatory framework and licensing system for vessels involved in coastal trading within Australia. A new Bill will supersede Part VI of the existing Navigation Act 1912.

Drafts of these five Bills and an associated Discussion Paper and Regulatory Impact Statement have been published inviting public submissions, which closed on 5 March 2012.

Commentary on the Single National Legislation

My summary of the three reform initiatives is that the single national jurisdiction for domestic commercial vessels will be a key issue for many practising naval architects.

AMSA maintains a web site with loads of information on the changes and on which you can register your details to obtain regular updates of information on progress on national maritime reform, including the status of outstanding NSCV sections — https://www.nationalsystem.amsa.gov.au/confluence/display/public/Home.

AMSA has also published their Regulatory Plan for domestic commercial vessels and their crews under the Maritime Safety National Law, which outlines what may be expected to be contained in the Regulations which support the Act, such as Marine Orders. It can be downloaded from www.nationalsystem.amsa.gov.au/confluence/display/public/Phase+1+-+Regulatory+Plan.

This website also contains several fact sheets which explain in detail the most important issues involved in national single jurisdiction.

It is noted that the last major section of work (Accommodation and Personal Safety) to be moved from the USL Code to the NSCV is well advanced but not yet completed, and that some uncertainties in interpretations across the NSCV are still not resolved. It is to be hoped that the appointment of AMSA as national regulator will correct these situations.

The Inter-Governmental Agreement (IGA) indirectly anticipates some kind of Memorandum of Understanding between the national regulator and the state and territory marine authorities to manage the considerable number of cooperative processes mentioned within the IGA, and one of these can be expected to be the on-going maintenance of the NSCV. It is worth highlighting that the NSCV was never intended to be a set of regulations "set in concrete", rather it is clearly worded to be a flexible set of requirements which will require continuous maintenance in order to efficiently meet changing public expectations of marine safety and be easy to use and apply.

The IGA, in Paragraph 2, also states that the aim is to improve safety and reduce costs and regulatory burden. It can therefore be expected from the parties to the IGA that there will be substantial reductions in cost and regulatory burden in return for the substantial increase in responsibility being placed on naval architects by the National Law.

A transition period of three years is anticipated for the switch to the single national jurisdiction, in the hope that those things which are being done today will continue without interruption by the switch to the national system.

This transition period should also give you time to think about the need to upgrade your Professional Indemnity insurance.

No doubt not everyone will be happy, but consistency of the application of the maritime safety standards, rules and subordinate legislation (regulations) is the prime purpose for the change to a single national jurisdiction, and its success is vital for our industry.

Tony Armstrong

INDUSTRY NEWS

Austal and GD to pursue Defence Business

Austal has enhanced its positioning for Australian and international defence programs by entering into an agreement with mission-system integrator General Dynamics Advanced Information Systems.

The companies aim to combine Austal's shipbuilding, systems and support capabilities with General Dynamics Advanced Information Systems' expertise in systems integration to support future shipbuilding and sustainment programs.

Austal's Chief Executive Officer, Andrew Bellamy, said that the agreement would enable the companies to provide best-value offerings to the marketplace.

"This agreement may involve partnerships to pursue opportunities with international governments and navies, including Australian programs such as Project SEA 1180 the Royal Australian Navy's Offshore Combatant Vessel," he said.

The agreement builds upon existing arrangements between the companies, including those for the Littoral Combat Ship Independence-variant and Joint High Speed Vessel programs. Austal is the prime contractor for those ships, while General Dynamics Advanced Information Systems designs, integrates and tests the electronic systems including the combat system, networks, and seaframe control.

"Our experience working with General Dynamics Advanced Information Systems on those US Navy programs over many years has been extremely positive both for Austal and our Navy customers," Mr. Bellamy said. "We look forward to building on that relationship and our in-house expertise to deliver similarly effective capabilities to other customers in the future," he added.

General Dynamics Advanced Information Systems, a business unit of General Dynamics, has extensive experience with both surface ships and submarines. The company's innovative open-architecture approach to systems integration allows for easy insertion of new technology advancements over the life cycle of the ship, reducing overall costs.

"Like the ships Austal manufactures, our proven open-architecture design ensures that the ships are able to keep pace with technology, giving the warfighters the capability they need, when they need it," said Michael Tweed-Kent, Vice President and General Manager of General Dynamics Advanced Information Systems' Mission Integration Systems Division.

Mr Tweed-Kent said the company's open-computing infrastructure (Open CI) provides a command- and control-infrastructure which can host a wide array of weapons, sensors, and combat system applications.

"This partnership extends the flexible and scalable Open CI design across the portfolio of ships and platforms which Austal builds," he added.

Wärtsilä launches Next Generation Medium Voltage Power Drive

Wärtsilä has launched its new medium-voltage power drive. The product will enable the delivery of electric and automation systems for large electric-propulsion vessels, such as drilling rigs and tankers, large passenger and cruise ships, various offshore service vessels, as well as compressors and pumps for the oil and gas industry. The addition of this medium-voltage unit to the low-voltage power drive range which Wärtsilä has offered since 2005 further enhances the company's total solutions on offer to the shipping industry.

Wärtsilä's new medium-voltage power drive is especially designed for marine applications, while the previous units in this range were first developed for land-based applications. It has been developed with special attention paid to personnel safety, while the modular design allows easy installation and maintenance. With the new power drive, Wärtsilä will be able to offer medium-voltage low-loss concept (LLC) solutions with increased efficiency and redundancy which, in turn, leads to lower fuel consumption and reduced operating costs. It can also enable the possibility of having less power installed, thus benefiting customers by reducing both capital and operational expenditures.

Development work began in 2009 and has been carried out at Wärtsilä's R&D facilities in Norway. Pilot sales are scheduled to begin this year, with an internal pilot to be installed in early 2013 and an external pilot later in that year.

Leading technology

The Wärtsilä medium-voltage power drive is based on press-pack IGBT (Insulated Gate Bipolar Transistor) technology with 3-level PWM inverter control. The modular design has large overload capacity, integrated gate driver boards, and a plug-in bus bar connection.

The unit can be used as a control device in various marine propulsion and thruster applications, as well as in large fans, pumps, compressors and hoists. Together with Wärtsilä's patented low-loss concept, the introduction of this next generation of medium-voltage power drives brings increased efficiency and redundancy to the larger marine electric-propulsion market. It also has the benefit of reduced weight and space requirements.

"This product launch emphasises once again Wärtsilä's unique position as a total solutions provider to the marine industry. The new power drive is the most compact in terms of space and weight on the market, while the technology is more advanced than anything else currently being offered to the shipping sector. It is one more step in our continued effort to shorten the route to lower costs and increased profits for our customers," said Juhani Hupli, Vice President, Wärtsilä Ship Power Technology.

Windfarm Support Vessel designs for Strategic Marine

BMT Nigel Gee Ltd, a subsidiary of BMT Group, has won a contract to supply the design for the construction of eight new 20 m windfarm support vessels, including options, to be built by the Australian shipbuilder Strategic Marine. The vessels are to be built for Njord Offshore Ltd, a subsidiary of Norse Management UK which has a long history in the marine industry.

This contract follows the signing of the Teaming Agreement between Strategic Marine and BMT in September last year and reinforces Strategic Marine's ability to provide offshore windfarm support vessels into the European market.

Developed from BMT's well-established range of windfarm support vessels the Njord Offshore vessels will be 20 m in length with a beam of 7 m, powered by two MTU 8V2000M72 diesel engines with fixed-pitch propellers and capable of speeds in excess of 25 kn. The vessels will be built to the DNV Wind Farm Service 1 notation and will be delivered later this year.

Commenting on the significance of the order, BMT Nigel Gee's Technical Director, Ed Dudson, said: "These 20 m vessels are the first in a range of offshore windfarm support vessel designs developed by BMT specifically for Strategic Marine. It confirms BMT's ability to offer cutting edge designs for this fast growing market and demonstrates yet another success for the specialised vessel design team at BMT Nigel Gee."

Terry O'Connor, Chief Marketing Officer at Strategic Marine stated "By leveraging the combined capabilities of BMT Nigel Gee and Strategic Marine, Njord Offshore have chosen to build a fleet of boats with us, which is a fantastic result.

"We intend to be the market leader in providing support vessels into the offshore wind-farm industry and these contracts are a significant milestone in us achieving our objective."

The 20 m windfarm support vessel for Njord Offshore
(Image courtesy BMT Nigel Gee Ltd)

Wärtsilä to Power Future Inland Waterway Vessel

Wärtsilä has been contracted to supply a complete power system, including two of its 6-cylinder Wärtsilä 20DF dual-fuel medium-speed engines, for a new dry-cargo inland-waterway vessel. This order extends the benefits of gas-fuelled operation to an inland waterway vessel, and represents a strong endorsement of gas as a marine fuel. The vessel will be part of the ECO_2 Inland Vessel project, which is focussed on developing innovative measures for making the inland shipping sector more economically and environmentally sound. A transition to liquefied natural gas (LNG) is widely viewed as being one of the most realistic options for significantly reducing the environmental footprint of marine transportation.

This will be the first-ever medium-speed, dual-fuel, mechanically-driven inland-waterway vessel capable of operating for 95–99 percent of the time on LNG fuel, with a minimum of pilot marine gas oil (MGO) used for ignition. The engines are also capable of operating fully on MGO. In addition to the two Wärtsilä dual-fuel engines, the scope of the order includes two fixed-pitch propellers in nozzles, the coldbox, and the LNG tanks.

The 135 m vessel will set new standards in environmentally- and economically-sustainable operations on inland waterways in the Netherlands, Germany, Switzerland, Belgium and France. The vessel is being built for Combi International, a Dutch ship development, design and construction company located in Raamsdonksveer. The order has been placed by Koedood Diesel Service BV.

ECO_2 Inland Vessel project

The vessel is the first of three inland vessels which will serve as pilots for innovative, environmentally sound power systems (engines and propulsion) for inland shipping. All three vessels will be designed, tested and implemented within the ECO_2 Inland Vessel project.

A consortium of companies has joined forces in this project with Wärtsilä Netherlands BV as the co-ordinating partner. The other partners are Koedood Dieselservice, Combi Group BV, Reederei Deymann, TNO, DST and Hochschule Emden-Leer. The project's goal is to identify the most efficient and economical power systems for various types of inland shipping vessels, to the ultimate benefit of the global inland shipping industry. The project is part of a larger initiative known as MariTIM (Maritime Technologies and Innovations Model region Germany–The Netherlands), sponsored by the EU.

"This ECO_2 Inland Vessel project is helping the inland shipping industry to become more sustainable, whilst at the same time increasing fuel efficiency and reducing costs. Under the auspices of the project, all three pilot vessels will be monitored for up to three years in order to provide valuable input data for future generations of inland waterway vessels. The Wärtsilä dual-fuel engines have proven their reliability throughout five million running hours, which clearly indicates our leading position in this field. Wärtsilä's dual-fuel engine technology, which is well established in ocean going applications, can now be applied to small-scale LNG fuelled vessel applications," said Bram Kruyt, Director, Inland Water Ways, Wärtsilä Services at Wärtsilä Netherlands BV.

Wärtsilä 20DF engines

Wärtsilä's dual-fuel (DF) engine technology allows flexibility in fuel choice, since the engines can operate either on LNG, MGO or HFO. In gas mode, harmful exhaust emissions are drastically reduced since nitrogen oxide (NOx) emissions are cut by at least 85 percent, CO_2 emissions by some 25 percent, while sulphur oxide (SOx) and particle emissions are reduced by almost 100 percent from those produced by standard diesel fuel marine engines. The engine is fully compliant with the IMO Tier III exhaust emission regulations.

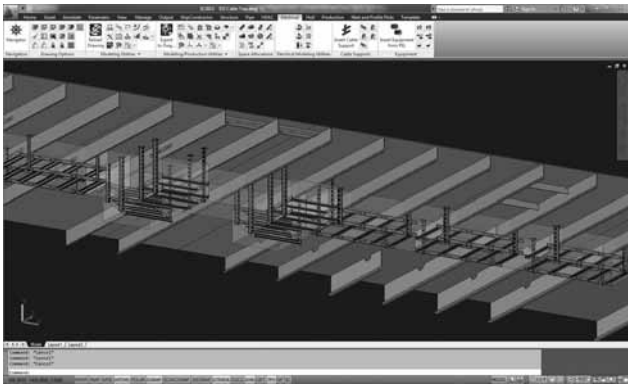
ShipConstructor 2012 R2 Released

ShipConstructor Software Inc. has released a new version of its AutoCAD-based CAD/CAM software. ShipConstructor 2012 R2 sets a new standard for 3D modelling efficiency and the rapid creation of clear production documentation. The latest version of the software also contains multiple enhancements to speed up the process of labelling production drawings.

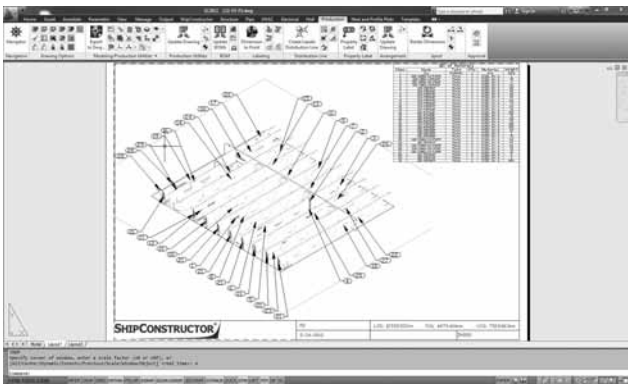
ShipConstructor 2012 R2 Subscription Advantage Pack Customers will have the added benefit of a new feature which allows the ability to automatically label to the edge of a part rather than piecemark. When combined with the other labelling improvements in this release, this change will dramatically reduce the time and effort required to create clear and concise production documentation.

ShipConstructor 2012 R2 also provides the ability to model Electrical Cable Supports within Space Allocations. These Cable Supports are included in BOMs, interference checking and production output which results in more-accurate centre-of-gravity reporting (by assembly or for the entire vessel), improved material and production planning, and helps prevent errors from making their way to production where they are more costly to resolve.

Additonally, ShipConstructor 2012 R2 users will appreciate the troubleshooting and analysis capabilities offered by the voluntary Customer Involvement Program which is being fully rolled out with this version of the software.



Cable supports in ShipConstructor 2012 R2
(Image courtesy ShipConstructor Software)



Part labelling in ShipConstructor 2012 R2
(Image courtesy ShipConstructor Software)

The following new features and enhancements will, along with a host of additional minor improvements to the software, contribute to the ongoing success of those within the ShipConstructor community:

ShipConstructor 2012 R2 New Features:

- **Labelling Improvements** – Significantly reduced time and effort required to label production drawings with enhanced options for automatic labelling, label placement and label distribution.
- **Performance Enhancements** – Significant improvement in both larger projects and multiple-user concurrent usage scenarios, most notably in updating of production drawings.
- **Cable Supports** – A more complete model of the entire vessel and production output with equipment

style modelling of inverted tee, trapeze, tray, tray supports, and other types of cable supports within Space Allocations.

- **Increased Flexibility for Saddle Connections** – Enhancement for creating a saddle connection via interference with the outer diameter of the header and the inner diameter of the branch.
- **Dynamic Marking Blocks** – Reduced effort to communicate a large volume of information to production staff with the ability to specify alignment marks, edge preparation, bevel codes and any other information required on plates in a standardised, centrally-controlled and efficiently-managed fashion.
- **CIP Data Collection** – Help to improve the software by collecting data on the execution, sequence and duration of commands within the ShipConstructor environment.

HydroComp Propels the *Iowa* Project

HydroComp announced in March that it has participated in an unusual project — to create a novel model of a US battleship. Recreating a model of a fully-functioning historical battleship requires time, passion, and dedication. Donn McKinney had a passion for ships from his early childhood. His dedication, spanning more than 30 years and hard work ,will soon produce a fully operational and functional replica of four Iowa-class battleships ships; USS *Missouri* (BB-63), USS *Iowa* (BB-61), USS *New Jersey* (BB-62) and USS *Wisconsin* (BB-64).

HydroComp was called upon to assist with the recreation of the ship propellers. According to HydroComp's Technical Director, Donald MacPherson, HydroComp was able to contribute to the project by using HydroComp's PropCad® software to design the four- and five-bladed propellers.

HydroComp staff was tasked with recreating the original propeller blades and hubs as full 3D models for the quadruple-screw Iowa-class hulls. Copies of the original propeller design documents were reviewed to determine the particular geometric characteristics of the two sets of four- and five-bladed propellers (the outboard and inboard pairs respectively). HydroComp's PropCad propeller modelling software was employed to develop the recreated designs, and then to export the geometry to 3D CAD. The blades and hub were then combined and finished into individual solid models.

Once the battleship replicas are completed, they will be put on display in local museums and education centres for the enjoyment of the general public. Visitors will have access to controls in order to operate elements of the ship and ultimately enhance their learning experience.

USS *Missouri* leaving Sydney after a port visit in 1986
(Photo John Jeremy)

US-built Tugs for Port Botany Construction Works

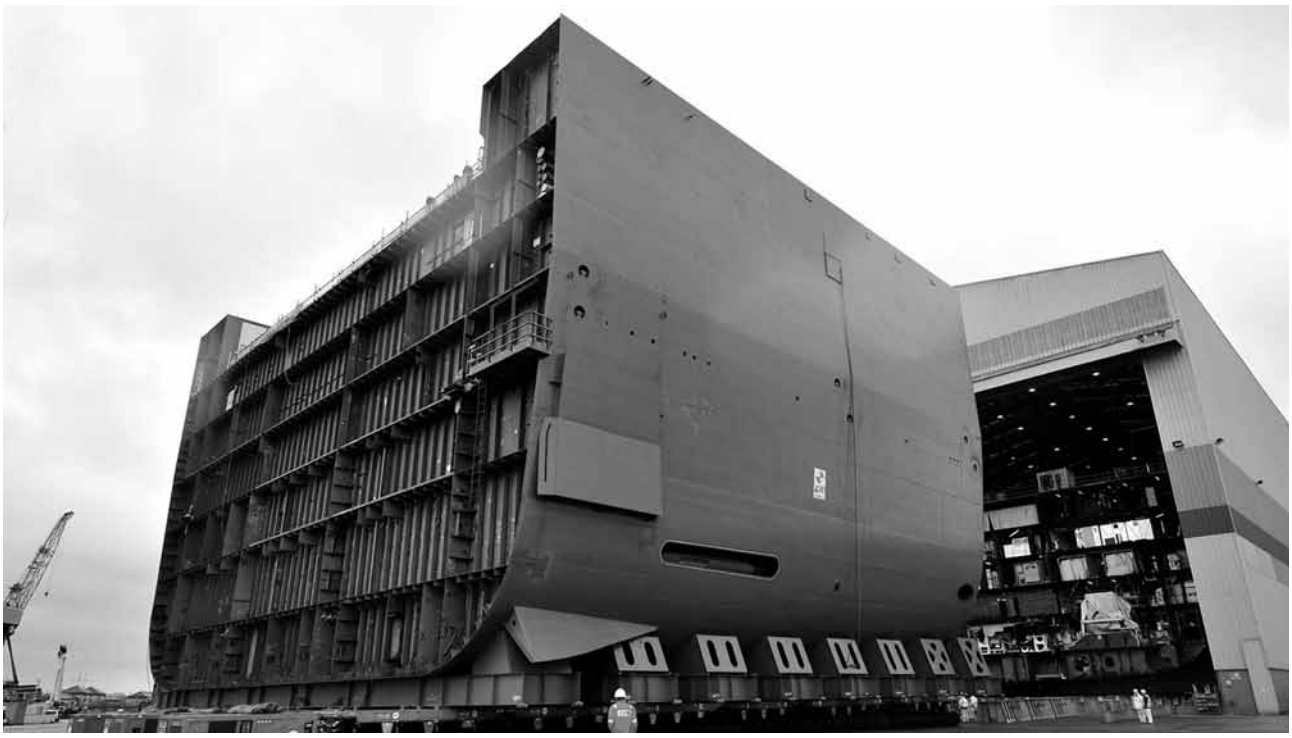
St Johns Ship Building of Palatka, Florida, has delivered two custom-built twin-screw pusher tugs, *Lady Shayne* and *Lady Dashelle*, for Smithbridge of Brisbane. These 7.6 m tugs feature twin John Deere model diesel engines with a combined rating of 447 kW and conventional shaft drives with reversing gears.

"*Lady Shayne* and *Lady Dashelle* will be assigned to a very high-profile marine construction site in Botany Bay in Sydney, where a new bulk liquid terminal is being built to accommodate tankers," said Ron Mason, Marine Operations Manager and New Construction Projects Manager for Smithbridge.

With these tugs, Smithbridge can adapt various kinds of utility equipment to the front of the vessel for different project requirements, "Thanks to the excellent job St Johns did in developing our hydraulic anchor handling frame for the bow," said Mason. *Lady Shayne* and *Lady Dashelle* will handle the 48.5 m by 24.2 m piling barge as it goes through the piling process for the terminal.

In addition to these vessels, St Johns Ship Building will begin work on a second pair of identical tugs, as well as a pair of 12 m truckable tugs, for Smithbridge.

BRITISH CARRIER PROGRESS



A significant milestone was achieved in April on the construction of HMS *Queen Elizabeth*, the first of the Royal Navy's two new aircraft carriers, when two sections of Lower Block 04 (LB04) were brought together for the first time in a precision move at BAE Systems' Govan shipyard.

Using a fleet of 132 remote-controlled transporters a section, weighing over 4000 t, was carefully manoeuvred 100 m across specially-reinforced concrete. In a two-hour move, the section was carefully lined up with the rest of the block, which will collectively form the aft section of the hull. Housing the two main engine rooms, a medical area and accommodation, LB04 will weigh over 11,000 tonnes on completion, stand over 23 metres tall, 86 metres long and 40 metres wide. The block, which will be transported to Rosyth later this year, will be the last hull section of HMS *Queen Elizabeth* to arrive and will join the other units and sections of the ship in dry dock where she is being assembled.
(Photo courtesy BAE Systems)

Lower Block 05 of HMS *Queen Elizabeth* betng prepared for transport to Rosyth from Portsmouth in April
(Photo courtesy BAE Systems)

MEMBERSHIP

Australian Division Council

The Council of the Australian Division of RINA met on Wednesday 27 March 2012 in Brisbane, prior to the Annual General Meeting later the same day. The President, Prof. Martin Renilson chaired the meeting.

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

Divisional Officers

Council considered the letter of resignation of the President, who had accepted a position in Abu Dhabi as notified in his column in the February edition of *The ANA*. In accordance with Prof. Renilson's nomination, Council elected Mr Jim Black as President for the forthcoming two years. Council thanked Prof. Renilson for his service to the Division during his term — he will continue to participate in Council as Immediate Past President.

Noting that the terms of existing Council members nominated by their Sections would end after the AGM later in the day, the President thanked those members who were retiring.

The Walter Atkinson Award

Further to the decisions made on this matter by Council at its December meeting, Council confirmed that in addition to papers presented to RINA meetings (e.g. Section meetings and PACIFIC 2012), those published in *The ANA* during 2012 would also be eligible. However, they must be papers and not simply presentations and must be nominated by a member other than the author. The winner will be decided by a panel appointed by Council and announced at the Division's 2013 Annual General Meeting.

Commercial Vessels Single National Jurisdiction

In relation to consideration of this matter at recent Council meetings, Council decided that it would set in place arrangements for making representations to AMSA where members have significant concerns about the arrangements being put in place. Council accepted the offer by Dr Tony Armstrong to act as a focal point/coordinator for this work.

PACIFIC 2013 International Maritime Conference

Following the success of PACIFIC 2012, Council was notified that the next IMC would be brought forward to 8–10 October 2013 to coincide with the centenary International Fleet Review of the Royal Australian Navy.

Next Meeting

The next meeting of the Council of the Australian Division is scheduled for Wednesday 20 June.

Annual General Meeting

Later on the same day as the Council meeting, the Division's Annual General Meeting was held in Brisbane. A feature of the meeting was the passage of the amendments to the Division's by-laws which were circulated with proxy forms in the February edition of *The ANA*. A Queensland Section meeting followed the AGM, featuring a presentation by AMSA on the single national jurisdiction for maritime safety.

Rob Gehling
Secretary

More Section News

New South Wales

Australia's Amphibious Capability

John Jeremy, of the Royal Institution of Naval Architects, gave a presentation on *LHD and LSD — the Evolution of Australia's Amphibious Capability* to a joint meeting with the IMarEST attended by 25 on 2 May in the Harricks Auditorium at Engineers Australia, Chatswood.

John's presentation will appear in a later edition of *The ANA* and is now available on the Engineers Australia webcast site (see below).

Webcasts of Technical Presentations

The NSW Section of RINA and the Sydney Branch of IMarEST trialled recording of the technical presentation by Tim Holt in March last year and having it placed on the Engineers Australia website as a webcast which can be accessed 24/7 (see *News from the NSW Section* in the May 2011 issue of *The ANA*).

The decision was taken early this year by the two institutions to record the technical presentations in May through October 2012 and to place them online, and this is now in progress, with the technical presentation by John Jeremy in May now available. Future presentations should be available online a few days after the date of the presentation itself.

To find the webcasts, go to the Engineers Australia website at www.engineersaustralia.org.au, scroll down to the bottom of the home page, and click on Webcasts: Online CPD under the Videos heading. If the webcast is a recent one, then it will appear on the first page. However, if you are looking for a presentation from months or years ago, then it can be quicker to use the Webcast Search function on the left.

For example, to find Tim Holt's presentation in March 2011, select Sydney Division from the drop-down menu, then type "holt" (without the quote marks) into the Speaker box, and click Search, and the presentation comes up. Alternatively, you could select Sydney Division from the drop-down menu, then select March and 2011 from the drop-down menus, and click Search, and the presentation is the third of the three which come up.

Feedback about whether you access the webcasts, whether you find them useful or how they could be improved, are requested. Comments may be sent to the Technical Meeting Program Coordinator of the NSW Section at p.helmore@unsw.edu.au.

Phil Helmore

Boatbuilding in the Desert

Last year the Australia Division of RINA offered to support an unusual boatbuilding project which was about as far from the sea as is possible. The support took the form of a prize for students in boatbuilding at St Philip's College in Alice Springs. Geoff Leedham, Head of Applied Technology at the school tells the story:

"The St Philip's College workshop has been in operation for over 20 years now with all students being taught in the Applied Technology subject area. This includes wood, metal, plastics, design, and drawing. This year saw even more activity as recent timetable changes facilitated a review of the subjects taught and the year levels with an acknowledgement that Year 12 should offer a challenge to those students who undertake this level of study. With a strong base in a number of specialist material and processing fields in my training, I had to make a topic selection.

"Boatbuilding was the last specialist area I studied during my training for a BEd and despite, or perhaps because of, the school's location, this was chosen as the specialist Material Products field for my students. As a standard response to "Why boats?" I replied "Why not?" We are equal distance to any coast of Australia with Alice Springs being in the centre of Australia.

"Our boat launch in Glen Helen Gorge, a beautiful waterhole 130 km from Alice Springs on Wednesday 30 November was a great success. The Headmaster, Mr Chris Tudor, has been very supportive of the class activity and also enjoyed his time on the water.

"The students undertook all facets of modern timber boatbuilding which utilised Australian-made marine grade Hoop Pine and other associated timbers, including Fiji Mahogany and Huon Pine. With modern epoxy adhesives one boat used only six screws in its construction, while the other had none.

"The winner of the RINA award, Paul Berriman, did an excellent job on the 18ft (5.49 m) Iain Oughtred-designed *John Dory*, which was on display in The Minnamurra Hall foyer. The school plans to keep this craft as a show piece (but inevitably also as a conversation piece). St Philip's College is the only secondary school in Australia currently offering boatbuilding as a mainstream senior subject. Students get points from this subject towards their ATAR for university entrance.

"In 2012 two more craft will be constructed, with both of these having been designed by the well known Ross Lillistone, a Queenslander from Esk. These are the *Phoenix III* in lapstrake, and *Alby*, a single-chine plywood tender.

"The course was designed to give exposure to processes and techniques which would stretch the students and give them maximum opportunity to utilise their problem solving and design skills. Being able to read and interpret design plans and scaled drawings are high among these endeavours. Congratulations to the Class of 2011."

Paul Berriman receiving his award
(Photo courtesy St Philip's College)

The prize-winning dory afloat at Glen Helen Gorge
(Photo courtesy St Philip's College)

NAVAL ARCHITECTS ON THE MOVE

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

Bronwyn Adamson has moved on several times from her position as Second Engineer on *Ocean Victory*, and has just competed a two-year posting as Chief Engineer on MY *Lammouche*, a 44 m San Lorenzo luxury yacht (see, for example, www.superyachttimes.com/yachts/details/2346), and is back in Australia arranging visas and evaluating opportunities.

Tony Armstrong has taken early retirement from Austal Ships, where he has been Chief Scientist since 1998. He obtained his PhD from the University of New South Wales with an Incat Scholarship in 2000. He intends to devote more time to his hobby of building harpsichords, whilst continuing to consult to the fast ferry industry in which he has been involved for the past 22 years. He can be contacted on fastships@spin.net.au.

David Beresford has moved on from ABS Pacific and has taken up a position as a naval architect with ASO Marine Consultants in Chatswood.

Matthew Cleary moved on from Imperial College, London, five years ago and took up a position as a lecturer at the University of Queensland in Brisbane. He recently moved on from there, and has now taken up a position as a lecturer in the School of Aerospace, Mechanical and Mechatronic Engineering at the University of Sydney, specialising in the fields of thermofluids and combustion.

Alexander Conway has completed his industrial training at Austal Ships, and has headed off for the 470 World Championships sailing in Europe as the start of a four-year campaign to compete in the 2016 Olympic Games in Rio de Janeiro, Brazil.

Valerio Corniani has taken up a position as an engineer with Composites Consulting Group (CCG) in Sydney.

Rowan Curtis has moved on from NSW Roads and Maritime Services and has taken up a position as a Dimensional Control Officer with Forgacs in Newcastle on the AWD project.

Derek Gill has moved on from Austal Ships and is now completing his MBA at the University of Western Australia full-time.

Annette Hill has moved on from One2three Naval Architects and has taken up a position as a trainee surveyor with Lloyd's Register Asia in Sydney.

Bryan Kent has moved on from Incat Crowther and has taken up a position as a naval architect with London Marine Consultants in St Dunstan's Hill, London, UK. For London *aficionados*, the location is just a few blocks from the Tower of London, and not far from the London office of Lloyd's Register.

Matthew Laverty, a naval architecture student at the University of New South Wales, has taken up a part-time position with Burness Corlett Three Quays in Sydney while he completes the requirements for his degree.

David "Skip" Miller has taken up a position as an engineer with Composites Consulting Group (CCG in Sydney.

Martin Renilson has moved on from consulting and teaching at the Australian Maritime College and has taken up the position of Dean of Maritime Engineering at the Higher Colleges of Technology in Abu Dhabi, UAE, for three years.

Kris Rettke has moved on from McAlpine Marine Design and has taken up a position as a naval architect with the Amphibious and Afloat Support Systems Programs Office (AASSPO) of the Defence Materiel Organisation at Garden Island, Sydney. AASSPO provides in-service support to HMA Ships *Tobruk, Sirius, Success,* the Landing Craft Heavy class, the sail training ship *Young Endeavour,* and the Army marine equipment fleet.

Anne Simpson has moved on from Lightning Naval Architecture and has taken up a position as a naval architect with the Amphibious and Afloat Support Systems Programs Office (AASSPO) of the Defence Materiel Organisation at Garden Island, Sydney.

Nick van den Hengel has moved on from Damen Schelde in The Netherlands and has taken up a position as a senior naval architect contracting to the Amphibious and Afloat Support Systems Programs Office (AASSPO) of the Defence Materiel Organisation at Garden Island, Sydney.

Ramesh Watson has moved on in Composites Consulting Group (CCG) and has moved from Sydney to Shanghai, China, to take up the position of Team Leader for CCG China on secondment. CCG is an independent DIAB Group Company, and he is working in a global team to provide consulting services to companies making innovative products in composite materials.

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

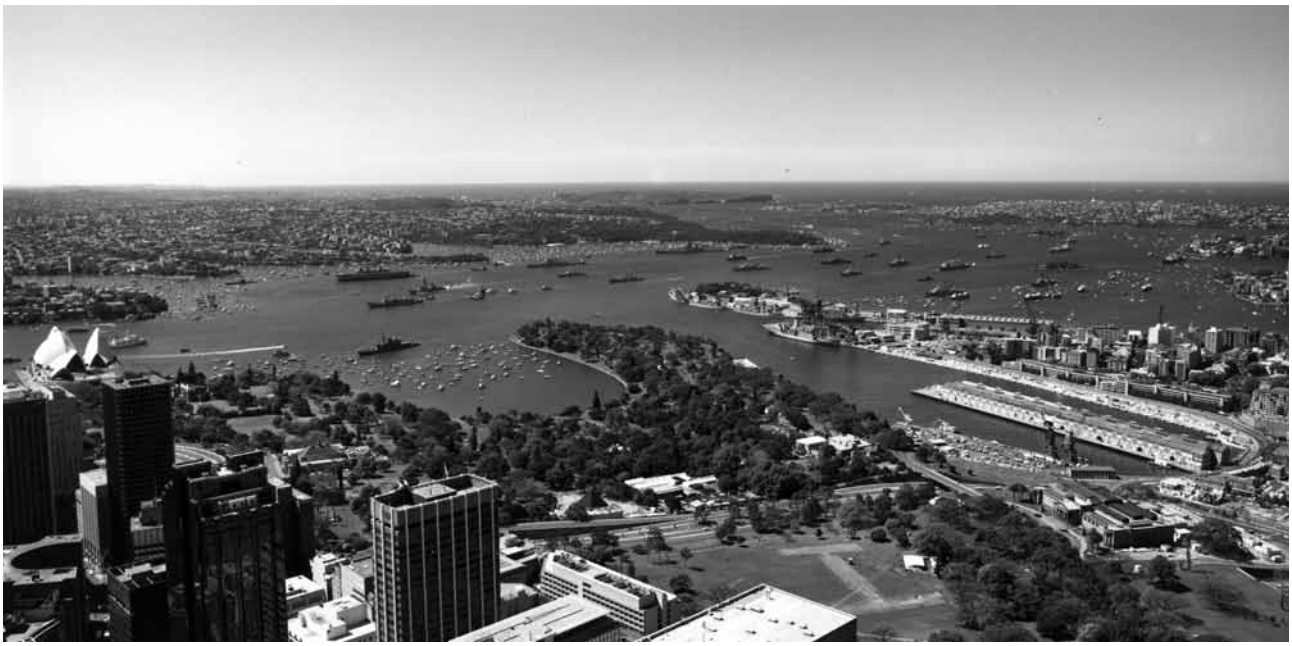
Contributions from RINA members for *The Australian Naval Architect* are most welcome

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.

This magnificent photograph of *Queen Mary 2* and the Australian National Maritime Museum's *Endeavour* replica was taken just outside Portland, Victoria, on 4 March 2012. Both ships were circumnavigating Australia. *Queen Mary 2* took 21 days for the round trip whilst *Endeavour* was nearing the end of a 13 month journey. *Endeavour* returned to Sydney and her home in Darling Harbour on 21 May (Photo by James Morgan on behalf of Carnival Australia)

FROM THE ARCHIVES



The International Fleet Review planned for Sydney in October 2013 will be the first since the Bicentennial Naval Salute of October 1988 — the review planned for 2001 was cancelled because of the events in New York in September of that year.

Visiting ships in 1988 included the Royal Navy carrier HMS *Ark Royal*, the French cruiser *Colbert* and the battleship USS *New Jersey* which can be seen at anchor between Neutral Bay and Athol Bight in the above photograph
(RAN photograph)

A spectacular element of the evening display during the Bicentennial Naval Salute was the 'dump and burn' flypast by three RAAF F111s. Unfortunately, with those aircraft now out of service, a repeat will not be possible next year
(RAN photograph)

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LIFE MATTERS