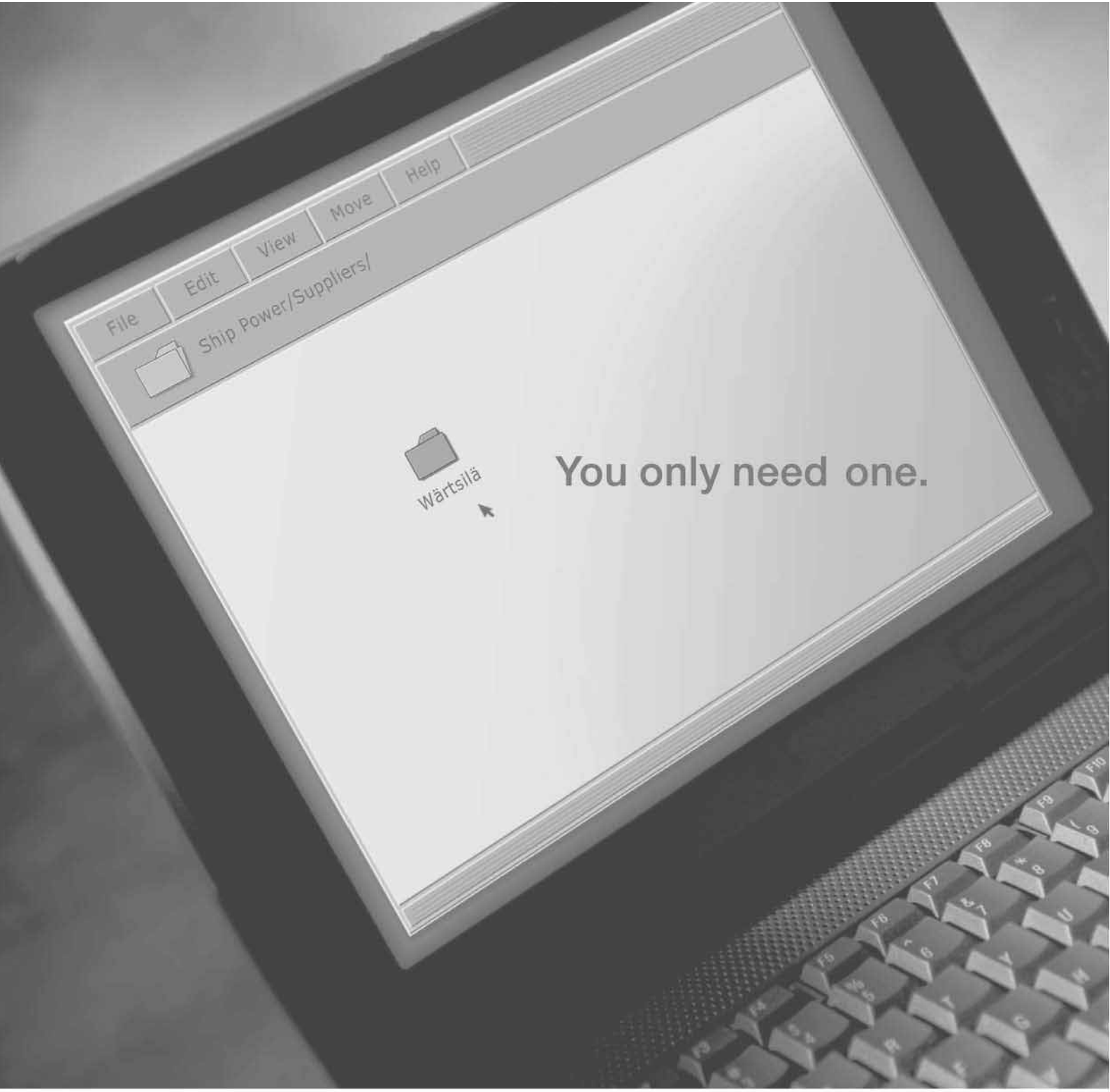
THE AUSTRALIAN NAVAL ARCHITECT

Volume 10 Number 2
May 2006



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THE AUSTRALIAN NAVAL ARCHITECT

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

Volume 10 Number 1
February 2006

Cover Photo:

Sir James Hardy's 13.6 m gaff cutter *Nerida* and Andrew Minter's 8.2 m gaff schooner *Jameil* (J26) head for the finish during the Sydney Amateur Sailing Club's recent Gaffers' Day on Sydney Harbour
(Photo John Jeremy)

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

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The deadline for the next edition of *The Australian Naval Architect* (Vol. 10 No. 3, August 2006) is Friday 28 July 2006.

The Australian Naval Architect
ISSN 1441-0125

Editor in Chief: John Jeremy
Technical Editor: Phil Helmore

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

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RINA Australian Division
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From the Division President

It is not my usual practice to use this column to talk about individuals, but in this instance I think an exception is well justified.

The Institution's Annual General Meeting in London last month marked the end of Noel Riley's term as a member of Council, having served for the maximum period permissible under the rules, and was therefore a milestone in his gradual retirement. I should point out that, although we Australians can and do generally participate in Council by teleconference, at his own expense Noel has improved his effectiveness as a Council member by attending numerous meetings in person.

Over the past year, Council has been a considering a paper on the future directions for the Institution that I submitted in consultation with Noel and Bryan Chapman as the other Australian representatives on Council. The benefits from this exercise, which will be reported upon by the Chief Executive in a forthcoming issue of RINA Affairs, will probably only emerge over time. But it has sown seeds for gradual change that will owe much to Noel in terms of his asking questions, promoting useful change and supporting progressive ideas.

Many of you will know Noel as the Past President of the Division who initiated and presided over the revision of the Division's constitution which resulted in the current arrangements whereby Divisional Council is no longer Sydney-centric but is truly representative of the Division as a whole. Many of the above-mentioned ideas put forward to London Council are products of the Division's experience with these changes.

I suspect that Noel had been fermenting these changes to the Division for several years, since he had arranged in the early 1980s to meet me with another member of what became the Division's Future Directions Committee, long before I first was elected to the Division Council by which time the new regime was in place.

During his Presidency Noel also initiated the formalisation of our relations with Engineers Australia through our Heads of Agreement. These arrangements, administered by the Joint Board, are now beginning to show benefits in terms of confirming the Division's position in the Australian engineering firmament, providing appropriate recognition to members of both institutions and providing members with access to the National Professional Engineers Register.

I first met Noel in 1978, at the very start of my career as a regulator, when he was one of the leading Sydney consultant naval architects that I was sent to meet. He turned up soon thereafter in my office, when he was in Melbourne to do a job "for love" on one of the sail training ships down there. A further indication of his commitment to sail training ships was evident several years later, when one of his staff turned up in Adelaide for a job on the sail training ship *One and All* in the late 1990s, which I can't imagine was a paying job either.

But, unbeknown to me, he and I had a connection in that I started my career at the Whyalla Shipyard in the early 1970s, while he had lectured naval architecture at the South Australian Institute of Technology in the same city about a decade earlier.

He has continued to be involved in the education of naval architects until relatively recently, by teaching studentsat the University of NSW and by sitting on the industry advisory committee for the naval architecture course at the Australian Maritime College.

His career since his Whyalla days has touched upon most aspects of naval architecture in Australia and the Pacific islands. Early on, it was as Naval Architect to the Australian Army managing their landing craft project. In recent years he seems to have had a hand in everything up to the largest of tugs. In fact, several years ago when talking to a North Queensland fisherman, it emerged that he and most of his colleagues maximized the propulsive efficiency of their boats with propellers and nozzles designed by Noel.

Noel tells me that he is retiring to spend his time making ship half-models in his boathouse. We will see — almost every time that I try to contact him he is still off on some job or other at a slipway on a Pacific island or in a New Zealand court!

That said, there are not too many areas of naval architecture in Australia and the Pacific that have not benefited from his knowledge and experience, from the education of the next generation of naval architects, through design and vessels in service, to sorting out problems in court — probably long after the vessels themselves have disappeared.

Noel says that his involvement in the Institution has for the purpose of putting something back into the profession that has served him very well. I think he has done that several times over. The profession, the Institution and most of all the Division, are very much in his debt for it.

I would like to conclude by wishing Noel and Donela a long, happy and healthy retirement, but would not be surprised if it's only semi-retirement and he turns up here or there doing some work he finds interesting.

On another subject, as a necessary part of the opening of an 'area of practice' on the National Professional Engineers Register, Engineers Australia has asked the Division to provide suitable assessors for its assessment panels. These assessors are required in each State and for the full gamut of naval architecture specialties. If you are MRINA (or above) and CEng/CPEng and interested in undertaking this role, which should not be arduous, please provide Keith Adams with your name and details of specialty. Keith will maintain a list from which suitable nominees will be selected for each NPER interview.

Rob Gehling

Editorial

In *The Australian* of 31 March 2006, Patrick Walters reported that the Department of Defence had told the current Senate inquiry into naval shipbuilding that there is 'no strong strategic reason' to build the navy's next-generation warships in Australia. The Defence submission went on to say 'constructing the ships identified in the Defence Capability Plan in Australia has the potential to impact on the overall wealth of the nation. Given the competition for scarce skilled resources these may be better focussed on non-defence projects (such as export-oriented investments) aimed at the long-term good of the nation and wealth generation, rather than being employed in any new ship construction.'

Walters reported that Defence argues that its primary strategic priority for the maritime industry is to be able to repair, maintain and upgrade warships in Australia.

That need has been stated by Defence as the primary priority for many years, and it is undeniably correct. In circumstances short of a major conflict like World War II, the main need is to be able to keep the ships we have at sea. Even during World War II, despite the considerable achievements of the Australian shipbuilding industry which grew from almost nothing in 1939 to an industry employing some 20 000 people by 1945, the rate of production was frequently slowed by the need to meet that first priority of keeping ships at sea.

Many of us who have had experience in both building and maintaining naval ships would argue that there is a strong link between our capability to maintain and modernise those ships and keep them at sea and the extent to which we participate in the design and construction of those ships.

The people who serve in the RAN deserve the highest level of support we can afford. We need people in the technical areas within Defence with the training and experience to enable the RAN to be an intelligent customer when seeking new ships or planning modernisation projects. We need engineers, naval architects and technicians in industry who are up-to-date and understand the design philosophy and operation of the navy's ships and submarines, and we need managers in industry who understand the product and the complexities of modern naval projects. Certainly examples can be produced where we have very successfully supported ships and submarines built overseas, but this has often been with considerable overseas support and the help of imported skills.

The decision to build the Collin-class submarines in Australia was bold and controversial, yet it has undoubtedly resulted in industry benefits for Australia as a whole, directly and indirectly. It has fostered a closer relationship between DSTO and industry and improved the capability of both. It has enabled us to face the future need to replace these boats with a new generation of submarines with a solid background of experience and knowledge. Yet as the Australian Strategic Policy Institute pointed out in its recent publication *Cutting Edge: The Collins Experience,* 'If ASC had not won the AWD contest, the engineering and design skills needed for the next submarine build would probably have dissipated despite the on-going maintenance and upgrade on the Collins boats.'

We are all proud of the achievements of the high-speed aluminium ship construction industry in Australia over the last 20 years. That an Australian company should be so prominently involved in the design of a significant combat ship for the US Navy would have seemed an impossible dream 30 years ago. We would not have created this valuable industry had we set our sights simply on maintaining, repairing and modernising those ships we operated in Australia.

Some people have suggested that, by building our new warships in Australia, we risk diverting people and skills away from this valuable export industry and that the Defence industry cannot hope to compete with the resource industry for skilled people. There is undoubtedly a skill shortage in Australia that needs to be addressed but, surely, undertaking the construction and, to the maximum extent practicable, the design of our Australian warships in Australia, is one way of addressing that shortage by attracting more young people to find rewarding world-class careers in the industry.

One obstacle that stands in the way of meeting the needs of the future naval construction projects in Australia is a lack of continuity — and this is not a new problem, it has existed for years and its solution remains as elusive as ever. Periods of drought followed by periods of plenty inevitably result in skills shortages as those people trained during the last project move on to find careers elsewhere. Capability cannot be sustained if not used and then, when it is really needed, it may not be there.

John Jeremy

Letters to the Editor

Dear Sir,

I refer to the very interesting letter from Greg Cox in the August 2004 edition of *The ANA* on his sentiments concerning the Uniform Shipping Laws Code, Category T, with which I heartily agree.

On reflection though, it has been my experience as a ship surveyor that, in some cases, a vessel only complies with the conditions set down on a certificate of survey until just after the 'ink is dry' on the surveyor's declaration.

One of my great concerns is the seaworthiness of vessels entered and accepted as entrants in ocean racing events. When I was a ship surveyor with the Department of Marine and Harbours, an application was received from a yacht charter firm with a request to assess their vessels under the Australian Yachting Federation stability formula. The application was refused and the company advised that only full stability data would be accepted by the Department.

How this formula was derived is anybody's guess — perhaps by a committee after a very long lunch! In 1995 I wrote a short article which was published in *Groundswell*, the in-house journal of the Cruising Yacht Club of South Australia, pointing out the shortcomings of the AYF formula. I also suggested that, before accepting a yacht as an entrant in an ocean racing event, any sailing committee should require that the yacht have a certificate of survey from a recognised authority such as Lloyd's Register, Bureau Veritas, Germanischer Lloyd, Det Norske Veritas or American Bureau of Shipping. I stressed that, in the event of an accidental death, in the ensuing inquiry a coroner would be

likely to ask some very difficult questions. Nobody would be immune from litigation — from the chairman of the committee to other racing officials, yacht owners, etc.

Modern racing yachts are worth many thousands of dollars and the cost of a certificate of survey and full stability data would only be a mere fraction of the value of the vessel.

There are many young practising naval architects in the nation who are very capable and able to produce such stability data at a very moderate and reasonable fee. I would suggest that the AYF should consider this very closely.

A certificate of survey is essential. In recent years with glass-reinforced plastic construction there have been several instances of chain plates pulling out and masts going over the side; of bolted-on fin keels carrying away and the vessels capsizing. With proper construction and the securing of such fittings under the guidance of a recognised survey authority, such incidents would be brought to a minimum.

Neil Cormack

Dear Sir,

During a recent spurt of energy, I decided to look up various high-profile yacht races on the Internet, including The Sydney to Hobart, The Vendée Globe, The Fastnet Race and the Volvo Ocean Race. I found this to be an interesting exercise, as I spent most of my time looking at the types of boats which are entered into each of the races.

While there are specific differences in the types of boats and classes which are entered, if you were to look at the vessels which were expected to take line honours in all the races, they can be put into another class altogether. What really struck me while looking at these sites, was that the old saying, "sailing is a rich man's sport", really is true. All of the high-profile races these days are about getting the best boat and for this you need money; lots of money.

Now, don't get me wrong; I realise that high-performance racing is all about winning, and to win you need a combination of the best yacht and best crew. However, my feeling is that this is now moving down the line to the clubs and to weekend racing too. I grew up on the Derwent River (not so long ago), and you could go down to the club on a Saturday morning in a T-shirt and thongs and pay five dollars to borrow an Optimist for the morning. If you wanted to race, then you paid another five dollars for the afternoon, and everyone had a lot of fun. There have to be clubs like this still around, but they are not the prominent ones any more. From what I see out on the harbour each weekend, there are lots of big boats, but not as many of the centreboard classes as there used to be. More and more, it is a sport that you take up because your parents do it, and because you have enough money to pay the high club fees.

It is something that I wish we could see more of, family sailing coming back into the community. It is sad that such a wonderful sport is not encouraged more in schools and the community as a great way to get out and meet new people, and have a lot of fun.

Joanna Mycroft
UNSW Student

Dear Sir,

It is no secret that Australia's shipbuilding industry is now primarily high-speed catamarans. Therefore, as a student studying naval architecture in Australia, I have accepted, and even embraced, the probability that I will work for a company specialising in high-speed craft. I have therefore taken it upon myself to learn more about these fast craft so that I am better-prepared for the industry.

I have recently learned about the record-breaking ferry, *Luciano Federico L*. She was designed here in Australia by Advanced Multihull Designs, and operates on a 110 n mile route along and across the Rio de la Plata (River Plate) between Buenos Aires, Argentina, and Montevideo, Uruguay. This car and passenger ferry has a maximum speed of 60 knots and is, therefore, able to compete with the airline which services the same route.

I would like to know why there are not more orders for these super-fast ferries.

Learning about this project has encouraged me to want employment in the high-speed craft industry, and someday, become involved in the design and development of super-fast ferries like *Luciano Federico L*.

Mate Ostojic
UNSW Student

Dear Sir,

I must apologise to the editor and readers of the last issue of *The Australian Naval Architect* for an error in the Queensland Section News. My Continuous Membership Certificate was for 45 years and not 40 years as printed — my mistake.

Brian Robson

Dear Sir,

I was interested to read the *From the* Archives column in the November 2004 issue of *The ANA*. There, John Jeremy shows a photo of the vessel *Ormonde*, with the caption:

Some World War I transports became well known to Australians in later years, like the Orient Line's Ormonde*, seen here in Sydney in 1918. Her construction was suspended on the outbreak of war, but resumed in 1917 for completion as a troopship in June 1918. After the war she was fitted out for commercial service and returned to Australia in November 1919. After further duties as a transport during World War II, she carried migrants to Australia. The first Orient liner to have a cruiser stern, she was broken up in Scotland in 1952.*

Many readers would not have experienced travel on these older liners, so here are some first hand comments.

Certainly *Ormonde* "carried migrants to Australia", and more. Some were on "assisted passages" for £10, others were full-fare paying, and some went on to New Zealand. Ten pounds in those days would be equivalent to around $A600 today.

Life in the UK in the late 1940s (after World War II) was still difficult. There was pollution, fruit was scarce and some food was still rationed, (meats were supplemented with horse meat and tripe — which actually tasted OK), and quite a few families had ongoingly sick members. In those days, it was not uncommon for doctors to recommend that such families move to New Zealand for the better food and climate.

The post-war liners had not yet completed building, and they

were air conditioned, unlike old *Ormonde*. Also there were insufficient berths to satisfy demand, so you took whatever was available. Thus it was that, on 29 June 1950, my family boarded *Ormonde* as full-fare passengers, paying £59 for each parent and half that for me as a young schoolboy. She was listed as "Tourist Class B, One-class Vessel". The voyage time to Sydney was around 36 days, and I still have the following vivid memories.

The cabins were six berth (which necessitated splitting up families). The bunks were athwartships, and were fitted with nets for rough weather to stop the occupants from rolling out. The bathrooms had deep baths with huge taps, with hot and cold salt water — we were given special soap for salt water since ordinary soap would not lather.

Going through the Suez Canal we were pacing a (rather slow) steam train for quite a while. Since there was no air conditioning, and the passage through the Red Sea was so hot, everyone was issued with a sleeping bag so as to sleep on the upper decks every night. Then at 6 am we all had to pack up when the crew came to hose down the decks. We anchored in the stream in Bombay and Ceylon (now Sri Lanka), where the bum-boats came alongside to sell silk scarves and elephants carved from ebony or ivory; we would throw down a bucket on a rope with some money, and haul it up with the goods. "Magicians" also came on board to make a bit of money. During the voyage, children under twelve years of age were not allowed on the uppermost deck, but there was no such restriction on the lowest open deck at the stern, and I spent many an hour sitting on the manila ropes watching the log line trailing astern.

Subsequently, I believe *Ormonde* was used as a troop ship (again) for the Korean War.

Further details of *Ormonde* may be found on the web, for example at www.theshipslist.com/ships/descriptions/ShipsO.html

Up to the 1960s, there was a weekly service between Sydney and Auckland, and Sydney and Wellington, alternated by *Wanganella* and *Monowai*. So, shortly after arriving in Sydney, we boarded *Wanganella* on 10 August 1950, and arrived in Auckland four days later. The fares were £24 each parent plus half that for me, for a three-berth cabin in First Class. Before being broken up many years later, this ship ended her days as an accommodation vessel during the construction of the Manapouri power station in the south-west of New Zealand. On 28 October 1959 I came back to Australia, taking four days from Auckland on *Monowai*.

Hugh Hyland

Monowai off Walsh Bay outbound for New Zealand on 7 March 1959
(Photo John Jeremy)

NEWS FROM THE SECTIONS

Queensland

The Queensland Section held its Annual General meeting on 7 March 2006. This was followed by a technical presentation. The following officers were elected to the Section Committee for 2006.

Chair	James Stephen
Deputy Chair	Mark Devereaux
Members	Bill Barlow
	Brian Robson
	Marc Richards
	Tommy Ericson
	Tom Ryan

As no nominations were received at the AGM for the position of Honorary Secretary/Treasurer, the Chairman-Elect James Stephen took on the task on behalf of the incoming Committee of finding a willing member to take up the Sec/Treasurer position. Alan Prigg has subsequently accepted the nomination, which will be put to the section committee for election on 30 May 2006. The outgoing Secretary/Treasurer, Brian Hutchison, who had held the position for the last six years and who had instigated the setting up of the Queensland Section was thanked by the meeting for a job well done. We all wish Brian well for the future.

The technical presentation following the 2006 Annual General Meeting was *Some Background and Progress on the National Standard for Commercial Vessels (NSCV)* by Mark Devereaux of Maritime Safety Queensland, Department of Transport. Speaking to his PowerPoint presentation, Mark provided extremely interesting background information on the progress and update of the proposed National Standards.

Brian Robson

Tasmania

The Tasmanian Section held its first committee meeting for the year on 27 March 2006, and there have seen some changes in membership of the Committee. The new committee for 2006 is:

Chair	Stuart McDonnell
Secretary	Gregor Macfarlane
Treasurer	Jonathan Duffy
Members	Alan Muir
	Guy Anderson
	Giles Thomas
	Greg Piper

Gregor Macfarlane

New South Wales

NSW Section AGM

The NSW Section held its eighth AGM on the evening of 14 March 2006, following the March technical presentation and the Australian Division AGM at Engineers Australia, North Sydney, attended by fourteen with Phil Helmore in the chair.

Phil, in presenting the Section's Annual Report, touched on some of the highlights of 2006, which included nine joint technical meetings with the IMarEST (Sydney Branch), with attendances varying between 67 (the second-highest ever, at Clive King's presentation on *Design of the RAN's New Air Warfare Destroyer*) and twenty-seven. The NSW Section had held two additional technical meetings during the year, a joint meeting with the Maritime Panel of Engineers Australia and a joint meeting with The University of New South Wales. Our other major event was the sixth successful SMIX Bash in December 2005 which was attended by 203.

Adrian Broadbent presented the Section's Financial Report. The Section budget for 2006 is $1538, comprising mostly venue hire. The Social account includes all SMIX Bash finances, and now has a surplus which allows us to plan for SMIX Bash 2006 with greater confidence. SMIX Bash 2005 generated a small profit which was split equally with the IMarEST.

All committee members were thanked by the Chair for their contributions, some for a number of years. During the year, David Firth, Don Gillies, Grahame Parker and Martin Williams resigned from the NSW Section committee due to the pressure of other things and we welcomed John Butler, Geoffrey Fawcett and Craig Hughes onto the Committee. Current members have signified their willingness to continue in their current positions, obviating the need for elections this year. As a result, the committee for the coming year is as follows:

Chair	Phil Helmore
Deputy Chair	Graham Taylor
Treasurer	Adrian Broadbent
Secretary	Lina Diaz
Assistant Secretary	John Butler and Geoffrey Fawcett
AD Council Nominee	Craig Boulton
Website	Bruce McRae
Member	Craig Hughes

NSW Section Committee Meetings

The NSW Section Committee met on 27 March and, other than routine matters, discussed:

- SMIX Bash: One sponsorship still to be received for 2005; projections are for a small profit and a donation of $500 to be made to the Australian Heritage Fleet; possibilities being investigated for increased numbers.
- The Walter Atkinson Award for 2005: No nominations received, and committee not aware of any papers suitable for nomination.
- Fisher Maritime Training Course: Hard-copy and soft-copy brochures have been received; everything on track.
- Finance: We currently have $1814 in the bank, made up of $2307 in the Social Account (including SMIX Bash monies), and the Section Account $493 in the red; i.e. the social account is keeping the section account afloat. However, we are owed $700 for venue hire for the Chief Executive's presentation to DSTO, LR and DNV at Pacific 2006, and this will put the Section Account $208 into the black. The Section accounts for 2005 have been audited, and will be forwarded to the Australian Division.

Maritime Security Technologies

Jon Clemesha, Marine Manager for Defence Maritime Services, gave a presentation on *Maritime Security Technologies: Rafael Protector Unmanned Patrol Vessels and Associated Applications* to a joint meeting with the IMarEST and the Australian Society of Defence Engineers attended by twenty-six on 14 February in the Harricks Auditorium at Engineers Australia, North Sydney.

Introduction

Jon began his presentation with an overview of Defence Maritime Services. The company was set up as a joint venture between Servo and P&O, and they have three principal contracts: RAN port security and support craft, the Armidale-class patrol vessels for the RAN, and the Bay-class patrol vessels for the Australian Customs Service.

The Armidale-class patrol vessels have two items of equipment supplied by Rafael: the Toplight electronic-optical surveillance system (EOSS), and the remotely-controlled Typhoon 50 mm gun. DMS have been involved in the installation and maintenance of these items, and are now working closely with Rafael.

He showed a slide of the three generations of patrol vessels alongside at Pacific 2006 in Darling Harbour: the Attack, Fremantle and Armidale class patrol vessels. There have been leaps in technology between each of these classes, and Jon has seen a similar progression into other fields, such as gun maintenance and training, and another part of this process is in port security.

DMS has two offshore supply vessels which have multi-purpose roles (such as submarine support, rescue operations, etc.) They have a number of assets based at Jervis Bay, including *Seahorse Horizon*, and they lay mines for the navy to practise detection and sweeping, and clear them away afterwards. They have a landing barge, *Kultar*, which also has multiple roles, such as munitions transfer, a dive launch for diver training, a 14 m jetboat, and a number of 7.3 m Zodiac RIBs, which are similar to the Protector craft in a number of ways.

Protection of Facilities

Facilities can be protected in a number of ways from terrorist-type attacks. *Protector* is a remotely-controlled armed vessel, designed for outer-perimeter patrol for detection and interdiction. Closer inshore, there may be a floating barrier, such as they sometimes deploy at Garden Island to prevent the close approach of unwanted vessels to the naval vessels.

The prototype vessel is in aluminium, and has a mini-Typhoon 50 mm gun mount. The vessel and weapon are controlled from a remote control room (shore or ship based). There are four main components in the control system. These are the communications (via multiplexing on broadband), the radar (including GPS so that the controllers can set courses, search patterns, etc.), the Toplight EOSS (to see what is happening on board and all around) and the laser rangefinder. Optional equipment includes a green laser dazzler (for disorientation of the receiver), a maxi-beam spotlight, and a phraselator (or language translator) for communicating with people in other languages.

Video

Jon then showed a promotional video of the *Protector* system, with the vessel in action, and the view of the control room and what the operator sees. The system is capable of locking onto a target and tracking. The boat has been in operation for three months in the Royal Singapore Navy in the Persian Gulf. The commanding officers have been intrigued and impressed with the capabilities of the vessel, which has been deployed for more than eight hours at a time.

Advantages

The vessel is capable of long and continuous missions and operational profiles, with minimal manpower requirements. It is able to conduct a wide spectrum of risky missions without exposure of personnel to the risks. It is cost effective: it is unmanned, small and modular. It is able to provide force protection for own vessel or for a battle group against asymmetric force, i.e. terrorist activity.

Jon then showed a series of slides of a small vessel which had claimed to be in trouble and, when a patrol vessel had manoeuvred close, the crew blew the small vessel up in order to damage the patrol vessel! In this case, the flare of the bow took the brunt of the explosion, and no personnel on the bow had been injured, but it was lucky. Had *Protector* been deployed, the small vessel could have been interdicted at some range and not have been allowed to come so close. Due to a number of such incidents in the past, security has had to become more wary, and *Protector* is one way of dealing with a real problem.

Protector can be used to patrol around vessels (such as container ships, tankers, etc.), oil rigs, shore-based installations (refineries, naval establishments, etc.) and any other high-value items.

System Description

The control units consist of a shore control unit, a ship control unit, and an interface between the control units. The communications include data, audio and video links. The navigation equipment includes radar, GPS, navigation lights and a navigation camera. The vessel itself is between nine and eleven metres in length, propelled by a waterjet driven by a diesel engine, and has a payload of 1000 kg. The security payload includes a light projector, public address system and microphone. A good system of operation would be to have two separate vessels and one control unit so that continuous coverage can be applied.

Principal particulars of the vessel are:

Length	9 m
Beam	3 m
Displacement	< 3300 kg (excluding payload)
Payload	1000 kg
Engine	Caterpillar 3126B
Propulsion	Hamilton Jet 274
Fuel	700 L
Speed	> 35 kn in up to sea state 3
Endurance	> 8 h @ full speed
	>14 h @ 20 kn
	> 24 h @ 10 kn

Command and Control

Lightlink is the system developed by Rafael to aid control

of the operation. It provides line-of-sight operation for up to 10 n miles, and is able to downlink video, audio and telecommunications. It has been designed for unmanned naval platforms, and is well-suited for fast-moving vehicles.

Jon then showed slides of what the operator sees. The main display shows a digital chart of the area and where vessels are located, together with the video of what the camera in the vessel can see, and a control panel for engine, steering, gun mounting, etc. The operator's task is to locate targets, and to decide which are dangerous.

The control panel can be switched to training mode, and is able to record three months of data. This can be replayed, i.e. there is the ability to revisit decisions made by the operators.

The vessel's course and speed can all be set by the operator, and are controlled with the mouse. On the chart, the operator can set waypoints for a grid search pattern, or a particular route to be followed. If the vessel loses all communications, it is programmed to retrace its whole course so that it returns to where it started. Some of the typical sailing modes include pass by, identification, interception, dynamic positioning, escort, and avoidance manoeuvring.

Conclusion

In summary, *Protector* is an unmanned, integrated naval combat system which has a wide range of other potential uses, such as in port security, anti-terror and force protection in coastal areas and inland waters, surveillance and reconnaissance missions, and is operable under hazardous conditions.

Questions

Question time elicited a number of further interesting points.

The recommended mode of operation is to have two vessels with one control unit; however, it is possible to have three vessels operating from one control unit.

The vessels are unlikely to have a communications "shadow" area; the aerials have about 2000 frequencies available, so there will be few areas which shadow all at once; and the multiplexing gives very high reliability to the communications.

An indicative price for a *Protector* vessel, complete with control unit, is $5 million. However, this does the job economically, especially if compared to a crewed vessel of similar capability.

The controller needs to be highly trained. As well as having the qualifications of a commanding officer on a patrol vessel at the site, the controller needs to be trained in the remote-control of the operation. This is one of the advantages of the system, that it has its own in-built training mode.

The on-board camera does not have 360° vision; it is slightly blanked by the mast on which it is mounted, and would have about a 5° blind arc right aft. However, the vessel is highly manoeuvrable, and a slight alteration of course gets around the blind spot.

In order to rearm the vessel, it is necessary for it to return to base or the "mother" ship, and this is why two vessels are recommended; one can be refuelling/rearming while the other is providing operational coverage.

The vote of thanks was proposed by John Lanahan of ASDE.

National Standard for the Administration of Marine Safety

Mori Flapan, Technical Adviser to the National Marine Safety Committee, gave a presentation on *Vessel Survey Innovations in the New National Standard for the Administration of Marine Safety* to a joint meeting with the IMarEST attended by thirty-nine on 14 March in the Harricks Auditorium at Engineers Australia, North Sydney.

Introduction

Mori began his presentation with a very brief overview of the National Marine Safety Committee, which was formed to promote national consistency and uniformity among the eight Australian jurisdictions. i.e. the various governments have come together to facilitate the conduct of business between the states.

The National Standard for the Administration of Marine Safety is a new standard and, in this, it differs from the National Standard for Commercial Vessels which is being written to replace the Uniform Shipping Laws Code. It will be an agreed standard, specifying what each jurisdiction expects of its "brother" jurisdictions so as to be satisfied that agreed safety outcomes have been met.

The problem is that there are differences in opinion between the jurisdictions on the administration philosophy, objectives, desired outcomes, interpretations, and resources to be devoted to marine safety. There is also an underlying lack of confidence in the survey arrangements of other jurisdictions and, in view of the above differences in opinion, it is not surprising that there are differences in outcomes. Most jurisdictions accept the approval of a classification society, but not necessarily that of a brother state-survey authority.

The first USL Code was issued in 1979, and included the safety outcomes which were to be achieved, as well as how the safety outcomes were to be verified. Ideally, the safety outcomes would be politically acceptable, nationally consistent, cost effective, and mutually recognised. The new standard for the safety outcomes is the NSCV (to replace the USL Code), and the new standard for the delivery of the safety outcomes is the NSAMS (new and separate from the outcomes themselves).

Contents of NSAMS

The National Standard for the Administration of Marine Safety contains five sections:

1. General Requirements
2. Administration of Marine Safety
3. Regulatory Compliance
4. Surveys of vessels
5. Audits for Training Providers

Sections 3, 4 and 5 are the equivalent of documents from a quality-management program, and ensure compliance between the jurisdictions.

Section 4 (Surveys of Vessels) replaces Section 14 of the USL Code. Most jurisdictions currently put this into their regulations directly, and so this is not simply a part of the NSCV (as it was of the USL Code).

Section 4 has the following chapters:

1. Preliminary
2. Control of Survey Process
3. Initial Survey
4. Periodic Survey

and the following annexes:

A. Design Type Approval by Authority
B. Quality Management
C. Internal Control
D. Sample Vessel Verification by Authority
E. Items Subject to Survey
F. Functional Periodic Survey Outcomes
G. Guidance on a Risk-based Approach to Varying Periodic Inspections
H. Manufacturer's Declaration
I. Required Marking of Vessel

There are different systems in use at present. For example, the Queensland system says that qualified persons are responsible for marine safety; this is not quite the same thing as a certificate issued by a jurisdiction whose own surveyors carry out the survey and stands behind them.

Chapter 2 (Control of Survey Process) is directed specifically at this problem, addressing the competence of persons conducting surveys, management of the process, delegations by the authority (i.e. stating that the survey is done on behalf of the jurisdiction), reliance on others, and what to do about unsafe vessels.

Initial Survey

For the purposes of the standard, the initial survey of a vessel is divided into three phases: design (which includes review of plans, calculations and specifications), construction (which includes verification that the vessel is built in accordance with the design documentation, quality of workmanship, and quality of materials) and commissioning (which includes tests and trials of the vessel, and verifying safety equipment and information).

Mori then showed a slide of Table 1 from NSAMS, which specifies the survey authority for each phase for different categories of vessels, taking into account the complexity of the vessel and the consequences of error.

Periodic Survey

What is the objective of periodic survey? It could be to:

1. Ensure that the vessel continues to meet the requirements of the USL Code.
2. Ensure that the vessel continues to be safe.
3. Verify, to a limited extent, that specific aspects of the vessel continue to meet minimum standards.
4. Verify the vessel's continued compliance with legislation.
5. Investigate specific items in a vessel with a view to determining whether fuller checks are required.

Mori then asked the audience for their views and, even from those with wide knowledge of the industry, these varied. After some discussion, it was agreed that the objective could not be (1) or (2), but could be (3), (4) or (5). However, in order to have nationally-consistent outcomes, the jurisdictions must agree on what they are trying to achieve. The objective of periodic survey has not yet crystallised for the NSAMS.

Current periodic survey tables are determined on a basis of length. However, length is not necessarily a good indicator of risk. Proposed changes in NSAMS take a more risk-based approach, in which there are two levels of periodic survey (Level 1 includes all passenger and seagoing vessels plus all non-seagoing vessels which carry cargo fuel or cargo in bulk, dangerous goods, crane barges and tugs, and Level 2 includes all other vessels) and two levels of risk (general vessels, and small craft). Tables specifying the scope and depth of periodic survey are given in Annex E.

Variation of Periodic Inspections

Annex G gives guidance to Authorities for implementing an objective and systematic risk-based approach to varying periodic inspections. The objectives are to:

(a) reinforce positive behaviour by reducing the cost of operation where an operator's commitment effectively minimises risk;
(b) reduces risks associated with negative behaviour by increasing the scope, depth and/or frequency of inspections; and
(c) allows a more efficient utilisation of resources by the Authority by focussing effort on operations of highest risk.

There is ongoing assessment of each operator's approach, and three levels of compliance: a proactive culture of compliance (the operator tries to do the right thing before being told); a reactive culture of compliance (the operator tries to do the right thing after being told), and negative factors against compliance (the operator does not try to do the right thing). The risk index for the operator is continually adjusted according to performance over the survey schedule on a 5-point system, rather like a no-claim bonus, and is administered by the jurisdictions.

Review Process

The NSAMS is now out for public comment, and copies are currently available for download from the NSCV website at www.nscv.gov.au or in hard copy by contacting the NMSCC Secretariat on (02) 9247 2124 or email secretariat@nscv.gov.au. Public comment closed at the end of April.

All public comments received will be reviewed by a Reference Group, comprising delegates from the eight jurisdictions and from industry.

There was no Regulatory Impact Statement prepared from NSAMS (as would usually be the case). The NMSC will incorporate the RIS for NSAMS into a broader RIS which will deal with the implementation of the NSCV as well.

Certificates of Survey

In the NSCV, consideration has been given to a fundamental change in the function of a certificate of survey. Currently, a certificate of survey has the dual function of certification of survey and a legal licence to operate. The NSCV proposal is to uncouple the certification of survey from the licence to operate. There would then be two certificates required: the Certificate of Survey would be valid Australia-wide, and the Permit to Operate would be the licence to operate and would incorporate any local conditions for the operational area. This is similar in principle to the separation of a vehicle's "pink slip" certificate of inspection from the registration (permit to operate).

Conclusion

The new National Standard for the Administration of marine Safety proposes some far-reaching innovations and changes to the ways in which marine safety is currently administered throughout the Australian jurisdictions. The changes have been proposed with a view to making the agreed safety outcomes nationally consistent.

Questions

Question time elicited some further interesting points.

In reply to a query about the continuation of Queensland's system of accreditation of surveyors, Mori thought that NSAMS would require modification of the system so that the Queensland government guaranteed (stood behind) the certificate of survey, instead of the current arm's-length approach.

The HSC Code spells out acceptable sound levels for various spaces; does the NSCV do likewise? Keith Murray advised that there are two Australian Standards for ship-generated noise, one aimed at on-board habitability and one aimed at the environment.

Periodic surveys refer to a one-to-two year period, with a complete cycle taking eight years for general craft and four years for small craft. This contrasts somewhat with the approach taken by AMSA and classification societies of annual, intermediate and renewal surveys.

Surveyors are sometimes drawn from the ranks of master mariners, shipwrights, marine engineers and naval architects. Jurisdictions are suffering from a shortage of skilled applicants for jobs, and must therefore consider the provision of more structured training for their surveyors.

The vote of thanks was proposed by Adrian Broadbent and carried with acclamation.

MAN B&W Two-stroke Electronically-controlled Engine

Richard George, of MAN B&W, gave a presentation on *The MAN B&W Two-stroke Electronically-controlled Engine* to a joint meeting with the IMarEST attended by 26 on 11 April in the Harricks Auditorium at Engineers Australia, North Sydney.

Introduction

MAN B&W has combined traditional proven technology for fuel injection with enhanced electronic control to design engines which, while being production-friendly and operationally easy to handle, provide all the benefits to the owner of contemporary and future software developments.

Camshaft control of fuel injection and exhaust-valve timing has been state-of-the-art since the birth of reciprocating machinery. However, the possibilities for control are limited with mechanical cams, not least being the control and variation of fuel-injection pressure over the load range.

The main purpose of changing to electronic control is to ensure fuel-injection timing and rate, as well as exhaust-valve timing and operation, as and when desired to optimise efficiency. The control system has been designed so that it can provide a high fuel-injection pressure at low load, without resulting in a too-high pressure at high load (as would be the case in a camshaft-controlled engine). Electronic control extends to the cylinder lube-oil feed (which saves oil in comparison to mechanically-controlled lubricators), governor functions, auxiliary blowers, and starting and reversing sequences.

Differences

The mechanical differences between a camshaft-controlled engine and its electronically-controlled counterpart consist of a number of mechanical parts made redundant and replaced by hydraulic and mechatronic parts with enhanced functions.

The following parts have been omitted: the chain drive, chain-wheel frame, camshaft and cams, roller guides for fuel pumps and exhaust valves, fuel-injection pumps, exhaust-valve actuators, starting-air distributor, governor, regulating shaft and mechanical cylinder lubricator.

These parts have been replaced by: an hydraulic power supply, hydraulic cylinder units, engine-control system (controlling profiled fuel injection, exhaust-valve actuation, fuel oil pressure boosters, starting and reversing sequences, governor function, starting-air valves, and auxiliary blowers), crankshaft position-sensing system, and electronically-controlled cylinder lubricator.

The power necessary for fuel injection and exhaust-valve operation, previously provided by chain drive, is now provided by an hydraulic power-supply unit located at the front of the engine at bedplate level. The main components include a self-cleaning filter with 10 micron mesh, redundancy filter with 25-micron mesh, start-up pumps, and engine-driven axial-piston pumps supplying high-pressure oil to the hydraulic cylinder unit with oil pressures up to 250 bar. Before engine start, the hydraulic oil pressure is generated by electrically-driven start-up pumps; after start, the engine-driven pump takes over the supply.

The control system is designed so that no single failure of anything shall make the engine inoperative, and so all essential computers are provided with a hot stand-by. The computers are all of the same execution, and can replace each other in any location, adapting to the desired location after installation.

For installation, apart from the cabling of the control network, the camshaft-controlled and electronically-controlled engines are practically the same for a shipyard with regard to overall dimensions, weight, and most systems.

Features

The purpose of electronic control is focussed on ensuring fuel-injection timing and rate, as well as exhaust-valve timing, as and when required. This has been achieved.

The exhaust-valve timing can be varied, and this can be used to control the energy to the turbocharger, during both steady and transient-load conditions. Smoke-free acceleration is a natural benefit, as well as specific fuel consumption optimisation at any load.

The electronic control of fuel injection opens up a multitude of possibilities for the timing, length, and even the number of activations per stroke. A double-injection profile is specifically tailored for a significant reduction of NOx emissions, for example. General performance curves illustrated the improvements which have been achieved.

Summary

In summary, the advantages of the electronically-controlled engine are significant, and include lower specific fuel consumption and better performance parameters, thanks to variable electronically-controlled timing of fuel injection and exhaust valves at any load; appropriate fuel-injection pressure and rate shaping at any load; improved emission characteristics with lower NOx and smokeless operation; easy change of mode during operation; simplicity of mechanical system with well-proven traditional fuel-injection technology which is familiar to any crew; more precise timing of control system, giving better engine balance with equalised thermal load in and between cylinders; monitoring and diagnostics of engine for longer times between overhauls; lower RPM for manoeuvring; better acceleration, astern and crash-stop performance; upgradable with software development over the lifetime of the engine.

As a consequence of the above, many more features and operating modes are feasible with the fully-integrated control system, and these will be retro-fittable and eventually offered to owners of these electronically-controlled engines.

Phil Helmore

COMING EVENTS

NSW Section Technical Meetings

Technical meetings are generally combined with the Sydney Branch of the IMarEST and held on the second Tuesday of each month, starting at 5:30 pm for 6:00 pm and finishing by 8:00 pm.

The venue is Engineers Australia, which is moving from North Sydney to their new premises at 8 Thomas St, Chatswood on 22–29 May. The June and subsequent technical meetings will take place at the new venue.

The program of meetings for 2006 (with exceptions noted) is as follows:

13 Jun	Graeme Nelmes, Patrick Terminals, *The Robotic Container Terminal*
11 Jul	Bruce McRae, Murray Burns and Dovell, *High-performance Surfboard Fins*
8 Aug	John Willy, OOCL (Australia), *The Salvage of* Jodie F. Millennium *at Gisborne, NZ*
12 Sep	Peter Goodin Australian Marine Technologies, *From* Delos *to HMAS* Sirius*: A Serious Design Challenge*
10 Oct	Stuart Cannon, Defence Science and Technology Organisation, *Post-damage Ship Structural Strength*
7 Dec	SMIX Bash 2006

Queensland Section Technical Meetings

The next technical meeting of the Queensland Section will be held on Tuesday 6 June 2006 from 6:30 pm to 8:00 pm. The venue and subject of this technical meeting is yet to be determined.

Contract Management Training Program

The Fisher Maritime Consulting Group, headed by Dr Ken Fisher, is returning to Australia in 2006 with its well-known and widely-respected Contract Management for Ship Construction, Repair and Design training program. The program will be held over three days, 2–4 August 2006, in Melbourne. The outline of the program is as follows:

- Day 1 Project formation utilising principles of contract management
- Day 2 Negotiating, pricing and scheduling
- Day 3 Project control through application of principles and proven techniques

The cost for the three-day course is $2195 per registrant. There is a 10% team discount, applicable to the second and subsequent registrants from one organisation, and every fifth registrant from the same organisation attends free.

For groups of seven or more, the course can be presented on-site very effectively; possible dates are 8–10 August or 14–16 August. Contact Fisher Maritime at register@fishermaritime.com for further information about on-site presentation.

Full details of the course and the registration form are included in the brochure mailed with this issue of *The ANA*. Registration may be done by email to register@fishermaritime.com, by faxing the registration form to +1-973-660 1144, or mailing it to Fisher Maritime, 147 Columbia Turnpike #203, Florham Park, NJ 07932, USA.

Marine Safety 2006

The National Marine Safety Committee's (NMSC) conferences have established a reputation as the leading marine safety forum in Australia. The Marine Safety Conference 2006 will be held at the Gold Coast International Hotel, Surfers Paradise, from Tuesday 12 to Thursday 14 September 2006.

Call for Papers

As with previous conferences, the NMSC is seeking those who wish to take a lead on issues affecting Australia's marine activities and is inviting the submission of ideas and presentations for the conference. The committee welcomes original papers from professionals, voluntary groups and associations from across the industry.

Papers have been invited on the theme *Towards 2010* and will focus on these topics:

- Technological Developments in the Design of Boats and Ships
- Keeping the Recreational Boater Safe
- Radio Communications for Australia
- New Developments in Navigation and Safety Equipment
- Legislation for Marine Safety
- Research into Accidents and Incidents
- Meeting the Training Agenda for the Maritime Industry
- Improving Marine Safety Administration
- Growing the Maritime and Boating Sectors in Australia

- Exporting and the International Boating Market
- A National Approach to Survey
- Promotion of the Recreational Boating Industry
- The Role of Women in the Maritime Sector
- Resolving the Relationship between the Maritime Industry and the Environment
- Safety and the Fishing Industry
- Succession Planning for the Maritime Industry

Abstracts were due for submission in March. The schedule is now as follows:

Submission of final paper	30 June
Conference	12–14 September

For submission of papers contact Emma Farag on (02) 9247 2124 or email efarag@nmsc.gov.au.

Conference Program

The Marine Safety Conference 2006 brings together a wide range of representatives who work in and support Australia's vast maritime industry. The conference includes special segments on recreational boating and a shipping symposium covering large-ship issues.

Through a streamed approach to the conference, delegates will be able to choose to attend the forums which meet their needs. The conference will also provide valuable networking and social activities for participants and their partners.

Exhibitors and Sponsors

The Marine Safety Conference 2006 is an excellent opportunity to gain exposure to major decision makers within Australia's marine industry. NMSC can provide organisations with sponsorship packages and details of conference exhibition opportunities.

For further details contact Marlene Glenister on (02) 9247 2124 or email mglenister@nmsc.gov.au.

HIPER 06

The fifth International Conference on High Performance Marine Vehicles (HIPER) will be held between 8 and 10 November 2006 at the Australian Maritime College in Launceston. HIPER Conferences are held once every two years. The inaugural conference was held in South Africa in 1999; subsequent ones have been held in Hamburg in 2001, Bergen in 2002 and Rome in September 2004.

Dr Prasanta Sahoo is the Convenor of the fifth HIPER conference. Papers are invited on the design and operation of high-performance marine vehicles, such as hydrodynamic or structural analysis, or economical, ecological or safety aspects, etc. There will be two parallel sessions and proceedings will be published in hardcover book format.

Abstracts were due for submission at the end of March, accepted at the end of April, and papers due for submission for review at the end of May. The schedule is now as follows:

Acceptance of papers after review	30 June
Author registration	30 July
Submission of final paper	31 August
Conference	8–10 November 2006

Fees for the conference include attendance at all technical sessions, a copy of the proceedings, lunches, refreshments, conference dinner and barbecue, and are as follows:

Registration until 16 July 2006	$850
Registration after 16 July	$950
Student (including higher degree) discount	50%

For further information, check the conference website, www.amc.edu.au/hiper06, or contact the conference secretariat at hiper06.amc.edu.au, or Dr Sahoo on (03) 6335 4822 or email p.sahoo@mte.amc.edu.au.

GENERAL NEWS

Austal Wins Australian Defence Exporter of the Year Award

On 15 March Austal was named 2005 Australian Defence Exporter of the Year in the *Australian Defence Magazine*, Defence Industry Awards held in Canberra.

Recognising vision for export and growth, innovation in marketing, strength of defence relationships and a long-term strategy for continued growth and development, the award is a fitting tribute to export success with the US Navy, US Marines, Yemen Navy and the Kuwait Coast Guard.

On accepting the Award, Stephen Lupi, Austal Strategy and Business Development Manager said "As early as the mid 1990s Austal recognised that its world-leading technology in the design and construction of high-performance aluminium fast ferries could be beneficially applied to the global defence market.

"This Award is a tribute to Austal's highly skilled and dedicated workforce."

Austal's offering to the defence sector is unique; the application of proven and cost-effective commercial off-the-shelf technology combined with an unparalleled ability to customise designs for the end user.

Following the establishment of a US shipyard in 1999, the confirmation in October 2005 of the order to build one of two initial Littoral Combat Ships for the US Navy was not only a supremely proud moment for Austal but confirmed the publicly-listed Western Australian company as a world-class organisation, achieving what is probably unprecedented, an Australian company chosen as the vessel designer and builder for a US Navy fighting-ship programme. 100% of Austal's design for the LCS is carried out in the West Australian shipyard whilst the construction will be completed at Austal's Mobile, Alabama, USA, shipyard.

In addition to export deliveries, Austal has completed fleets of eight boats for the Australian Customs Service and nine boats for the New South Wales Water Police. With twelve new patrol boats for the Royal Australian Navy and six new Water Police boats currently under construction this totals a fleet of thirty-five Austal-built vessels servicing Australia's security needs.

Fifty Years of Defence Science in Sydney

On 28 April 2006 the Parliamentary Secretary to the Minister for Defence, Senator the Hon. Sandy Macdonald, congratulated the Defence Science and Technology Organisation (DSTO) on 50 years of Defence science in Sydney.

In 1956 the Royal Australian Navy established its first experimental laboratory at Rushcutters Bay in Sydney. This research facility was eventually moved to Pyrmont in 1984, under the auspices of DSTO.

"Australia has always taken a leading role in Defence science and DSTO Sydney has been behind a number of important defence technologies, including the Australian Minesweeping and Support Systems," Senator Macdonald said.

"DSTO Sydney has conducted world-leading scientific research to position the Royal Australian Navy as a highly-advanced modern navy.

"Today I have the pleasure of launching a history book, *Pyrmont People: 50 years of Defence Science in Sydney*, which tells the story of those fifty years of science by DSTO and the Royal Australian Navy in the Harbour City.

"DSTO Sydney has been instrumental in providing the Australian Navy and other navies with numerous technological advances over the years of its operation. I congratulate all the scientists and staff who have contributed to Defence science in Sydney over the past fifty years," Senator Macdonald said.

RAN Ship Communications Upgrades

It was announced in February that ADI Limited has been selected as the preferred tenderer for Phase 3 of Project SEA 1442. The $45 million project, approved by Government in May 2004, will modernise the Royal Australian Navy's on-board communication and information systems.

The Government has also approved the $55 million acquisition of further broadband satellite-communication terminals for the remaining five Anzac-class frigates and an additional guided missile frigate, being in addition to those currently being fitted under JP2008 Phase 3E.

The Australian Defence Force's ability to successfully conduct maritime operations is highly dependent on the exchange of operational information between ships, aircraft and land units.

Additional JP 2008 satellite terminals combined with the SEA 1442 integrated communications architecture will significantly increase the ability of the Navy to successfully collect, organise, store, process and distribute information.

Capabilities introduced by the projects will allow deployed ships to establish computer-based wide-area networks at sea via broadband satellite-communication bearers and other communication media, allowing Navy to rapidly move information around its ships, share tactical information, communicate with headquarters and allies, and is a response to the increased tempo of modern military operations.

The capability is an important contributor to the requirements set out in the Defence 2000 White Paper, by providing communication capabilities that can support Australian

operations throughout our territory and immediate region, and is a significant step towards network-centric warfare.

These projects will also improve quality of life provisions for sailors serving on board ships by enabling them to have increased contact with their families and loved ones through improved email and internet access capabilities.

Selection of ADI as the preferred tenderer will allow the ADF to leverage off ADI's co-parent Thales' significant knowledge and experience in the latest European and US communication-systems development, particularly with a similar system being implemented for the French Navy.

The additional SATCOM terminals will be negotiated with BAE Systems Australia Ltd under an extension to the existing JP2008 Phase 3E contract. The contracts will also provide opportunities for a number of Australian small to medium enterprises in the development and support of the systems.

HMAS *Westralia* Home from Final Deployment

The Royal Australian Navy's underway replenishment ship, HMAS *Westralia*, arrived at Fleet Base West for the last time on 6 April when the ship returned after her final 74-day deployment to New Zealand and the eastern and southern States of Australia.

HMAS *Westralia* took part in Exercises Ocean Protector and Tasmanex in January before making goodwill visits to Auckland and Wellington. *Westralia* also visited Melbourne, Hobart, Adelaide and Albany before returning home to Fleet Base West.

HMAS *Westralia* is due to decommission in September this year after 17 years of service since commissioning into the Royal Australian Navy on 9 October 1989.

The Commanding Officer of HMAS *Westralia*, Commander Tim Crawford, RAN, and the ship's company were welcomed to their homeport for the last time by the Senior Naval Officer West Australia, Commodore Richard Shalders, CSC, RAN.

"HMAS *Westralia* has provided outstanding service over the last 17 years, extending the operational capabilities of both Australian and allied warships and aircraft. Her role will be continued by the underway replenishment ship HMAS *Sirius*, to be commissioned later this year," said Commodore Shalders.

"The ship's company is very happy to arrive home to Fleet Base West today. It's been a busy few months, and we're all looking forward to some well-earned leave before preparing for the formal decommissioning of *Westralia* and commissioning of *Sirius* later in the year," said Commander Crawford.

HMAS *Westralia* has steamed 458 254 n miles since commissioning in the RAN, and has conducted 1270 underway replenishment transfers involving some 300 000 t of diesel fuel. *Westralia* conducted her final replenishment at sea with the frigate HMAS *Warramunga* in Bass Strait on 24 March.

She is the second RAN warship to bear the name *Westralia* after the State of Western Australia. The first HMAS *Westralia* was a passenger liner requisitioned for naval service during WWII. The current HMAS *Westralia* was leased in 1989 from the Royal Navy and purchased outright in 1994, when a flight deck was added to accommodate helicopter operations. *Westralia* saw active service in the first Gulf War as part of a multi-national naval force conducting operations in support of Kuwait. She has also participated in operations in the Southern Ocean and deployed throughout South East Asia.

HMAS *Westralia* in Sydney in January 2006
(Photo John Jeremy)

LHD RFT Released

On 2 May the Minister for Defence announced that Requests for Tender for the $2 billion large amphibious ships project had been released. The two ships, to be named HMAS *Canberra* and *Adelaide*, are scheduled to enter service with the Royal Australian Navy from 2012.

This is a major milestone in the process that will lead to final project approval and shipbuilder and design selection early next year. It comes after an intensive design development effort by Defence and the two competing designers, in which the designs have been adapted to meet specific Australian legislative and regulatory requirements.

Two Australian companies — ADI and Tenix — will team with the designers to compete for the contract to supply the ships. ADI will team with the French designer Armaris, and Tenix with the Spanish designer Navantia.

The Tenix-Navantia team will propose a variation of the Navantia 27 000 t design, while ADI-Armaris will propose a variation of the Armaris 22 000 t Mistral class.

Both prospective designs offer a quantum leap over our current capability and satisfy Government's strategic guidance. Selection of the preferred consortium to construct the ships will be determined on value for money grounds.

The tender documentation will allow bidding companies to:

- submit fixed price bids;
- bid through life support solutions; and
- provide innovative solutions to improve price and schedule.

Australian industry stands to benefit considerably from this project of national significance.

Each ship will have the ability to transport up to 1000 personnel, have six helicopter landing spots and a provision for a mix of troop-lift and armed-reconnaissance helicopters.

It will also be able to transport up to 150 vehicles including the new M1A1 Abrams tank and other elements of the hardened and networked Army.

Each ship will also be equipped with medical facilities, including two operating theatres and a hospital ward.

The project will allow the Australian Defence Force to perform a range of tasks, including regional disaster relief, delivering humanitarian aid, support for peace operations, and assistance to policing or military operations.

New Centre of Expertise to Boost South Australia's Defence Industry

Parliamentary Secretary to the Minister for Defence, Senator the Hon. Sandy Macdonald announced on 22 March the launch of a new Centre of Expertise in Systems Integration (CoESI) which will boost South Australia's ability to support complex defence projects such as the Air Warfare Destroyer.

The Defence Science and Technology Organisation (DSTO) and the University of South Australia have signed a three year agreement to establish the centre and boost Defence's Systems Integration capability.

"This new Centre will benefit complex defence projects such as the air-warfare destroyer which will be built in South Australia, requiring deep technical expertise as well as sound systems engineering and systems architecting practices," Senator Macdonald said.

"The Centre of Expertise is a long-term strategic engagement to build capability in systems-integration skills in Australian defence and industry sectors," he said.

DSTO's Deputy Chief Defence Scientist Dr Nanda Nandagopal signed the agreement in Adelaide on behalf of DSTO, while the University of South Australia's Professor Robin King, Pro-Vice Chancellor, Division of Information Technology, Engineering and the Environment, signed for the University.

"This is a move to ensure that a lack of systems-integration skillbase in industry and Government does not compromise major and complex defence-acquisition projects such as the air-warfare destroyer," Dr Nandagopal said.

"DSTO is tackling this issue head-on by drawing on expertise within DSTO including the deployment of its system-integration laboratories, industry and the universities to build a national capability in the integration of complex systems."

The Centre will provide a research and education framework to address key systems-integration issues, especially for large complex defence acquisition projects.

"The University of South Australia has developed a world-class reputation in systems engineering and systems architecting, the two key disciplines that will be brought to bear in addressing the systems-integration problem," Professor King said.

He said that the Centre would bring together DSTO's modelling and simulation infrastructure, extensive domain expertise and the University's strong research profile in systems engineering to create an important national capability.

New Australian Minesweeping System

On 28 April the Parliamentary Secretary to the Minister for Defence, Senator the Hon. Sandy Macdonald, unveiled a new class of highly-advanced sea-minesweeping technology being developed by Australia's Defence Science and Technology Organisation (DSTO).

During a visit to DSTO Sydney, Senator Macdonald witnessed a demonstration of the new technology.

The new system is based around high-temperature superconducting-magnet technology and represents a leap forward in magnetic minesweeping. Australia is believed to be the only country in the world currently investigating the application of high-temperature superconductors to sea-mine warfare.

"The superconducting magnet, developed by DSTO, is another world-leading advance in minesweeping technology which will maintain Australia's reputation as a leader in mine warfare," Senator Macdonald said.

"Australia is already a leading exporter of minesweeping equipment. This new technology is designed to complement current systems, but has the added benefit of being smaller, lighter and more portable.

"This makes it a flexible device which can be transported by air, allowing the Australian Defence Force to deploy the system to any area of operation and tow it from almost any available vessel.

"This development will also ultimately mean more jobs and increased exports for Australia," Senator Macdonald said.

The initial Australian Minesweeping and Support System was first conceived by DSTO in Sydney more than two decades ago. Today's demonstration highlights the latest advancements in minesweeping technologies.

Austal Signs Strategic Alliance with DSTO

On 14 March Austal and Defence Science and Technology Organisation (DSTO) signed a five-year Industry Alliance that will strengthen Australia's maritime defences.

The purpose of this Alliance is to formalise and strengthen links between DSTO's maritime research and development activities and Austal's expertise in high-speed vessel design, construction and systems integration.

Austal Executive Chairman, John Rothwell said: "In recent years Austal has expanded from a shipbuilder of high-quality fast ferries for the commercial market to a supplier of patrol boats, high-speed support vessels and combat ships for use by Defence and Government agencies such as the Australian Customs Service, the Royal Australian Navy and the US Navy."

"Austal will be able to build on current expertise by accessing the latest DSTO research and development in areas such as operational analysis, signature management and systems integration."

Dr Nanda Nandagopal, DSTO's Deputy Chief Defence Scientist (Systems), said that through this alliance DSTO will gain a greater understanding of the long-term performance and cost of ownership of high-speed aluminium vessels, which will also assist it to provide whole-of-life support for the Royal Australian Navy's Armidale-class patrol boats, and strengthen our maritime defences.

"The scientists and engineers in both organisations will benefit from the opportunity to have exposure to leading-edge science and enabling technologies and advanced manufacturing technologies," he said.

Austal is currently building Australia's new patrol boat fleet, known as the Armidale Class. This innovative 56 m, all-aluminium vessel is providing increased operational capability and improvement in onboard comfort, with reduced maintenance and through-life cost compared to previous ship construction technology available to the Royal Australian Navy.

Through its US shipyard Austal is currently involved in the construction of a 127 m aluminium trimaran for the United States Navy known as the Littoral Combat Ship (LCS) — to be named USS *Independence*. Capable of providing high speeds, multi-mission capability and superior aviation operations, Austal is the designer and builder of the LCS seaframe as part of the General Dynamics/Bath Iron Works Team offering the unique trimaran solution. The design and construction of the LCS is the culmination of 17 years of continuous development of high-speed aluminium technology by Austal.

Due for delivery in late 2007, the trimaran has a flight deck larger than any other surface combatant which will support near-simultaneous operation of two large MH-60R/S helicopters or multiple unmanned vehicles. The Austal-designed LCS will also provide one of the largest usable payload volumes of any US Navy surface combatant and deliver greater payload per displacement tonne than any ship of comparable displacement.

Floating Dock for Western Australia

The Western Australian State Government called for expressions of interest in January for the construction of a $35 million floating dock at the Australian Marine Complex (AMC) in Henderson.

The AMC is an integrated industrial estate servicing the defence, marine, mining and petroleum sectors.

Minister Assisting in Planning and Infrastructure, Francis Logan, who has ministerial responsibility for the AMC, said that the floating dock would give Western Australia a fantastic opportunity to bid for a wide range of marine maintenance and construction jobs.

It would also add to the capacity of the rapidly-developing complex. Mr Logan said part of the AMC expansion would include the $23 million submarine-maintenance facility being established by ASC Pty Ltd.

"That facility will provide maintenance and repair facilities for the Royal Australian Navy's Collins-class submarines under a 25-year contract," he said.

The Minister said the AMC was gaining an international reputation as Australia's leading industrial facility for marine-related industries.

The expansion of its facilities would generate many jobs and economic benefits for the state. It would also expand WA's already high skill-base in the marine and defence-related sectors.

"The expression of interest is for the first 99 m section of the dock, which will eventually be nearly 200 m," Mr Logan said.

"The initial section will be capable of dealing with surface vessel docking, the launch and retrieval of large commercial vessels, and docking and transfer for Collins-class submarines.

"While the State Government is committed to buying locally, construction of floating docks is a specialised field and the call for expressions of interest is being made in WA, around Australia and internationally."

Mr Logan said the construction of a floating dock and the extension of the eastern wharf were part of the first stage of a $90 million upgrade project. Five contractors had been short-listed for the wharf extension and the successful tenderer would be announced by the middle of the year.

"The extension of the eastern wharf will see the berthing capacity at the AMC increased from two to four world-class berths to attract both commercial and RAN operations," the Minister said.

An impression of the AMC Common User Facility in Western Australia
(WA Department of Industry and Resources image)

New Patrol Boats Named at Austal

Four more Armidale-class patrol boats under construction in Western Australia by Austal for the RAN have been named in recent ceremonies.

On 18 February 2006 *Albany* and *Pirie* were named in a ceremony at Henderson. *Albany* was named by Mrs Annette Knight AM JP CITWA, former Mayor of the Town of Albany and Pirie was named by Mrs Margaret Humphry, daughter of Lt J. Ellershaw, gunnery officer of the first HMAS *Pirie*, a Bathurst-class minesweeper of World War II. *Albany* will be the first of the name in the RAN.

The sixth and seventh Armidale-class patrol boats were both named at a ceremony at Henderson on 6 May 2006. *Maitland* was named by Mrs Jacqueline Rice and *Ararat* was named by Mrs Jennifer O'Malley.

Maitland will also be the first ship of that name to serve in the RAN, but the first HMAS *Ararat* was another Bathurst-class minesweeper which served in the RAN during World War II.

Foam everywhere as the new Armidale-class patrol boat *Maitland* is named at a ceremony at Henderson in Western Australia on 6 May 2006
(Photo courtesy Austal Ships)

The Armidale-class patrol boat *Ararat* alongside *Maitland* after the naming ceremony on 6 May
(Photo courtesy Austal Ships)

European Warship Builders Pool Strengths

Five major European naval shipbuilders announced in Paris on 24 April that they have formed a club to promote synergies in materials procurement as part of broader efforts to reduce costs.

The companies — BAE Systems, DCN, Fincantieri, Navantia and VT Shipbuilding Limited — recently signed an agreement setting up the Warship European Procurement (WEP) Club.

By cooperating with suppliers, establishing common technical specifications and coordinating purchasing, the club will pave the way for future European quality standards in naval shipbuilding and enhance value-for-money for its customers.

New South Wales Industry News

Kamira Holdings 15 m Patrol Boats

Three patrol boats to a design by Kamira Holdings are currently being constructed by NGV Tech at their Sijangkang yard (just south of Port Klang) in Malaysia for a Bahrain company as part of a package of 14 vessels. They will eventually be on long-term charter in Saudi Arabia. The vessels are designed to provide 24-hour security and high-speed interception in and around offshore rigs and shore-based installations in Saudi Arabia, but are only operated as day boats with no long-term accommodation.

Principal particulars of the vessels are as follows:

Length OA (hull)	15.01 m
Length WL	13.40 m
Beam	4.00 m
Draught	0.85 m
Displacement	19.3 tonnes loaded
Engines	2 × Caterpillar C18 each 747 kW
Gearboxes	2 × ZF 550 with 1.262:1 RR
Water Jets	2 × Doen DJ170 Mk2
Genset	1 × 20 kVA
Fuel	3600 L
Water	200 L
Speed	43 kn at full load
Class	Bureau Veritas

The owner's specification turned out to be extremely demanding:

- Operation in 50°C ambient air and 43°C water temperature
- Minimum 40 kn at full load
- 30 kn cruise in 1 m waves
- Range of 4 h at 40 kn or 10 h at 30 kn, with 1 h reserve
- Must be self-righting
- Additional fire fighting and rescue capability
- Dimensional and severe fiscal constraints

The structure is substantial to meet the speed/wave height requirement and most of it is good for about 3.5*g* acceleration. The need for passive roll-over capability plays havoc with the layout and weights in such a small boat, especially when there is so much machinery aft.

The Caterpillar engines were chosen by default, being the narrowest engine in this power bracket. The engine power needed to achieve the 40 kn condition is only 611 kW per side, so they will be blocked to that power to try and increase life because, apparently, the crew cannot be trained not to exceed a certain vessel speed or rpm setting.

Apart from having enough air conditioning capacity to chill beef, the need to limit the engine rating in the ambient conditions requires large-capacity fans (total inlet flowrate of 6.5 m^3/s, outlet 4.5 m^3/s — thank heavens for two-pole motors!) The C18 Caterpillar engines are peculiar in that they radiate the same quantity of heat as a small celestial body. All you have to do is keep the water out of this over-sized ventilation system to meet the self-righting condition and you're away.

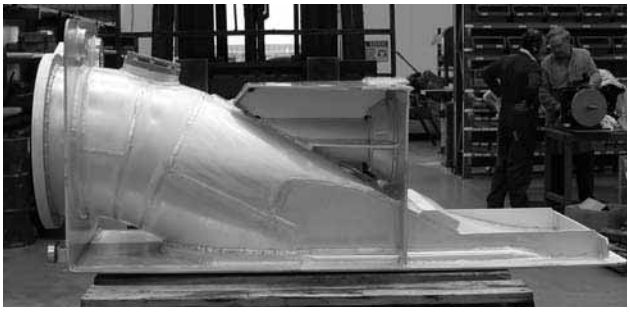
Armament is two machine guns, mounted above the wheelhouse for clear firing, using the air intakes as platforms. The firing position is far enough aft to make the guns usable, unlike many other small patrol craft which have guns positioned forward of the wheelhouse. These are normally the designs which use the "rule minimum" design acceleration and can go twice as fast with half the power but, otherwise, spend most of their life tied up at the jetty being re-welded.

The waterjets chosen for this application are a new version of the Doen DJ170, manufactured locally by Doen Jets in Melbourne. This is an axial-flow jet with a 432 mm diameter impeller. Unlike the earlier version which used a part-cast part-fabricated intake, the complete intake duct was fabricated by Doen and welded in as a complete unit. This is the same arrangement as used in Doen's 200 series jets (impellers larger than 20 inches), except that the 200 series have a full stainless steel pump assembly, whereas the DJ170 retains the aluminium pump assembly with stainless steel liner in the impeller casing. The DJ170 also uses the same "inboard hydraulics" system as the 200 series. The first DJ170 Mk2 units have been sold into the US market.

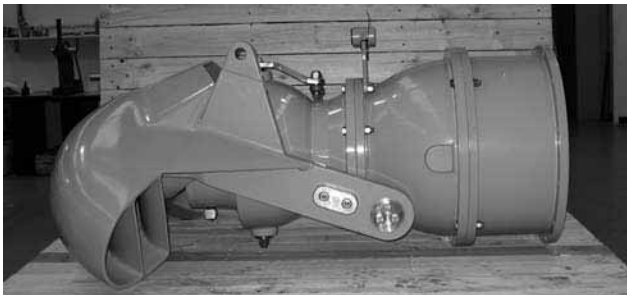
Although the efficiency of an axial-flow jet tends to level out at speeds over 35 kn, their overall efficiency makes them the preferred option. Mixed-flow jets, being more expensive to manufacture, tend to be specified with minimal margin to keep the jet size as small as possible. Apart from deteriorating efficiency below 25 kn, mixed-flow jets are sensitive to vessel weight changes and resistance hump conditions. Most small patrol boats need a moderate cruise speed capability and may operate at a speed where hump drag is high. Also, weight growth (or miscalculation) is a constant problem for small craft. This is why the axial-flow jets have, and will, dominate the small-craft sector, where efficiency over a wide operating range is required.

And, yes, they were all manually lofted and cut from hand-drawn drawings. The lofting, fairing (no computer fairing here!), marking and cutting for the hulls of all three boats was completed in six days. Handover of the three vessels is due in October.

Greg Cox



Doen DJ170 Waterjet Intake for Kamira's Patrol Vessels
(Photo courtesy Doen Waterjets)



Doen DJ170 Pump Assembly for Kamira's Patrol Vessels
(Photo courtesy Doen Waterjets)

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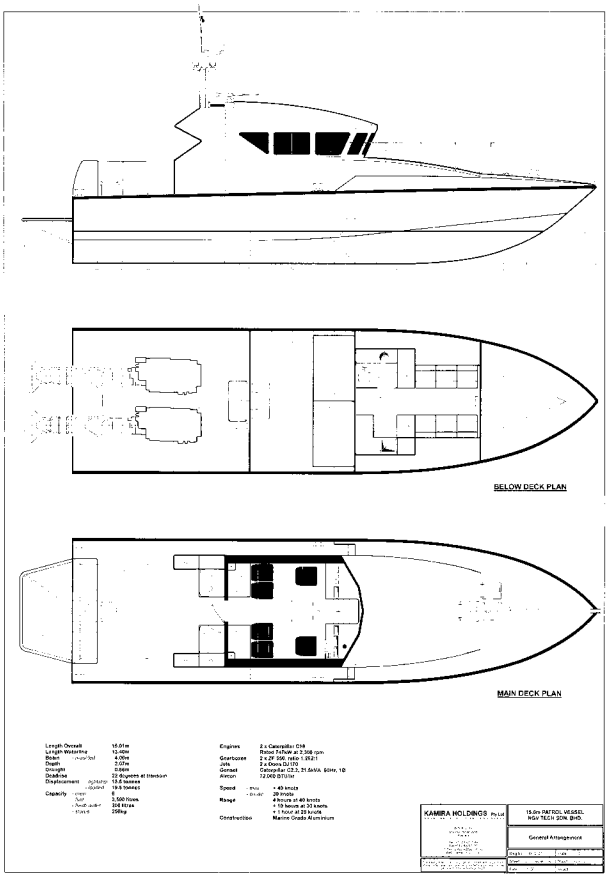


General Arrangement of 15 m Patrol Vessels by Kamira Holdings
(Drawing courtesy Greg Cox)

Peter Lowe Design

The start of 2006 has seen the office of Peter Lowe Design just as busy as it was for the same period of 2005.

The Evolution 110 ft (33.5 m) motor yacht as featured in previous issues of *The ANA* was launched in May 2005. Sea trials ran successfully and saw the yacht meeting all performance expectations, a true testament to the dedication to perfection that is inherent in all of the hulls and general engineering that comes from the Peter Lowe Design office. The construction and finish of the yacht is a credit to the Evolution Motor Yachts team, especially as this is the first yacht to emerge from their yard in Western Australia. The yacht was immediately shipped to Europe for the Monaco boat show where it was met with great interest and show-cased to the world's yachting community what Australia has to offer in the way of luxury-yacht design and construction.

The Evolution 80 ft (24.4 m) vessel which also featured in previous issues of *The ANA* has just been launched and is currently undergoing sea trials. Running on a Peter Lowe Design hull with full engineering, this yacht is certain to turn heads and there has been much anticipation of its launch following the publicity surrounding the previously launched Evolution 110. Sam Sorgiovanni Designs in Western Australia carried out the styling and interior design for both vessels.

The office is now well into the design of its largest yacht to date, also to be built by Evolution Motor Yachts. Having grown slightly in length from the original 50 m to 52 m, the steel is now at nesting and cutting stage with the keel to be laid imminently. The yacht will have a steel displacement hull with an aluminium superstructure and was styled by Jonathon Quinn Barnett in Seattle. The vessel will also feature many exciting and challenging engineering aspects which have become more common in yachts of this calibre.

The 125 ft (38.1 m) motor yacht currently being built in Dubai for a Queensland owner is rapidly approaching launch day and will be a great-looking addition to the Australian boating landscape. With full engineering by Peter Lowe Design, this motor yacht features a semi-displacement hull, with construction in GRP to ABS classification.

On the sailing front, the office has been approached by a client to design a 36 ft (11.0 m) cruising/racing yacht with consideration of a production run to be built in China. We have based the new boat on our 31 ft (9.45 m) design which has proved to be a great little performer on Sydney Harbour. The owner reports her to be "very well balanced and comfortable, with no vices — even when pressed".

Principal particulars of the vessel are as follows:

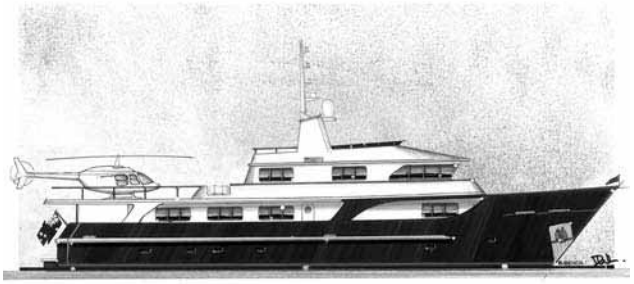
Length OA	11.16 m
Length WL	9.80 m
Beam	3.46 m
Draft	2.30 m
Displacement	4.20 t

Currently under consideration for an Australian client is a proposal for a 35 m expedition-style motor yacht. This particular client is looking for a luxuriously-appointed vessel, suitable for long-range cruising with a hull designed to withstand the most rigorous of seas and allowing the owner and guests to cruise to the more isolated areas which the globe has to offer.

Principal particulars of the vessel are as follows:

Length WL	35.0 m
Beam	8.50 m
Draft	2.50 m

Brian Bench



35 m Expedition-style Motor yacht
(Image courtesy Peter Lowe Design)

Incat-Crowther

Florida-based operator Key West Express LLC has just taken delivery of its third Incat-Crowther catamaran ferry for operation along the west coast of Florida between Fort Myers and Key West.

The vessel is a 52 m high-speed catamaran ferry capable of carrying 513 passengers at a speed of 41.5 knots. The main cabin contains seating for 268 passengers in a mix of lounge, bar and row seating. Catering facilities are a feature of the vessel, which has a journey time of approximately 3.5 hours. A centrally-located bar provides full cocktail drinks service with counterside seating for nine. A kiosk, providing pre-

packaged food, snacks and gifts is located aft amongst casual lounge and kiosk seating. The mid-deck cabin has seating for 147 passengers primarily seated in rows. There is a small feature lounge at the rear of the cabin offering passengers a more relaxed atmosphere. An outdoor seating area for 56 passengers is fitted aft of the mid-deck cabin and protected from the elements by enclosed sides. For the thrill seekers there is seating on the upper deck for 54 who will be able to experience the true force of this vessel when under way at full speed.

The vessel is powered by four MTU 16V4000 M71s, each producing 2465 kW and coupled to Hamilton HM811 waterjets.

The vessel was built by Louisiana-based shipbuilder Gulf Craft Inc. This is the second high-speed vessel which has been built to an Incat-Crowther design in the past two years, and has helped to establish a strong bond between the two organisations. Gulf Craft Managing Director, Kevin Tibbs, said "with the help of the value-adding service of Incat-Crowther, this is one of the finest vessels we have had the privilege of building". Gulf Craft are also in the final stages of completing a third Incat-Crowther catamaran being built for service in Honduras. This vessel is expected to be launched during the northern summer.

Key West Express specialise in providing a high-speed ferry service between the ports of Fort Myers and Marco Island to Key West on the southern tip of the Florida Keys. The 120 n mile route is arguably the longest and roughest passenger-only trip in the USA. The Incat- Crowther design was specifically developed with a combination of higher-than-normal freeboard and an interceptor-based MDI ride-control system to provide a very comfortable ride over the three-and-a- half hour journey. The design was also optimised around the MTU 16V4000 M71s to provide a very fuel-efficient vessel. Co-owner of the vessel, Joe Miller, believes that "the new vessel will save us over 2000 gallons (7570 L) of fuel per day when compared with our existing two-vessel operation".

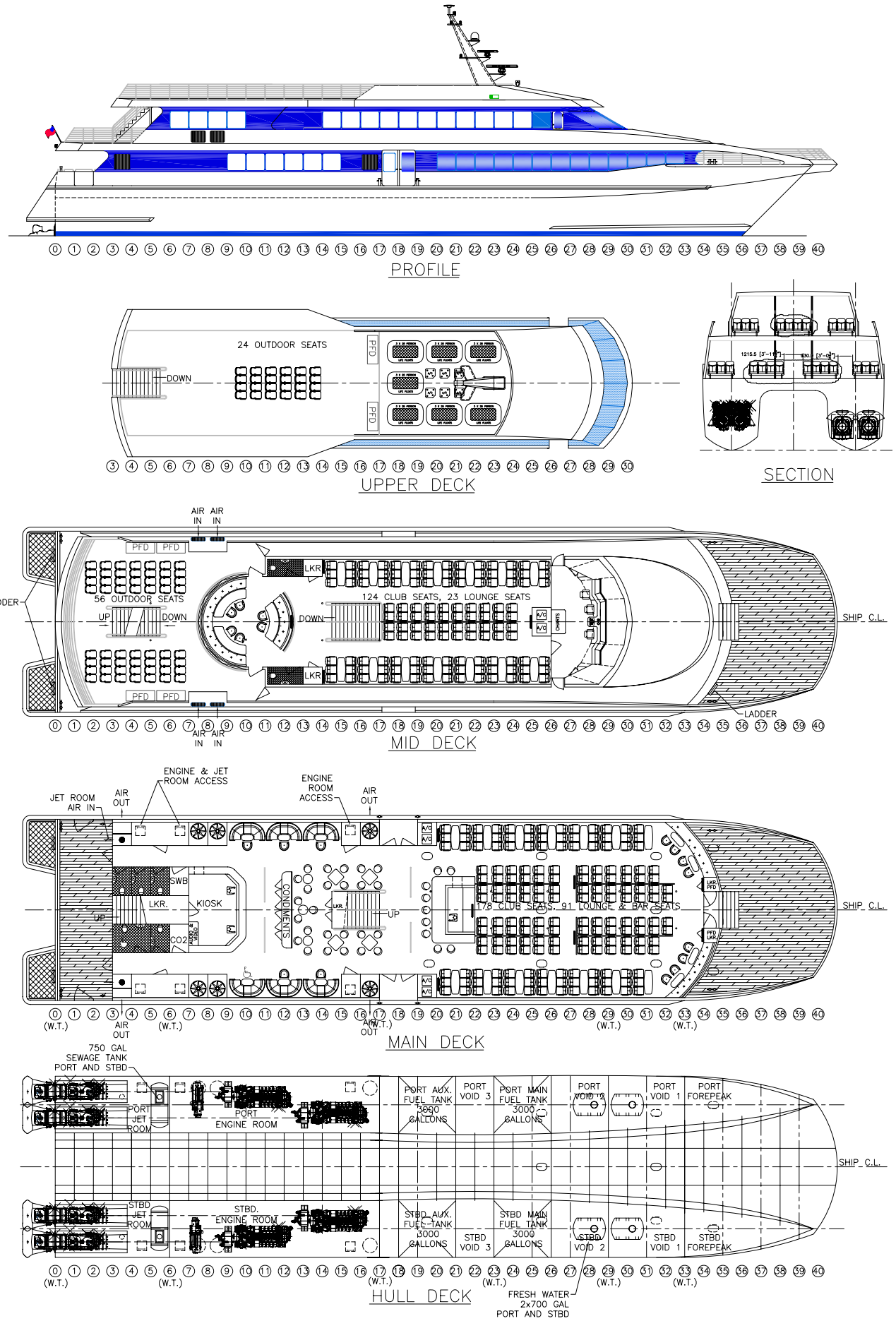
Key West Express represents the 226th high-speed catamaran designed by Incat-Crowther and the 20th design in the 40–60 m range.

Principal particulars of the vessel are as follows:

Length OA	52.27 m
Length WL	44.12 m
Beam	11.58 m
Draft hull	1.60 m
Fuel capacity	49 210 L
Fresh water capacity	10 500 L
Passenger capacity	513
Deadweight	67.4 t
Speed	41.5 kn
Main engines	4 × MTU 16V4000 M71 each 2465 kW
Propulsion	Hamilton HM811 waterjets
Survey	USCG Sub Chapter K 'Limited Coastal'
Construction	Marine Grade Aluminium

Main cabin seating on *Key West Express*
(Photo courtesy Incat-Crowther Design)

Key West Express shows her paces on trials
(Photo courtesy Incat-Crowther Design)



General Arrangement of 52 m Catamaran *Key West Express*
(Drawing courtesy Incat-Crowther Design)

Lounge area aft of main cabin on *Key West Express*
(Photo courtesy Incat-Crowther Design)

Incat Crowther has delivered its largest kit boat to date with the launching of the third Incat-Crowther catamaran ferry for Thai operator, Lomprayah High Speed Ferries Co.

The vessel was built by Sea Crest 1993 in Samutprakam, Thailand, from a fully-developed and pre-cut aluminium package from Incat-Crowther. The plate and extrusion, purchased from One Steel in Western Australia, was packaged for delivery to Thailand. Incat-Crowther's Managing Director, Brett Crowther, said "the aluminium package and design provided by Incat-Crowther allows us to reduce first-time high-speed aluminium ferry builder's exposure to many of the issues that are faced by other yards at a similar stage".

Maenam is a 25 m high-speed catamaran ferry capable of carrying 255 passengers at a speed of 29 kn. The main cabin contains seating for 176 passengers in rows on reclining aircraft-style seating. Television monitors are provided for safety and entertainment while a bar, located aft, provides drinks, food, snacks and gifts. The upper-deck cabin has seating for 49 passengers seated in rows. An outdoor seating area for 30 passengers is fitted aft of the upper deck cabin.

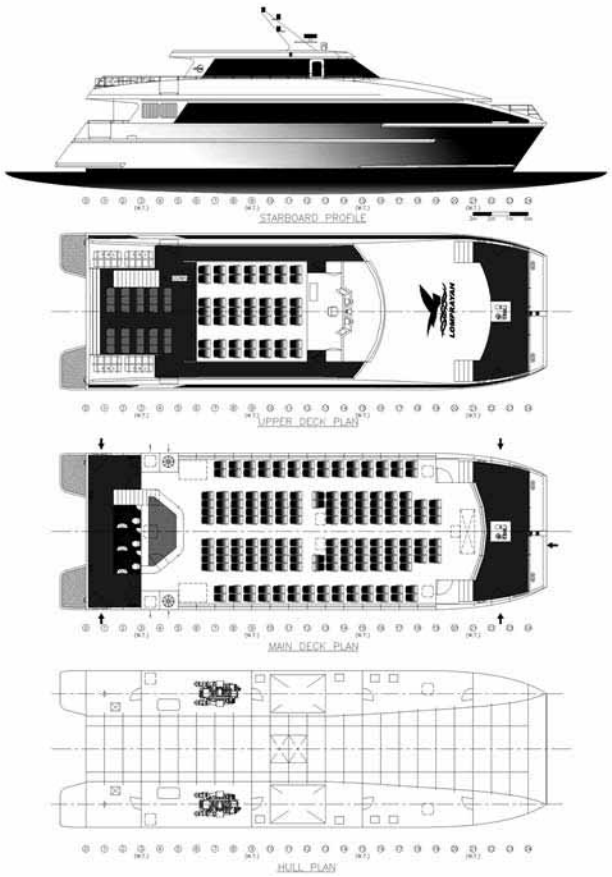
The vessel is powered by two MTU 12V2000 M70s each producing 787 kW, coupled to ZF gearboxes and 5-bladed propellers.

Lomprayah Fast Ferries Co. provides service to the east-coast islands of Koh Tao, Koh Phangon and Koh Samui from the mainland city of Chumporn. They also provide luxury-coach transit from the major centres of Bangkok and Huahin to the vessels. In addition to *Maenam*, they operate *Pralarn* (20 m catamaran built in 2002) and *Namuang* (25 m catamaran built in 2004).

Maenam represents the 232nd high-speed catamaran designed by Incat-Crowther and the 85th design in the 20—25 m length range.

Principal particulars of the vessel are as follows:

Length OA	25.00 m
Length WL	23.00 m
Beam OA	8.50 m
Draft (approx)	1.30m
Passengers	
Main Deck internal	176
Upper Deck internal	49
Upper Deck external	30
Capacities	
Fuel	2 × 3000 L
Fresh water	2 × 1000 L
Deadweight	33.43 tonnes
Engines	2 × MTU 12V2000 M70 each 787 kW @ 2100 RPM
Gearboxes	2 × ZF 2150 RR 2.5:1
Propellers	2 × 5-bladed
Speed	29 kn
Survey	Thai Government
Construction	Marine-grade aluminium



General Arrangement of 25 m Catamaran *Maenam*
(Drawing courtesy Incat-Crowther Design)

Seating in main cabin on *Maenam*
(Photo courtesy Incat-Crowther Design)

Maenam starboard hull and wet deck under construction
(Photo courtesy Incat-Crowther Design)

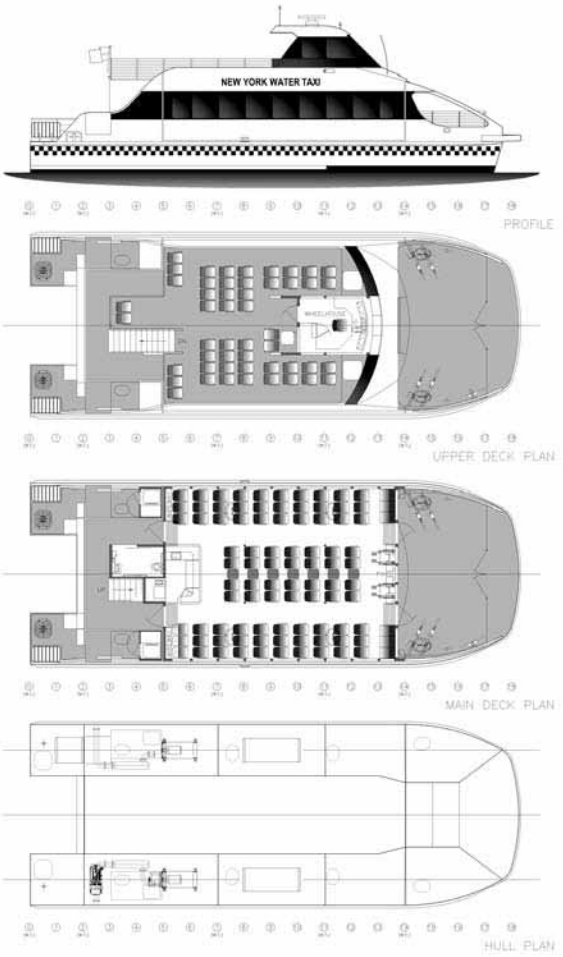
Maenam at launching
(Photo courtesy Incat-Crowther Design)

Gladding Hearn and Incat-Crowther are teaming together to provide another vessel for New York Water Taxi. Following the successful introduction of *Seymour B. Durst* and *Sam Holmes*, NYWT has ordered a third vessel due for delivery in this northern summer. The vessel will be absorbed into the current fleet of eight vessels running commuter and tour services around Manhattan and surrounding areas.

The 22 m vessel will be certified to carry 149 passengers with 99 passengers in the main deck cabin and the remainder on the open upper deck. Like the previous vessels, this one will have the same low-wake hulls and hospital-grade mufflers that are an element of NYWT's commitment to minimize the impact of its operation on the marine environment. The vessels are also accessible to people with disabilities and will include Gladding Hearn's Winterisation Pack which features hull strengthening for operation in slush ice, deck heating and enhanced cabin insulation. The vessel will be fitted with a pair of Cummins QSK19-M main engines, each producing 597 kW at 2100 rpm and giving the vessel a service speed of 26 kn at full load.

Principal particulars of the vessel are as follows:

Principal Dimensions	
Length OA	22.00 m
Length WL	20.79 m
Beam OA	8.10 m
Draft (approx.)	1.67 m
Passengers	
Main Deck internal	99
Upper Deck external	50
Capacities	
Fuel	1000 US gal (3785 L)
Fresh water	300 US gal (1136 L)
Deadweight	16.12 t
Engines	2 × Cummins QSK 19-M each 597 kW @ 2100rpm
Gearboxes	2 × Twin Disc MGX-5145
Propellers	2 × 5-bladed Bruntons
Speed	26 kn
Survey	USCG Sub Chapter T
Construction	Marine-grade aluminium



General Arrangement of Catamaran for New York Water Taxi
(Drawing courtesy Incat-Crowther Design)

Seymour B. Durst in operation
(Photo courtesy Incat-Crowther Design)

Currently there are nine vessels under construction to designs by Incat-Crowther Design. The yards building these vessels are in Australia, North America, and Asia. Previous Incat-Crowther vessels are detailed on the website www.incatcrowther.com.

Ben Hercus

AMD Marine Consulting

AMD has designed a 52 m high-speed wave-piercing catamaran ferry for the Persian Gulf operation of Kuwait and Gulf Link Transport Co. The vessel will carry 300 passengers and 10 vehicles at a speed of 34 kn. A contract has recently been signed for the vessel to be built by Damen Shipyards at their Singapore yard.

AMD has also recently signed a contract for the design of two 52 m fast patrol and rescue vessels, to be called the Nimr class, for the Coast Guard of Royal Oman Police.

Principal particulars of the vessels are as follows:

Length OA	52.0 m
Beam OA	15.7 m
Draft (foil retracted)	2.0 m (approx.)
Operational Crew	22
Special Operations Crew	4
Passenger Seats	100

The vessels are powered by four 4 MTU 16V4000 engines, providing a loaded speed of 40 knots and a range of 800 n miles at that speed, or 1000 n miles at half power (25 knots). They are fitted with a retractable T-foil ride-control system, providing exceptional seakeeping ability. The passenger cabin is fitted with 100 seats for survivors or personnel transport. Sprint boats are provided on deck, along with rescue rafts, rescue slides, and a heli-basket. The vessel is fitted with a fully-equipped medical centre with three beds. The fire-fighting capability includes three fire monitors and a self-protection spray system. There is a helicopter landing deck with electrical power and refuelling system, and a special-operations centre behind the wheelhouse, with integrated navigation controls.

AMD has also recently signed a contract for the design of three 52 m wave-piercing catamaran ferries, to be called the Kharif class, for the Sultanate of Oman.

Principal particulars of the vessels are as follows:

Length OA	52.0 m
Beam OA	15.7 m
Draft (foil retracted)	2.0 m (approx.)
Operational Crew	10 with sleeping cabins on board
Passengers	94 Economy 12 First Class
Vehicles	22 cars, or 12 cars and three trucks

The vessels are powered by four MTU 16V4000 engines providing a loaded speed of 40 kn. The vessels have the capacity for 30 t of cargo drinking water and are fitted with emergency facilities including a small hospital, fire monitor, and helicopter landing deck.

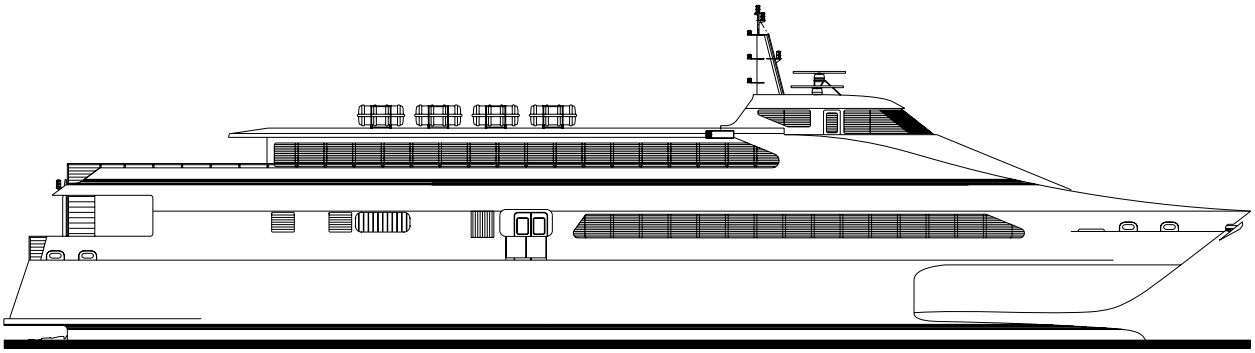
The vessels are designed to operate all year round to islands in the south of Oman, and consequently have to operate through the Khareef (Southern Oman monsoon) season. Seakeeping is therefore of prime importance, and the vessels' wave-piercing hullform reduces pitching, with the centre bow providing seaworthiness in waves that is not possible on a conventional catamaran. These "natural" seakeeping features are augmented by a Rodrequez-designed computer-controlled T-foil and interceptor ride-control system. The vessel is required to operate into shallow ports, so the T-foil is retractable.

The Omanis make very good use of their resources, so both the patrol vessels and the ferries are multipurpose. The ferries will be operating to islands in a remote region, and hence become the government presence in the area, and are designed to assist in emergencies by being fitted with fire monitor, hospital and heli-deck.

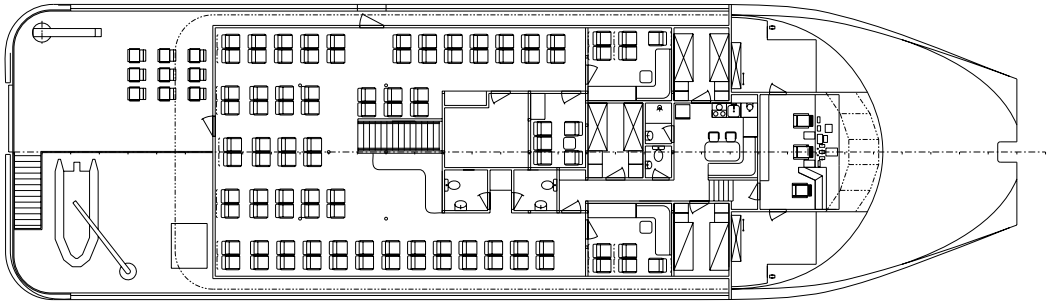
The two patrol vessels and the three ferries for Oman will be built by Rodriquez Cantieri Navali at their Messina yard in Italy.

Allan Soars

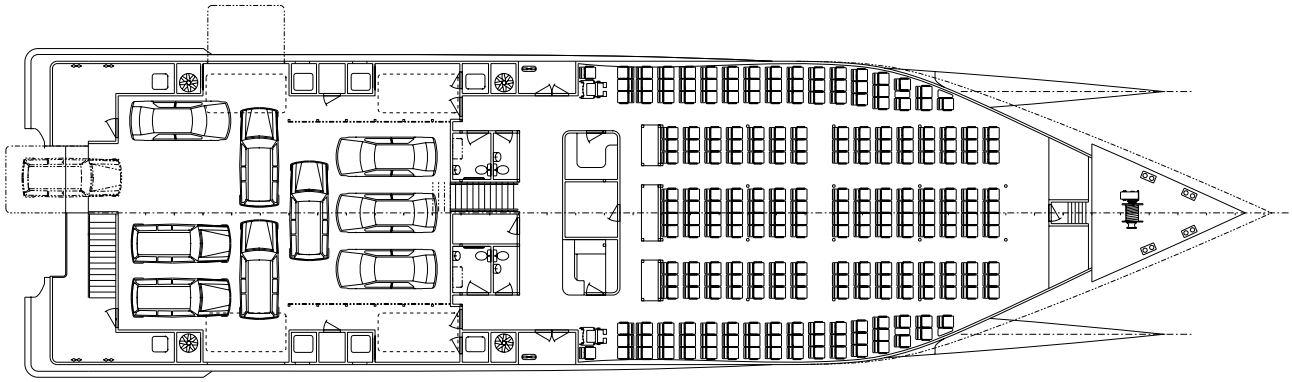
Nimr-class Patrol/Rescue Catamaran for Oman
(Image courtesy AMD Marine Consulting)



OUTBOARD PROFILE



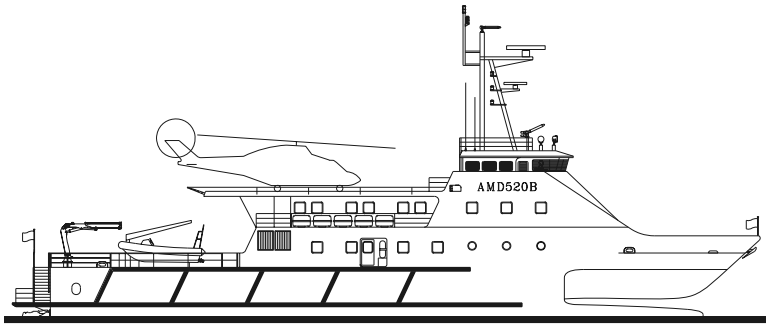
PLAN OF UPPER DECK

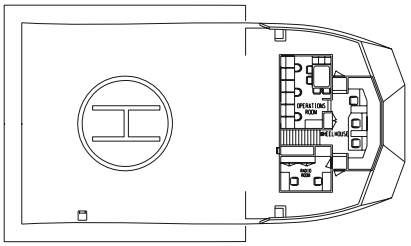


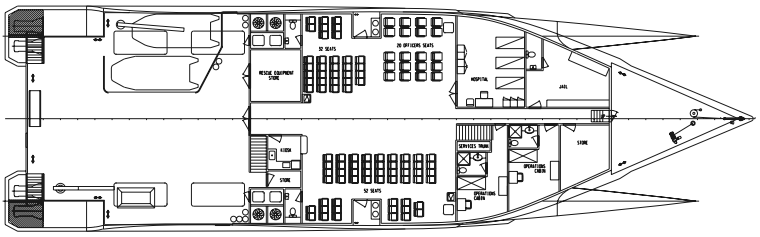
PLAN OF MAIN DECK

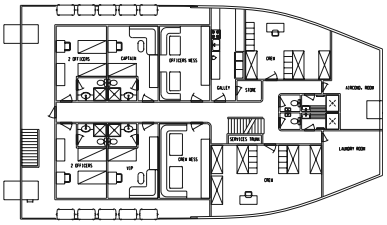
General Arrangement of 52 m Catamaran for the Persian Gulf
(Drawing courtesy AMD Marine Consulting)

Kharif-class Ferry for Oman
(Image courtesy AMD Marine Consulting)

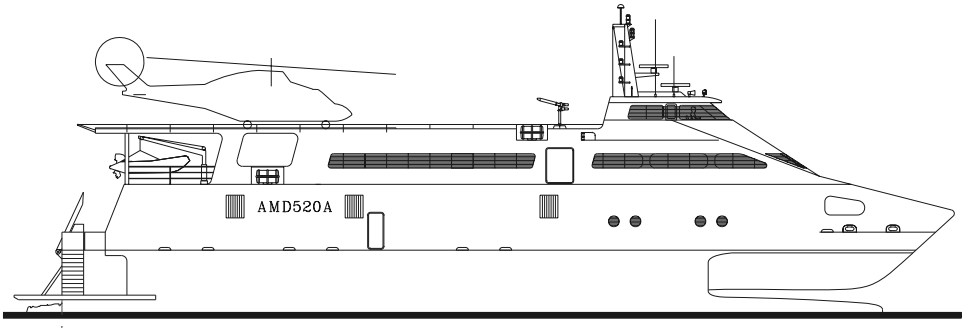




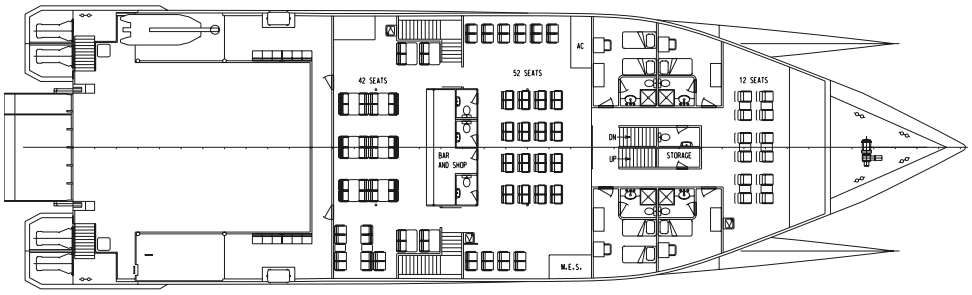




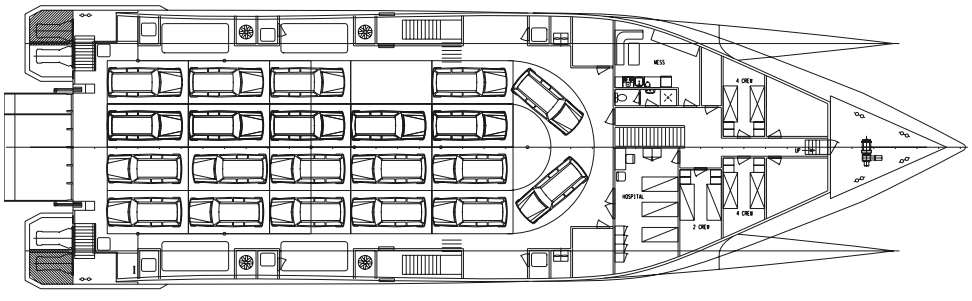
General Arrangement of Nimr-class Patrol/Rescue Catamaran
(Drawing courtesy AMD Marine Consulting)



OUTBOARD PROFILE



PLAN OF UPPER DECK



PLAN OF MAIN DECK

General Arrangement of
Kharif-class Ferry
(Drawing courtesy AMD Marine
Consulting)

Queensland Industry News

Gold Coast

This year the Sanctuary Cove International Boat Show was held from 18 May to 21 May 2006. As with previous years the main focus was the on water display with all major local and international manufacturers represented. The feature was the much-anticipated announcement of the Boat of the Year Award, as well as the launch of new production models from Gold Coast-based Maritimo, Sunrunner and Riviera.

The big news to hit the local Gold Coast marine industry recently was that notable production-boat builder, Perry Catamarans, has been placed into receivership. Over the years the company developed a first-class name within the industry for building quality sailing catamarans, namely the 13.1 m and 17 m, as well as 13.5 m and 17.4 m powerboats. Their closure has seen the loss of some 100 employees.

In other news, the design office of Sea Transport has just secured a lucrative design contract with Brazil's largest ferry operator, TWB. The project, which consists of the design of up to six 50-m passenger ro-ro vessels, was awarded to Sea Transport ahead of international design company Nigel Gee and Associates.

North Queensland

Cairns Slipways (Qld) completed numerous major refits during the first quarter of 2006, including the 48 m motor yacht *Triton*, Delta motor yachts 43 m *Serenity,* and 38 m *Andrea* and the 37 m *Shirley Anne*. Commercial and defence refits were completed on HMA Ships *Townsville* and *Gladstone*, the mini-cruise ships *Melanesian Discoverer* from Madang and the 38 m *Coral Princess*. Currently the 45 m Sunlover Cruiser tourist pontoon for Moore Reef is being entirely rebuilt in the main workshops. An exciting project starting early June will be the major refit of the 56 m, 825 t Oceanco-built super yacht *Lady Christine,* which will have new 5 m long Quantum Zero Speed stabilisers and a helicopter crane fitted with periodic class survey work as well as a full re-paint by Luxury Yacht Refinishers

AIMTEK (formerly NQEA) provided design and technical trades support to Cairns Slipways for the extensive refit of the luxury motor yacht *Shirley Anne* (originally *Ilona*) which was completed in late February. The vessel was purchased from Florida by her original owner for use as a private/ corporate yacht on Sydney harbour. This twelve-month project included a new interior fit out by FMCA, rebuilding of main and generating machinery, improved stability and subdivision with the installation of 15 t of ballast and watertight bulkhead doors, a remodelled flybridge with roll-over mast, extension to the upper deck accommodation, fairing/painting and extra sturdy accommodation ladders for access to large tenders. AIMTEK's follow-on-support design office has been busy on the RAN hydrographic ships *Leeuwin* and *Melville,* preparing the upgrade of the safety boat cranes, associated structure and systems. The 4.5 t capacity Carley Ocean Systems slew arm davits purchased through Owen International Australia will allow larger safety vessels to be deployed.

The Big Boat Shed has continued the many new construction projects, refits and repairs to FRP, steel and aluminium commercial and private vessels up to 25 m long. TBBS also has the agency for the 40 ft (12.2 m) fibreglass Pro Fusion Catamaran sailing yachts. The first containerised kit has just recently arriving from Thailand for a local client's 2C charter operation, with assembly and completion due within three weeks. The Big Boat Shed also holds the agency for the New Zealand-built Seafury surface drives, with numerous sales locally and in Asia.

Tropical Slipways lost several projects to a NZ yard due to the extreme wet season, including two 85 m gas tankers which service the Pacific islands. The Kwajalein Atoll based US Army ship, *Worthy,* was extensively refitted, including an upgrade of the ship's mission room. The fuel tanker *Petro Navigator* was refitted before travelling to Singapore for sale. Upcoming refits include the Noumea-based 67-m passenger/cargo ship, *Havana,* and the 87 m cargo ship, *Madang Coast*.

Cairns Custom Craft's recent deliveries include a 25 m catamaran game-fishing mother ship, *Odyssey,* for a Harvey Bay operator and an 11 m catamaran, *Penda d'Or,* for Noumea capable of 38 kn using twin 313 kW Yanmar diesels and Series 274 Hamilton waterjets. Under construction are an 11.6 m Benford Design Group of USA houseboat and a 9 m commercial dive vessel for a South Australian client.

The catamaran game-fishing mother ship *Odyssey*
(Photo courtesy Cairns Custom Craft)

Penda d'Or
(Photo courtesy Cairns Custom Craft)

English Engineering has a major project with the construction of the new 45 m cable-driven passenger/vehicle ferry due for completion in June. This vessel will provide the main access to the famous Daintree and Cape Tribulation World Heritage area and will be capable of carrying vehicles, heavy earth-moving equipment and trucks. Earlier in the year, English Engineering's subsidiary, Subsee Australia,

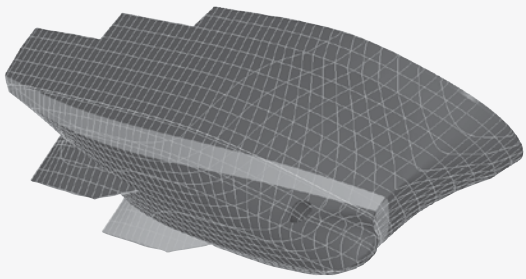
The Complete Shipbuilding Software Solution

HULL DESIGN
STABILITY
RESISTANCE
MOTIONS
INITIAL STRUCTURE
STRUCTURAL DETAILING
PIPING
HVAC
EQUIPMENT
NESTING
CUTTING

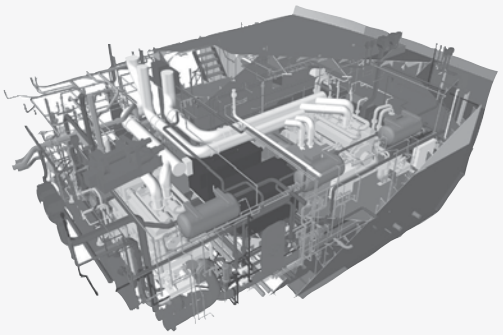
MAXSURF

ShipConstructor
Empowering AutoCAD

The combination of the Maxsurf suite of naval architecture software with the ShipConstructor structural detailing and production software provides shipbuilders with a complete, industry-specific CAD/CAM solution for all aspects of ship design and production.



Maxsurf is an integrated suite of design, analysis and construction software suitable for all types of vessels. All modules feature a consistent, graphical Windows interface, work from a common database, and provide data exchange with AutoCAD and Microsoft Office.



Contact us for a free demo CD, or download online

www.formsys.com

Formation Design Systems, P. O. Box 1293, Fremantle WA 6959 Australia
Tel: +61 8 9335 1522 Fax: +61 8 9335 1526 Email: info@formsys.com

delivered a 40-passenger Superview-series V-bottom semi-submersible with acrylic windows for Mary D Enterprises in New Caledonia.

Brisbane Region

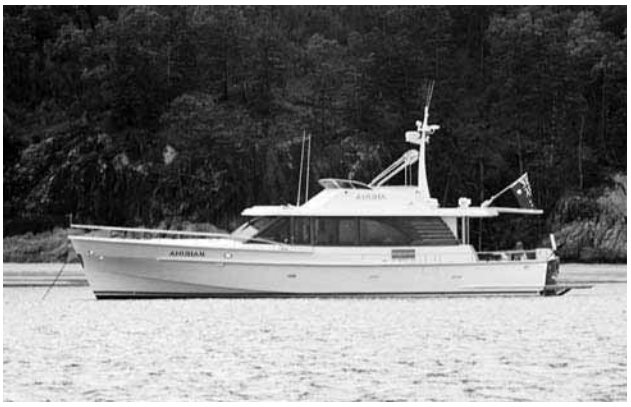
Norman R. Wright and Sons recently completed the pilot boat *Tuart*. It has just been launched and is currently on a truck heading for Bunbury Port Authority in WA.

Principal particulars are as follows:

Owner	Bunbury Port Authority
Builder	Norman R. Wright and Sons (Qld)
Designer	Norman R. Wright and Sons Designs
Construction	GRP/timber composite
Length	13.63 m
LWL	12.25 m
Beam	4.45 m
Survey	USL 2C and 1E
Displacement	13.9 t lightship
Fuel	1800 L
Water	200 L
Engines	2 x Cummins QSL9
	each 302 kW @ 2100rpm
Gearbox	2 x ZF325IV
Speed	24.3 kn @ 2100 rpm maximum
	21.0 kn @ 1900 rpm cruising
Seating	5 pilots, 1 crew and 1 helmsman

Norman Wright has begun building another near-identical pilot boat to *Tuart* for the Brisbane Marine Pilots. This is boat number five for them, and will provide them with a fleet of three Norman Wright pilot boats.

Pilot boat *Tuart*
(Photo courtesy Norman R. Wright and Sons)



Motor cruiser *Anuhan*
(Photo courtesy Norman R. Wright and Sons)

Anuhan was launched during April. This vessel is a cruiser bound for Sydney. Once again, designed and built in-house.

Principal particulars are as follows:

Builder	Norman R. Wright and Sons (Qld)
Designer	Norman R. Wright and Sons Designs
Construction	GRP/timber composite
LOA	15.6 m
Beam	4.98 m
Displacement	21.6 t half load
Fuel	2800 L
Water	1200L
Accommodation	6 berths
Engines	2 x Caterpillar C7 339 kW @ 2800rpm
Gearboxes	ZF 285A
Speed	22 kn maximum
	18 kn cruise

Brian Robson

US Navy Names DD(X) the Zumwalt Class

The US Navy announced on 7 April that the first DD(X) destroyer will be designated DDG 1000. As the lead ship in the class, it will also be named in honour of former Chief of Naval Operations (CNO) Adm. Elmo R. "Bud" Zumwalt, Jr.

Developed under the DD(X) destroyer program, *Zumwalt* is the lead ship in a class of next-generation, multi-mission surface combatants tailored for land attack and littoral dominance, with capabilities designed to defeat current and projected threats as well as improve battle-force defence.

Zumwalt was appointed US Chief of Naval Operations in 1970. As the youngest man ever to serve as CNO, Zumwalt cemented an acclaimed reputation as a visionary leader and thoughtful reformer. On 4 July 2000, then-President Bill Clinton celebrated Zumwalt's accomplishments and memory with the naming of the class and lead ship shortly after the admiral's passing in Durham, NC, 2 January 2000.

Compared to current US Navy destroyers, the Zumwalt-class destroyer will triple both current naval surface-fire coverage, as well as capability against anti-ship cruise missiles. It has a 50-fold radar cross-section reduction compared to current destroyers, improves strike group defence 10-fold and has 10 times the operating area in shallow-water regions against mines. The Zumwalt class fills an immediate and critical naval-warfare gap, meeting validated US Marine Corps fire-support requirements.

Last year Congress fully supported the DD(X) budget request, and the Zumwalt class is ready to start construction. In November 2005, the US Department of Defense granted Milestone B approval, authorizing entrance into Phase IV of the program, including the detail design and construction of the two lead ships.

Under the Navy's dual lead-ship acquisition strategy proposed in the President's budget for fiscal year 2007, Northrop Grumman Ship Systems and General Dynamics Bath Iron Works will concurrently build the dual lead ships. *Zumwalt* will be delivered in 2012.

Weight and Moment Management during FFG Upgrade

Zoran Jakšić
ADI Limited

ADI Limited is currently undertaking the FFG Upgrade Project at its Garden Island Facility in Sydney. The FFG Upgrade project is a very complex system-integration task and represents the most sophisticated enhancement of warships ever undertaken in Australia.

Maintaining the weight and stability status within critical limits is essential to the FFG Upgrade Project. Therefore, in order to achieve the required limiting displacement and centre of gravity of the upgraded ships, ADI design staff created work instructions for monitoring and recording the weight changes and developed a database for tracking and compensating for the changes. During the upgrade of the lead ship, HMAS *Sydney*, approximately 5 500 individual weight changes were tracked via the weight and moment database.

ADI's platform design sub-contractor, Gibbs & Cox, supplied the baseline weight estimates as part of the preliminary design for the upgrade. This data was used as the starting point for the weight and moment database. Weight data from approximately 300 Excel files was extracted and transferred into the database. Driven by the requirement to be "easy to use" this database gave full visibility and transparency to each ADI designer who did not fully understand the principles of weight and moment monitoring. The network-developed computer program contains specially-designed forms for recording data.

Each recorded weight item was linked to its TSC (Technical Subject Code) and SAP (Ship Alteration Package) number. This allowed weight changes to be analysed by associated design packages or by associated systems.

Due to the varying accuracy of the data available, the source of each item of weight data was identified by the following categories:

- estimated weight,
- calculated weight,
- vendor-supplied weight, or
- measured weight obtained from on-site weighing of the item.

The weight controller assisted by the design leaders updated the weight data on a daily basis. Gradually the original estimated data in the database was updated with calculated or measured values to provide an accurate measurement of the changes.

Based on the database weight reports, ADI naval architects determined the required locations and amount of the solid ballast needed to compensate for the upgrade weight changes and ensure compliance with the requirements of stability, limiting KG, list and trim whilst staying within the maximum allowable displacement.

The weight and moment database also provided the longitudinal distribution of the weight changes (see Figure 1) which was used to confirm that the longitudinal hull strength criteria were also complied with.

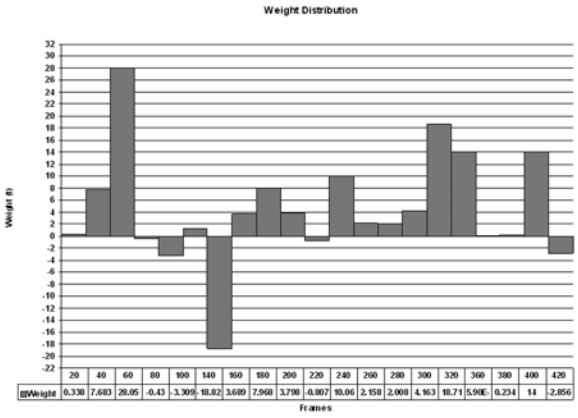


Figure 1 — Weight distribution changes during upgrade

The methodology used for recording and tracking of the weight changes was confirmed when HMAS *Sydney* lifted off the blocks at the predicted drafts with no visible movement and upright. Figure 2 shows HMAS *Sydney* at the moment she was refloated.

Figure 2 — HMAS *Sydney* post-upgrade undocking

Following the success of its application to HMAS *Sydney*, ADI will continue to use and develop the weight and moment database and its associated procedures for the tracking and recording of weight changes for all tasks which require weight monitoring.

FROM THE CROW'S NEST

Film *The Last Cape Horners*

As some readers will know, Gary Kerr began work on a documentary film, *The Last Cape Horners*, some two years ago when he commenced filming at the 2004 Annual Dinner of Cape Horners Australia Inc. in Port Victoria, SA. The film is now complete, and was screened for its inaugural public viewing in the Institute Hall at Port Victoria on Saturday 25 March, prior to the 2006 Annual Dinner.

While making the film, which covers the closing years of the square riggers and the grain races, Gary travelled to Mariehamn, Finland, to interview several people. These included Gun Erikson-Hjerling (granddaughter of Captain Gustaf Erikson), Jocelyn Palmer (the former South Australian girl who sailed in *Viking* in 1947–48), Freja Darby (daughter of Captain Sven and Pamela Erikson), Hanna Hagmark-Cooper (Curator of the Mariehamn Maritime Museum), and Captain Gunnar Eklund (who has memories of the social life in Port Victoria when he visited there in the crew of the four-masted barque *Pamir* twice during the late 1930s.

Also involved in the story are some of our local Cape Horners, telling of their experiences at sea in Captain Gustaf Erikson's ships, as well as our two Port Victoria treasures, Gerry Edwards and Alison Gibson.

The film is illustrated with dozens of old photographs, as well as archival and movie footage shot by Alan Villiers when he was in the ship *Grace Harwar* in 1929, Irving Johnson in *Peking* in 1929, and Tom Wells in *Passat* in 1939.

The film runs for 73 minutes and Gary Kerr makes the point that, in such a short time, only a small proportion of the interviews collected could be used, and so some very difficult decisions had to be made on what should be left out or included.

The Cape Horner Journal, February 2006

Cape Horner aficionados will know that the final World Congress of Cape Horners took place in St Malo, France, in 2003. The Amicale Internationale Capitaines au Long Course Cap Horner (AICH) was founded in St Malo, France, in 1937 and grew to boast more than 2500 members in 1975. However, with no source of younger members, involuntary retirements, and the advancing years of the elders making travel to congresses more difficult, the AICH was dissolved following the 2003 congress in its birthplace of St Malo. However, their website is still active at www.caphorniers.cl/amicale/amicale_eng.htm.

Cape Horners Australia Inc. is still going strong in South Australia, with their annual dinner for 2006 held in the Port Victoria Hotel on the evening of Saturday 25 March. Their newsletter, *The Cape Horner Journal*, is published twice-yearly through the untiring efforts of their Secretary, Neil Cormack, who may be contacted via email at nco82862@bigpond.net.au.

SNAME Publications Available to RINA Members

RINA has a reciprocal arrangement with SNAME whereby RINA members may purchase books published by SNAME at the SNAME member's price, without having to be a member of SNAME. The same applies for SNAME members purchasing RINA publications. The arrangement applies to books only, and not to journals. The arrangement will be reviewed later this year, and may or may not be continued.

Phil Helmore

EDUCATION NEWS

Curtin University of Technology

The Centre for Marine Science and Technology (CMST) has been active in ship hydrodynamics research over the past few months. Much of the work has involved ship under-keel clearance, either as approach-channel design or under-keel clearance guidelines for existing channels. CMST has purchased the first Australian licence of the well-renowned seakeeping software *Seaway*, which allows us to accurately calculate under-keel clearance in swell-affected shallow areas.

Lucie Lambert, a visiting masters-degree naval architecture student from Chalmers University in Sweden, recently completed her thesis on a new roll-damping method for seakeeping software, supervised by Dr Tim Gourlay. Other project students are continuing our ongoing work on CFD modelling of underwater vehicles.

CMST's ongoing collaboration with AMC continues to grow, with recent joint work on a commercial project and furthering plans for a joint naval architecture course, with students able to do their first two years at Curtin and last two years at AMC.

Tim Gourlay

The University of New South Wales

Undergraduate News

Student-Staff Get-together

The naval architecture students and staff held a get-together on Thursday 14 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 nine students in the third year and about ten in fourth year (one expecting to complete in mid-year), most of whom attended. Four of the full-time staff and one part-time staff member came along. A broad mix and some wide-ranging discussions ensued.

Dean's Award to Joanna Mycroft

The Faculty of Engineering Dean's Award is an annual award made to students in all undergraduate degree courses offered in the Faculty. The award recognises the outstanding academic achievement of students currently studying in the Engineering Faculty. Receipt of the award is acknowledged by a highlighted entry on the student's academic transcript, a certificate and medallion, and publication of award winners' names on the Faculty of Engineering's web page.

The Awards for 2006 were presented by the Dean of Engineering, Prof. Brendon Parker, at a ceremony in The Scientia on the evening of 5 April. Of the 120 awards made to the 5200 undergraduate students in the Faculty, 23 were made to the 770 undergraduate students in the School of Mechanical and Manufacturing Engineering, and one of those was presented to Year 4 naval architecture student, Joanna Mycroft. Congratulations, Jo!

Graduation

At the graduation ceremony on 6 April, the following graduated with degrees in naval architecture:

Campbell Baird	H1
Anderson Chaplow	H1
Constantine Ling	H2/2
Simon Orr	H2/2
Ethan Seah	H2/1
Craig Singleton	H1 and University Medal
Ramesh Watson	H2/1
Dan Wupperman	H2/1

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

A further six students have only their industrial training report to complete and should graduate in October.

Craig Singleton's University Medal deserves special mention. The medal is awarded for an average mark for all subjects in all years of the degree course (weighted more heavily towards the later years) of 85% or more. To put this in perspective, of our 290 graduates in naval architecture, forty-nine have been awarded Honours Class 1, and seven have been awarded the University Medal: Craig Singleton (2006), Tony Sammel (2004), Nigel Lynch (2002), Michael Andrewartha (2000), Steve Davies (1980), Brian Morley (1974) and Phil Helmore (1970).

The occasional address at the graduation ceremony, given by Mr David Cox, Executive Manager for Qantas Engineering, was inspiring and included a quote from one of Winston Churchill's many memorable perorations: *Success is never final; failure is never fatal; it is courage that counts*.

Simon Orr, Anderson Chaplow, Craig Singleton, Ramesh Watson and Dan Wupperman at UNSW Graduation Ceremony on 6 April (Photo courtesy Anderson Chaplow)

Prize-giving Ceremony

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

The Baird Publications Prize 1 for the best performance in Ship Practice to Joanna Mycroft.

The Baird Publications Prize 2 for the best performance in Ship Propulsion to Joanna Mycroft.

The Royal Institution of Naval Architects (Australian Division) Prize for the best ship design project to Craig Singleton for his design of a 50 m exclusive charter yacht,

carrying ten passengers and eight crew under sail to Australian and international destinations.

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

Congratulations to all on their fine performances.

Joanna Mycroft receives the Baird Publications Prize 1
(Photo courtesy Diane Augee)

Craig Singleton receives the RINA (Australian Division) Prize
(Photo courtesy Diane Augee)

Graduates Employed

Our April 2006 graduates are now employed as follows:

Campbell Baird	Prawn trawler, Gulf of Carpentaria
Anderson Chaplow	Lloyd's Register Asia, Sydney
Constantine Ling	Bumi Armada Navigation, Miri, Sarawak
Simon Orr	Australian Marine Technologies, Williamstown
Ethan Seah	Royal Singapore Navy, Singapore
Craig Singleton	EMP Composites, Sydney
Ramesh Watson	Diab Australia, Sydney
Dan Wupperman	Noakes Boat and Shipyards, Sydney

Engineers Australia Accreditation

Programs in the Faculty of Engineering at UNSW were last accredited by Engineers Australia in 2001. Five years have passed and new program structures have commenced rollout with Year 1 this year, and these new programs are up for EA accreditation. Faculty and School coordination meetings have been held, and preparation of documentation has commenced for the accreditation process. The visit by the accreditation panel is expected in late August this year.

Post-graduate and Other News

AGM Michell Award to John Reizes

The AGM Michell Award for 2006 was presented to V/Prof. John Reizes by the College of Mechanical Engineers of Engineers Australia in a ceremony at the Vibe Hotel in Sydney on Friday 17 March.

The award, presented for outstanding contribution to mechanical engineering, perpetuates the memory of Anthony George Maldon Michell (1870–1959), an outstanding Australian mechanical engineer. AGM Michell was a consulting engineer in the field of hydraulics and pump design and, in conjunction with his investigations of lubrication at the beginning of the century, he invented the tilting-pad thrust bearing, a momentous technical innovation. Other notable achievements were the invention of his viscometer, the development of hydraulic power transmissions, and the design and development of a series of crankless engines. He was elected a fellow of the Royal Society in 1934 and was awarded the Kernot Medal in 1938 and the James Watt Medal in 1943.

The AGM Michell Award may be presented for any of the following:

- sustained leadership in the affairs of the institution;
- sustained leadership in the profession of mechanical engineering;
- sustained contribution to the art and science of mechanical engineering; or
- a worthy blend of the above.

The award was made to John Reizes on *all four counts!*

John made a presentation to the assembly, covering some of the highlights of his career which included the UNSW design competitions which he made NSW-wide and which subsequently became the Australia-wide Warman Design Competition, the formation of the Engineers Australia Committee on Design, using a terminal at UNSW to control the CSIRO computer in Canberra in the 1970s (a big deal then), applications of CFD to many types of problems (such as bubbles, sewer overflows, and square engines), and appointment to the engineering panel of the ARC. Throughout, he referred to the influence of serendipity, i.e. happening to be in the right place at the right time, and "making discovery, by accident and sagacity, of things which we were not in quest".

Many of John's colleagues from UNSW and UTS attended the ceremony, including V/Prof. Kerry Byrne, Dr Tracie Barber, V/Prof. Eleanora Kopalinsky, Prof. Eddie Leonardi, Dr Victoria Timchenko, Em/Prof. Graham de Vahl Davis, Prof. Bob Randall, Dr Martin Cooke, Dr Seng Leong, A/Prof Berman Kayis, V/Prof Eric Hahn, V/Prof Alex Churches, and the Dean of Engineering, Prof. Brendon Parker.

Many former students will remember John teaching them at UNSW in the areas of fluid mechanics and thermodynamics. He later moved from UNSW to UTS to take up a position there as Dean of Engineering.

John has been retired from teaching for a couple of years now, but continues his research as a Visiting Professor at UNSW.

***Times HES* Rankings**

UNSW was recognised as the premier engineering university in Australia, and ranked 16th in the world by the UK's 2005 *Times Higher Education Supplement* World University Rankings.

Phil Helmore

Twenty-First International Workshop on Water Waves and Floating Bodies

This prestigious yearly workshop took place on this occasion in Loughborough, England, on 2–5 April 2006. A total of fifty papers was presented at the 21IWWWFB on all topics associated with water waves, with most of the papers devoted to the matter of wave impact on floating structures. However, some of the papers dealt with waves generated by ships and the impact of waves upon ships. There were sixty-six attendees.

The only Australian contribution was made by Professor Lawrence Doctors from UNSW on the topic *Influence of the Transom-hollow Length on Wave Resistance*. In this paper, Lawry dealt with the prediction of the water flow past a transom stern. In particular, he showed regression formulas for the unwetting (ventilation) of the transom stern (typical of Australian high-speed ferries) and the length of the hollow in the water behind the transom. By knowing these two quantities it is possible to provide an accurate prediction of the resistance characteristics of such vessels — even in the low-speed range.

Two other papers would also interest readers of *The ANA*. These were on the subjects *A Simple Theory of Overturning Ship Bow Waves*, by G. Delhommeau, M. Guilbaud, and F. Noblesse, and *When is the Bow Wave of a Ship in Steady Motion Unsteady?* by F. Noblesse, D. Hendrix, and G. Karafiath. These fine pieces of research provide simple but effective formulas for the shape of the bow wave for a high-speed vessel. The results would be most useful for estimating the additional frictional resistance on the vessel due to its bow wave.

The Twenty-second International Workshop on Water Waves and Floating Bodies is planned to take place in Plitvice, Croatia, on 15–18 April 2007.

Lawry Doctors

Australian Maritime College

AMC Bachelor of Engineering Student Numbers Looking Healthy

In 2006, approximately 175 students were enrolled over all four years of the Bachelor of Engineering degree at AMC. Just over 100 of these are enrolled in the naval architecture degree, a further 43 in Ocean Engineering and approximately 30 in the relatively new degree in Marine and Offshore Systems. Given recent statistics on AMC graduate employability, it is likely that a further increase in numbers should be sustainable.

AMC Graduation Ceremony and Australian Division President Visit to AMC

Mr Robin Gehling, President of the Australian Division of the Royal Institution of Naval Architects, spent a day at AMC in March to meet with local RINA Members, AMC research staff and to tour AMC facilities. Rob also represented RINA at the AMC graduation and prize-giving ceremony which was held on Friday 17 March 2006. The following students received their Bachelor of Engineering degrees:

Crystal Anderson	BE (Ocean Engineering) Hons Class 2 Div 2	Technip: Gorgon Upstream Joint Venture, WA
Ross Ballantyne	BE (Naval Architecture) Hons Class 2 Div 1	Oceanic Yacht Design, QLD
Nick Browne	BE (Naval Architecture) Hons Class 1	BMT Defence Services (Australia) Pty Ltd, VIC
James Clarkson	BE (Naval Architecture) Hons Class 1	DSTO, VIC
Luis Conde Alcala	BE (Naval Architecture) Hons Class 1	Javier Soto Aceda, Argentina
Lee Fennell	BE (Ocean Engineering)	Austal Ships, WA
Tim Hale	BE (Naval Architecture) Hons Class 2 Div 2	Vail Resorts (Beaver Creek Ski Field), USA
Wesley Heckendorf	BE (Naval Architecture)	
Peter Henry	BE (Naval Architecture) Hons Class 2 Div 2	Defence Materiel Organisation, NSW
Michael Hoult	BE (Ocean Engineering) Hons Class 2 Div 2	McDermott, Singapore
Chris Hutchison	BE (Naval Architecture) Hons Class 1	Michael Rikard-Bell, VIC
Iain Larkins	BE (Naval Architecture) Hons Class 2 Div 1	Austal Ships, WA
Warren Lund	BE (Naval Architecture)	DSTO, WA
Luke McCarthy	BE (Ocean Engineering) Hons Class 2 Div 2	McDermott, Singapore
David McCausland	BE (Marine & Offshore Systems) Hons Class 1	AMOG Consulting, VIC
Mark Niven	BE (Ocean Engineering) Hons Class 1	AMOG Consulting, VIC
Adrian Parkins	BE (Ocean Engineering) Hons Class 1	Clough Offshore, WA
Thor Schoenhoff	BE (Naval Architecture)	Austal Ships, WA

Jonathan Binns was awarded his Doctor of Philosophy degree for his thesis titled *Extreme Motions of Modern Sailing Yachts — Quantifying Re-righting*. Congratulations Jonathon! He is now working with BMW Oracle Racing in their design team

Prizes and Awards

The Connell Medal — Best Graduate (AMC wide): Nicholas Browne, BE (Naval Architecture)

Captain Thomas Swanson Prize — Best student over the duration of any engineering course in 2005: Nicholas Browne, BE (Naval Architecture)

Teekay Project and Technology Management Prize — Highest marks in technology and project management related subjects in any program in the Departments of Maritime Engineering or Maritime and Logistics Management: Joel Ireland, Ocean Engineering Year 3.

Royal Institution of Naval Architects Prize — Best research project by a final year student in the Bachelor of Engineering (Naval Architecture): Nicholas Browne, BE (Naval Architecture)

Institution of Engineers Australia Award — the Norman Selfe

Prize — Best achievement and attainment of professional skills in the final year of a Bachelor of Engineering course: James Clarkson, BE (Naval Architecture)

RINA/Austal Ships Prize — Best achievement in design related subjects (Year 2): Katrina de Graaf

Baird Publications Prize — Best mark in Ocean Vehicle Design in the Bachelor of Engineering (Naval Architecture): Luis Conde Alcala, Chris Hutchison and Iain Larkins

AMC Council Award for High Achievement in Teaching: Dr Irene Penesis.

Dr Irene Penesis lectures in the Department of Maritime Engineering. Her own enthusiasm for learning is quickly communicated to her students. Her teaching is characterised by her student-centred learning approaches and the development of effective learning practices which promote active student involvement and participation, while recognising individual differences.

The implementation of computer software packages has enabled engineering students to solve a range of mathematical problems more easily and understand complex three-dimensional applications. Feedback from students has been extremely positive and her ready availability to students is appreciated.

Irene is an active participant in a number of AMC committees and research seminars. As a mentor for other lecturing staff, Irene has given invaluable support in the formulation of solutions to academic problems in the classroom.

AMC Hosts ITTC Technical Committee Meeting

Members of the International Towing Tank Conference technical committee on ship resistance recently met at AMC. This was the first meeting for the (three-year) term of the 25th ITTC and there was considerable discussion of the recommendations of the advisory council by the entire committee. Based on these discussions, eight chapters were tentatively decided upon by the committee for the full report (to be presented at the 25th ITTC in September 2008 in Japan) with an additional task covering the evaluation of current procedures. Task leaders were assigned for each area along with some preliminary guidance on the important issues related to each area. The individual chapters and primary personnel involved are:

Trends in experimental fluid dynamics (EFD)
Ho-Hwan Chun, Pusan National University, Pusan, Korea

Trends in computational fluid dynamics (CFD)
Joseph Gorski, Naval Surface Warfare Center, West Bethesda, USA
De-Bo Huang, Harbin Engineering University, Harbin, China
Tommi Mikola, Helsinki University of Technology, Espoo, Finland
Ho-Hwan Chun, Pusan National University, Pusan, Korea

Scaling and extrapolation methods
Emilio Campana, INSEAN – Italian Ship Model Basin, Roma, Italy
De-Bo Huang, Harbin Engineering University, Harbin, China
Joseph Gorski, Naval Surface Warfare Center, West Bethesda, USA
Yusuke Tahara, Osaka Prefecture University, Osaka, Japan

Design methods and optimisation
Emilio Campana, INSEAN – Italian Ship Model Basin, Roma, Italy
Yusuke Tahara, Osaka Prefecture University, Osaka, Japan

Validation of prediction techniques
Tommi Mikola, Helsinki University of Technology, Espoo, Finland

Experimental facility bias — world wide model testing campaign
Jesús Valle, CEHIPAR, El Pardo, Madrid, Spain

Far-field waves and wash
Gregor Macfarlane, Australian Maritime College, Tasmania, Australia
Sandy Day, Universities of Glasgow and Strathclyde, Glasgow, Scotland, UK

Air flow around superstructure of vessels
Yusuke Tahara, Osaka Prefecture University, Osaka, Japan

In addition to the above tasks, the ITTC Recommended Experimental Procedures 7.5-01-01-01 and 7.5-02-02-01 will be reviewed by Sandy Day, Gregor Macfarlane and Jesús Valle. The 2nd meeting of the Resistance Committee is scheduled for September 2006 in Rome, following the Office of Naval Research Ship Hydrodynamics conference. Emilio Campana from the Italian Ship Model Basin (INSEAN) is the Chairman of the Resistance Committee.

Further information about the ITTC can be found at http://ittc.sname.org/index.html.

RINA President Visit to Tasmania

As part of his Australian tour in March, Nigel Gee, President of RINA, visited the Australian Maritime College. He met with local RINA Members, AMC staff and toured AMC facilities. In addition, Nigel gave a presentation to staff, students and visitors on the design and development of the X-Craft. The presentation was followed by a lunch attended by local members of the Tasmanian Section and representatives of the International Towing Tank Conference Resistance Committee.

Visiting Professor

Professor Wataru Sera recently completed another research sabbatical at AMC. Professor Sera is a lecturer in the Maritime Science faculty at Kobe University and he has been working on research relating to the simulation of swell and sea state within AMC's Ship-handling Simulator over the past three years. This work has involved the development of mathematical simulation techniques as well as the conduct of a series of ship model experiments within AMC's Model Test Basin to assist with the validation of the simulations.

Gregor Macfarlane

Research into Parametric Roll in Head Seas

The International Maritime Organisation (IMO) issued a circular in 1995 (IMO 1995) giving guidance to mariners on the avoidance of parametric roll in following and quartering seas. The IMO is currently reviewing this code with the

aim of improving the quality of its guidance, particularly for the occurrence of parametric roll in head seas. An investigation has been ongoing at the Australian Maritime College, in collaboration with the Australian Maritime Safety Authority, into the problem of parametric roll of containerships in head seas. Recent work has focussed on the influence of wave height, wave length and GM on parametric roll. Results from towing tank experiments have been compared with predictions of parametric roll occurrence using the Mathieu equation. Following the work by the research team of Giles Thomas, Jonathan Duffy and Tim Lilienthal from AMC and Rob Gehling of AMSA, a submission to IMO has been written.
Giles Thomas

Final Year BE Thesis Projects

A large variety of final year projects is being undertaken by naval architecture and ocean engineering students at present. A selection of these projects are briefly described below:

Hydrodynamic Properties of a Suction Can in Subsea Lifting and Lowering, Joel Ireland

Suction cans are a common type of foundation structure, widely used in the offshore industry. During offshore installation when the suction can is lowered onto the seabed (or retrieved from depth to surface), the structure is usually handled by a crane or a winch on an installation vessel.

Due to vessel motions, the dynamic load on the crane is affected by the heave added mass and damping of the submerged structure, as well as by the stiffness of the lifting rigging. As the heave added mass of a suction can is usually very large (much higher than its own structural mass), dynamic loads experienced by the crane and the lifting rigging may be substantially higher than the submerged weight of the can. These dynamic loads govern selection of the installation vessel, design of the lifting rigging and define the allowable sea state under which the operation can be conducted safely.

Information on hydrodynamic properties of the suction can is therefore important to make sure that the installation operation is conducted safely and without unnecessary expenses incurred. Currently, such information is not available to offshore engineers in a systematic form. The objective of this research project is to determine the heave added mass and damping of a typical suction can by the use of physical scale-model experiments. The dependency of both properties on the frequency and amplitude of heave motions will be assessed.

This project is being supervised by Gregor Macfarlane of AMC and Dr Yuriy Drobyshevski of Intec Engineering, Perth, WA.

Gyroscopic Stabilisation of Ships, James Atkinson, By way of introduction, a brief outline of various roll motion reduction methods including their advantages and disadvantages is discussed. This project covers fundamental theory of the gyroscope and how the conservation of angular momentum of a spinning flywheel can be used to stabilise a ship. On a more specific level, the problems associated with the interaction between the random nature of a sea state and the behaviour of the gyroscope is investigated.

Various published methods for sizing a ship gyrostabiliser are compared and discussed, as well as a detailed derivation of the equations used to size a model gyroscope used in a series of scale-model experiments conducted as part of this study. The experimental results will be presented and the roll response compared between the bare hull, the hull with bilge keels fitted, the hull with an anti-rolling tank installed and the hull with the model gyroscope.

This project is being supervised by Gregor Macfarlane of AMC and Paul Steinmann of Halcyon, Perth, WA.

Replenishment at Sea, Tristan Andrewartha

In any long-term naval operation, underway replenishment at sea, RAS, is essential for the success of the operation. RAS operations usually involve at least two vessels travelling in close proximity at a slow-to-moderate forward speed. When the ships are in these formations, the presence of the larger ship, usually the supply ship, can greatly influence the motions of the smaller ship. These motions can have a significant effect on the RAS equipment and the manoeuvring capability of the ships as well as crew safety. With the RAN about to acquire new vessels it is essential that the conditions under which RAS operations can be both safely and successfully undertaken need to be clearly defined.

Tristan Andrewartha is undertaking a study into the interactions between vessels during replenishment at sea operations. The program of work, supervised by Giles Thomas of AMC and Terry Turner of DSTO, includes both experimental and computational analysis.

Hull Form Design Tool, Peter Tomic

Given a prospective ferry route, a designer may be faced with a difficult decision: 'What is the most appropriate hull form configuration for this operational scenario? A monohull or a catamaran?' Peter Tomic is developing a decision-making tool to aid the designer when confronted with this situation. A number of factors are being taken into account, including resistance and powering, passenger comfort, structural configuration and cost, both construction and through-life. The operator provides required information concerning the route and performance of the relative platforms for a number of specific factors. This work is being supervised by Giles Thomas of AMC and Andrew Tuite of Incat-Crowther.

Catamaran Roll, Mani Hackett

Roll motions can be critical for catamarans, particularly those operating as high-speed passenger ferries. Uncomfortable roll motions may lead to motion sickness and difficult working conditions for the crew. It is therefore critical that roll motions can be accurately predicted during the design of a vessel to estimate its performance against certain limiting criteria. There is unfortunately a paucity of data available for validation purposes of seakeeping codes with respect to roll of catamarans. Mani Hackett, working under the supervision of Giles Thomas, is conducting a series of towing-tank experiments at the Australian Maritime College to investigate roll motion of catamarans. The model used for these tests is a catamaran version of the Series 64 hull form. A number of aspects are being investigated, including demi-hull spacing, heading angle and roll gyradius. Numerical predictions are also being carried out using a variety of seakeeping prediction codes. This work is being conducted in conjunction with Prof. Lawry Doctors of UNSW and Patrick Couser of Formation Design Systems.

Water Stilling, John Polmear

Towing tank experiments remain the most accurate technique for evaluating a high-speed vessel's performance prior to construction. In particular, resistance tests enable a designer to determine the appropriate engine for installation with confidence; whilst seakeeping tests provide valuable estimates of a vessel's motions in a seaway. To date, the time left between individual towing-tank test runs has been based predominantly on the researcher's judgment as to when the water in the tank has stilled to an appropriate level. John Polmear is conducting an investigation into the influence of a pre-existing wave environment on ship motion experiments using the ITTC uncertainty analysis technique. This will enable appropriate wave thresholds to be set to ensure consistent, accurate and repeatable results, whilst maximising the productivity of the tank by minimising the time between runs. This work is being supervised by Giles Thomas from AMC.

Overview of AMC Engineering Higher Degree Research Projects

Shinsuke Matsubara: *Unsteady loads on high-speed vessels*

Shinsuke Matsubara is working in the area of ship motions and wave loads for high-speed vessels through a collaborative ARC Linkage project supported by Incat Tasmania, Revolution Design, the University of Tasmania and the Australian Maritime College. Conventional strip theory for ship-motion predictions in the frequency domain encounters difficulties and limitations in the high-speed region, so that recent ship-motion prediction methods have evolved to enter time-domain analysis. Better predictions of ship motion and wave loads are required for better seaworthiness and optimised structural arrangement, which have become strong requirements in the high-speed ferry market.

A hydroelastic segmented model of the Incat 112 Evolution has been designed for towing tank tests, and is currently under construction. The model is designed to measure the slamming force on the centre bow, longitudinal bending moments on the demihulls, and ship motions in order to validate numerical simulations. Currently, validation of a time-domain ship-motion code, based on the high Froude number time domain strip theory developed by Dr Holloway and Prof. Davis from the University of Tasmania, is being undertaken against published experimental data.

Alexander Robbins: *A Tool for the Prediction of Wave Wake of High-speed Catamarans Operating in Shallow Water*

Alex completed his Master of Philosophy dgree at AMC in 2004. This project involved the development of a wave-wake prediction tool for catamarans operating in deep water. This study answered the key question — what hull form parameters influence a vessel's wash? However it generated far more questions, such as — what happens when the same vessel enters shallow water? — which parameters are important to reduce wash? — do shallow-water waves contain more or less energy than deep water waves? etc.

In the last quarter of 2005 Alex began study towards a PhD in an attempt to answer these questions, and more. Alex is based in Southampton in the UK and working on his PhD part-time. His external supervisors are Dr Martin Renilson of Qinetiq and Dr Ian Dand of BMT SeaTech. Dr Giles Thomas is his AMC supervisor. The following is a brief topic outline.

Part 1: Shallow Water Wave Wake Prediction Tool

Presently there is no simple shallow-water prediction tool for high-speed catamarans. Furthermore there is a knowledge gap in understanding how hullform parameters affect shallow-water wave wake. It is proposed that a systematic series of hullforms be established which can be tested, physically and numerically (CFD), for shallow water. Regression equations can be established from the data to create a shallow-water wave wake prediction tool.

Part 2: Expansion of Series

To increase the validity of the work and as a benchmarking exercise, it is proposed to add a known hull-form series, such as NPL, into the testing matrix. This would further validate the CFD, and provide useful data for AMC. This data could also be used to expand the range of the prediction tool.

Part 3: Exploration of Decay Co-efficient

It is known that a vessel's wave wake decays at a rate approximately equal to the inverse cube root of distance from the sailing line. It is also known that the decay rate can vary greatly from this approximation. An analysis of the wave data, for deep and shallow water conditions, may provide greater insight into what hull variables affect the rate of decay and possibly determine the limitations of this decay rate. Parts 4 and 5 have still to be finalised, but relate directly to the trans-critical Froude depth range with respect to wave wake. In January 2006 Alex completed Stage 1 of the physical testing program at the AMC shallow water basin. During the week of testing a soliton was generated. The soliton phenomenon was first described by John Scott Russell who observed a solitary wave in the Union Canal reproduced the phenomenon in a wave tank, and named it the 'Wave of Translation'. This was interesting, as the model being tested was not thought to have a sufficiently high displacement to generate a soliton.

Alex is expecting to have the PhD finished some time around 2008 — 2080! As with his MPhil, his work is fully published (i.e. disclosed) and can be downloaded, along with his PhD progress and other wave wake information from his web page, www.wavewake.com.

Roberto Ojeda: *Marine structures — Non-linear analysis of composite stiffened panels*

Linear finite-element analysis has been adopted by designers as a standard tool for the structural analysis of high-performance marine vehicle structures. However, it is known that the geometrically non-linear behaviour of laterally-loaded FRP shells and plates is significant, even at low load levels. Linear analysis may lead to overestimates of the displacement and result in the design of conservative structures. An understanding of this behaviour is therefore essential to produce an optimal design. Therefore, the objective of this research is to develop a finite-element formulation, based on the arbitrarily-orientated stiffener approach, for the non-linear analysis of stiffened and sandwich shells.

Bryce Pearce: *Cavitation and fluid dynamics*

Bryce is continuing with a PhD project *An investigation into the application of ventilated super-cavitating hydrofoils for use in the motion control of high-speed catamarans*. Recent efforts have involved the numerical investigation of super-cavitating lifting bodies using a 2D panel method. The remaining experimental program (in the soon-to-be-upgraded cavitation tunnel) will involve the force measurement and investigation of cavity characteristics of oscillating hydrofoils.

Area of research — Marine Engines

For economic reasons, today the shipping industry uses very low-quality fuel. The ignition and combustion quality of this low-quality fuel is very low and variable. This poor-quality fuel produces high pressure and high exhaust temperature, which can be harmful for the efficiency and performance of marine engines. A significant research effort in combustion can provide tools to predict the combustion in a given marine engine.

Nabeel Ashraf

Nabeel's current research goal is an experimental investigation of high-pressure diesel-spray dynamics in marine diesel engines. The first part of the project was the design and implementation of a high-pressure spray-test chamber that has already been completed. This chamber allows long, free sprays of heavy fuel oil to be diagnosed using various instrumentation including lasers, at pressures up to 10 MPa. In the next step, he will measure the spray angles, the spray penetration, droplet size and velocity distribution of sprays using the experimental setup. By including some variations in injector nozzle parameters and chamber pressures he plans to produce comprehensive data sets.

Chin Heung Bong

The aim of Chin's project is to develop an accurate spray break-up model and simulate this model on a CFD package. Although there are numerous researches in the field of diesel sprays, this project will be unique because it is a high-velocity, long-duration spray (about 10 times longer) on high-viscosity fuel. This meant that complex turbulent flows, viscosity and nozzle initial condition are to be considered. The spray penetration (and structure) as well as the droplet mean diameter has to be modelled accurately. Accuracy of the above parameters is essential and will directly affect the accuracy of the evaporative and combustion spray simulation.

Vikram Garaniya

Vikram's current research goal is to develop computational fluid dynamic (CFD) modelling of the combustion and ignition processes of marine engines. This will give insight into the combustion process of marine fuels in great detail. This includes development of the kinetic model for the thermal decomposition rate and polymerization rate within the fuel droplet. Furthermore, development of mass transfer and heat transfer models of the fuel droplet and validation of these models in the new spray chamber are being undertaken by AMC.

Hussein Samh Al-Masroori (Doctor of Philosophy): *Evaluation of the Industrial Trawling Sector in the Sultanate of Oman with respect to Ecologically Sustainable Development*

This research is aiming to evaluate and assess the industrial trawling sector in the Sultanate of Oman with respect to Ecologically Sustainable Development (ESD), supervised by Prof. Paul McShane. The impact of the trawling sector on humans and the environment will be measured-based on an ecological framework. ESD is a dynamic concept that recognises the need to integrate the short- and long-term economic, social and environmental aspects of activities that now applied in different fisheries.

The significance of this research is that it goes beyond the kinds of present researches that targets the efficiency and selectivity of the fishing gears in the Sultanate of Oman and stock assessment, protection and conservation without considering other aspects that are connected to the target of the research. This study therefore responds to a gap in recent research and will generate new knowledge by providing an insight into the role of sustainable development and the need to cross all aspects of any fishery (biology, ecology, environment, politics, society and economy) to maintain a sustainable growth and development of any fishery.

MARITIME SECURITY REGULATION

The events of 11 September 2001 initiated a change in concepts of security and a reconsideration of the types of threats that States might face. While states had long been aware of the possibilities of attacks against transportation, September 2001 saw a reorientation from attacking transport toward the use of the transportation system itself as a weapon. What became clear was that the nature of the emerging security environment was not reflected in international law; at issue was the fact that international law was based on acting after the event to 'punish' the perpetrators, rather than allowing states to suppress or prevent such acts from occurring in the first place.

At the instigation of the United States, the international community through the International Maritime Organisation (IMO), began considering in November 2001 how to improve the security of maritime transport worldwide to reduce the possibility of maritime terrorist attacks, and/or the importation of weapons of mass destruction (WMD). In December 2002, after 12 months of deliberation, the international community agreed to amendments to the *International Convention for the Safety of Life at Sea (SOLAS) 1974.* A new chapter was included in SOLAS — Chapter XI-2 *Special Measures to Enhance Maritime Security,* and the *International Ship and Port Facility Security* (ISPS) *Code* was introduced [1].

In May 2003 State and Federal Transport Ministers agreed to implement the ISPS Code in Australia, and on 12 December 2003 the *Maritime Transport Security Act (MTSA) 2003* was passed, entering into force on 1 July 2004 [2]. Under the MTSA, the owners of 300 port facilities in 70 ports and 55 Australian-flagged ships were required to conduct security risk assessments and develop appropriate security plans to manage those risks. These risk assessments and plans include an escalating security regime, whereby higher security levels require additional security measures to be put in place.

After reviewing Australia's maritime security arrangements in early 2004, the Secretaries' Committee on National Security proposed the creation of a Taskforce on Offshore Maritime Security to examine security arrangements for Australia's offshore oil and gas facilities; this Taskforce subsequently made a number of recommendations. Concurrently with Taskforce deliberations, the Government announced during the October 2004 Federal election campaign that two additional Armidale-class patrol boats would be purchased for the RAN to conduct augmented patrols of the North West Shelf [3]. On 15 December 2004, the Prime Minister announced that the Commonwealth would assume responsibility for all offshore counter-terrorism activity and the protection of offshore oil and gas facilities, with the States and the Northern Territory Government assuming responsibility for port security. He also announced the creation of a Joint Offshore Protection Command (JOPC), comprising the Coastwatch organisation in the Australian Customs Service and elements of the Australian Defence Force (ADF), and the development of an Australian Maritime Identification System (AMIS) [4]. Under AMIS, it is envisaged that ships proposing to enter Australian ports will be required to provide comprehensive information such as ship identity, crew, cargo, location, course, speed and intended port of arrival at 1000 n miles from Australia's coast. At 500 n miles from the coast, information would be sought voluntarily from vessels proposing to transit Australian waters but not enter a port. Within Australia's 200 n mile exclusive economic zone (EEZ), the aim would be to identify all vessels other than day recreational boats. JOPC is managing the development of AMIS, which will draw upon and fuse information from a variety of agencies. Flowing from the work of the Taskforce, the MTSA was amended in June 2005 to extend Australia's maritime security regime to Australia's offshore oil and gas facilities, resulting in the MTSA being renamed the *Maritime Transport and Offshore Facilities Security Act (MTOFSA) 2003* [5].

While the ISPS Code established a framework for preventive security for ships and ports, there was acknowledgment internationally that more work was needed to develop a framework for responding to intelligence about planned attacks, and intervening, before such attacks could occur. To address this need, the international community turned to an existing maritime security instrument — the *Convention for the Suppression of Unlawful Acts against the Safety of Maritime Navigation 1988,* which has become known as the SUA Convention.

In October 1985, four members of the Palestine Liberation Organisation hijacked the Italian cruise ship *Achille Lauro* on the high seas off Egypt, and an American tourist was subsequently murdered. After jurisdictional wrangling between various governments, the perpetrators were eventually released without being charged with any offences. In reaction to this attack, the IMO developed the SUA Convention, aimed at ensuring that anyone committing unlawful acts against the safety of navigation will not be given shelter in any country, but will either be prosecuted or extradited to a state to stand trial.

After September 2001, the IMO developed amendments to the SUA Convention, to overcome the lack of an enforcement mechanism and to create new offences for acts of terrorism at sea, including for the transport of certain items that could be used to commit terrorist acts. These amendments (the 2005 Protocols) were agreed at a diplomatic conference in London during October 2005 and broaden the list of offences made unlawful under the treaties, so as to include the offence of using a ship itself in a manner that causes death or serious injury or damage, and the transport of weapons or equipment that could be used for mass destruction. They also introduced provisions for the boarding of ships where there are reasonable grounds to suspect that the ship or person/s on board the ship is, has been, or is about to be involved in, the commission of an offence under the Convention [6]. Ninety days after 12 member states have ratified the 2005 Protocols, these new provisions will come into force.

Linked to the development of the ISPS Code, the IMO plans to introduce a Long Range Identification and Tracking (LRIT) system, to enable countries to identify all vessels transiting their waters and, particularly, those intending to enter port. All SOLAS-compliant ships will have LRIT satellite systems which will provide the ship's identity and location. It has already been accepted that flag states will be able to access the data from their ships anywhere in the world, while Port States will be able to access the data from a nominated port following a declaration from the ship of an intention to enter that port. Debate continues on when a coastal state should be able to gain access to this information for ships transiting its waters but not intending to enter port. From an Australian perspective, the further from Australia this information is made available, the more time is available to identify a threat and develop response options.

Small ships (less than 500 grt) are not regulated under SOLAS and thus constitute a possible threat to shipping, or are at least a vulnerability. The threat is that these small ships can be used as a means to attack other ships. While the attacks on the USS *Cole* in October 2000 and the MV *Limburg* in October 2002 were by speedboat, these incidents highlighted force-protection issues for both warships and international shipping. The vulnerability of small ships is that pirates and sea robbers may target them. Some members of the IMO are proposing to analyse and assess the vulnerability of small ships, and consider the appropriate security measures for them as well as implementation plans.

What does all this mean for the RAN? The impact of maritime security regulation is twofold: where it impacts on how the Navy undertakes its activities; and where it influences the roles the Navy might undertake.

The MTOFSA will have an impact on the RAN. Firstly, warships are exempt from its provisions, and are therefore not required to submit security plans consistent with the ISPS Code when entering an Australian security-regulated port. However, through a process of close consultation with the Association of Australian Port and Marine Authorities, liaison procedures have been developed to ensure that when RAN ships visit Australian ports, the self-protection measures they implement are consistent with and avoid compromising the port security plans in force. This also extends to ADF member exemptions from carrying the newly-introduced Maritime Security Identification Cards when going about their legitimate business in an Australian port. These measures avoid unduly hampering RAN operational activities but, conversely, in a heightened security environment, the RAN cannot utilise the MTOFSA to create security zones around its warships in security-regulated ports. Rather, it may have to rely on amendments to the C*ontrol of Naval Waters Act 1918* to designate these zones when alongside or underway in a port. Secondly, in the normal course of events the RAN is not responsible for commercial port security, which is a state government responsibility. However, under heightened security conditions, the Commonwealth may direct the RAN to assist state governments under the call-out provisions of Part IIIAAA of the *Defence Act 1903.* Finally, if a ship is deemed to be a threat, or its bona fides cannot be established, the RAN may be called upon to intercept the ship before it enters an Australian port.

The creation of JOPC, and the assignment to the Commonwealth of responsibility for offshore counter-terrorism and protection of oil and gas facilities, will impact on RAN responsibilities. It is likely that JOPC will make greater use of ADF assets to conduct surveillance, interception or boarding (visit, board and seizure) operations against suspect commercial shipping in Australia's EEZ, and the RAN will make a major contribution to these activities. When the LRIT system is agreed and implemented, the information provided will feed into AMIS, providing a more robust common operating picture. This information will allow agencies to assess risks posed by certain ships in order to determine whether they may transit Australian waters, and/or enter Australian ports. The MTOFSA will allow Australia to deny port access to any ships identified as a risk, while the amendments to the SUA Convention, once ratified and implemented in domestic legislation, will provide the legal basis for the RAN and ADF to intercept, board and detain these ships if necessary, well before they enter Australian ports.

1. International Maritime Organisation, *SOLAS - Consolidated Edition,* London, 2004.

2. *Maritime Transport Security Act 2003,* URL comlaw.gov.au/comlaw/Legislation/Act1.nsf/0/5ED0B1A0C30020B3CA256F720010C857/ $file/1 312003.pdf, 21 November 2005.

3. *Securing Australia's North West Shelf,* The Howard Government Election 2004 Policy, 16 September 2004, URL liberal.org.au/2004_policy/Securing_Australias_North_West_Shelf_Policy.pdf, 21 November 2005.

4. *Strengthening Offshore Maritime Security,* Prime Minister of Australia, Media Release, 15 December 2004, URL pm.gov.au/news/media_releases/media_Release11 73.html, 21 November 2005. After some confusion in the region over the purpose of the announced 'Australian Maritime Identification Zone', the terminology was subsequently amended to the 'Australian Maritime Identification System'.

5. *Maritime Transport and Offshore Facilities Security Act 2003,* URL comlaw.gov.au/comlaw/legislation/actcompilation1.nsf/0/F8311AC193742AF6CA257084001F6DB0/$file/MaritimeTransOffshoreFacilSecurity2003_WD02.pdf, 21 November 2005.

6. International Maritime Organisation, *Revised treaties to address unlawful acts at sea adopted at international conference,* Briefing 42, 17 October 2005, URL imo.org/newsroom/mainframe.asp?topic_id=1018&doc_id=5334, 21 November 2005.

Reproduced from Semaphore*, Issue 3, 2006, published by the RAN Sea Power Centre — Australia.*

Safer Boating with an ABP On Board

The Australian Builders Plate for recreational boats will make boating safer and could ultimately reduce fatalities out on the water, according to a National Marine Safety Committee spokesperson.

National Marine Safety Committee (NMSC) CEO, Maurene Horder, explained that the main aim of the ABP is to provide information to boat users on a boat's capability and capacity. "The ABP means that those operating a boat can easily plan for a safer trip. For example, they can calculate how many people can be on board, how much equipment they can stow and the maximum outboard engine power the boat can handle. This initiative will also require boat builders to apply minimum safety standards to some key elements in the design of recreational boats."

The NMSC will utilise the Sanctuary Cove International Boat Show, to be held from 18 to 21 May, to inform media on the impact of the ABP on the industry and boating public. NMSC and Marine Safety Queensland representatives will also be at the show to provide information and advice on the ABP to industry and the general public.

Ms Horder said that it was also important to get the message out that owner/builders will now be required to affix ABPs onto the boats they build from 1 July 2006. "The boating industry has been a keen supporter of the ABP initiative, and including owner builders will only make the industry safer," she said. "However, we understand the concerns of owner/builders, who have not had as much time as other industry sectors to implement the ABP."

Ministers of the Australian Transport Council endorsed the latest amendments to the ABP standard late last year, which included owner/builders being required to affix an ABP. Most states and the Northern Territory will be amending their legislation to bring the ABP requirements into force this year.

"We have had some feedback from owner/builders, and the challenge will be to inform as many as possible on the ABP," she said.

The ABP applies to most new recreational boats including those imported into Australia, and details vital information such as the maximum number of people and load allowed, engine rating and weight and, for boats less than 6 m, buoyancy performance.

Development of the ABP follows extensive consultation over the last five years with the boating industry, including manufacturers, designers, dealers and the general public, through surveys, workshops, consultation meetings and boat shows.

Two types of ABP have been developed, one for boats under 6 m inlength, which includes a buoyancy statement, and one for boats of 6 m or more in length, which does not include a buoyancy statement. From 1 July 2006, new boats of less than 6 m in length must have either basic or level buoyancy, as inadequate buoyancy will no longer be acceptable.

Ms Horder went on to say that there are no compulsory building standards or laws covering the construction of recreational boats in Australia. "According to our figures, approximately 31 000 recreational boats registered each year will be impacted by the ABP," she said.

Ms Horder assured the boating public that the Australian Builders Plate would provide accurate safety information. "A builder, importer or competent person are the only ones who can supply and approve information on an ABP, and they need to be a legal entity in Australia," she said.

New boats that will not need a plate include second-hand boats; aquatic toys; amphibious vehicles; canoes, kayaks or similar boats designed to be paddle-powered; surf skis; hydrofoils or hovercraft; pedal-powered boats; personal watercraft carrying no more than two people; racing boats; rowing shells used for racing or rowing training; sailboards; sailing boats; submersibles and surf row boats.

For more information on the Australian Builders Plate for recreational boats, log onto the NMSC web site at www.nmsc.gov.au and follow the links to the ABP page, or contact the NMSC Communications Officer, Ursula Bishop, on (0412) 813 056.

Comment Sought for New Fast Craft Standard

The National Marine Safety Committee (NMSC) is seeking feedback from the maritime industry and members of the public on a draft standard for Category F2 Fast Craft, part of the National Standard for Commercial Vessels (NSCV). The draft of Part F Subsection 1C; Category F2 fast craft and a Regulatory Impact Statement are now available for public comment.

A fast craft is defined as a domestic commercial vessel capable of 25 kn or more when fully laden, whilst a Category F2 fast craft is one that carries more than 12 passengers and which does not exceed 35 metres in length.

NMSC CEO, Maurene Horder, explained that the new standard would apply to new vessels operating in services similar to the Manly Jetcats, Rottnest Island ferries, some of the ferries that operate on the Great Barrier Reef, large high-speed diving boats and large thrill-ride boats. "Current standards for domestic commercial vessels in Australia do not address the special risks associated with craft which operate at speed," she said. "The aim of the new standard is to provide levels of safety on fast craft that are comparable to those on vessels which operate at slower speed, while at the same time minimising the burden on industry."

The draft standard specifies requirements additional to the standards for conventional vessels that vary according to key risk parameters of speed, passenger number, area of operation, size and operational characteristics. The additional requirements are based on the International Maritime Organisation's High Speed Craft Code, but modified for differences in risk associated with domestic operation.

Ms Horder said that Australia is a world leader in the design and construction of high-speed ferries. "An effective and practical Australian domestic standard can maintain and enhance this position, so we are keen to hear from industry on their opinions of this draft fast craft standard."

Copies of the new draft standard for comment can be downloaded from the NMSC website www.nmsc.gov.au, or in hard copy by phoning (02) 9247 2124. For further information, contact NMSC CEO, Maurene Horder, or Communications Officer, Rosemary Pryor, on (02) 9247 2124.

The period for public comment has been extended to 31 May 2006, so get your copy and comment today!

Thrill boat — one of the vessels to which the new Fast Craft Standard will apply (Photo courtesy Mori Flapan)

New Ready Reckoner on Marine Safety Standards

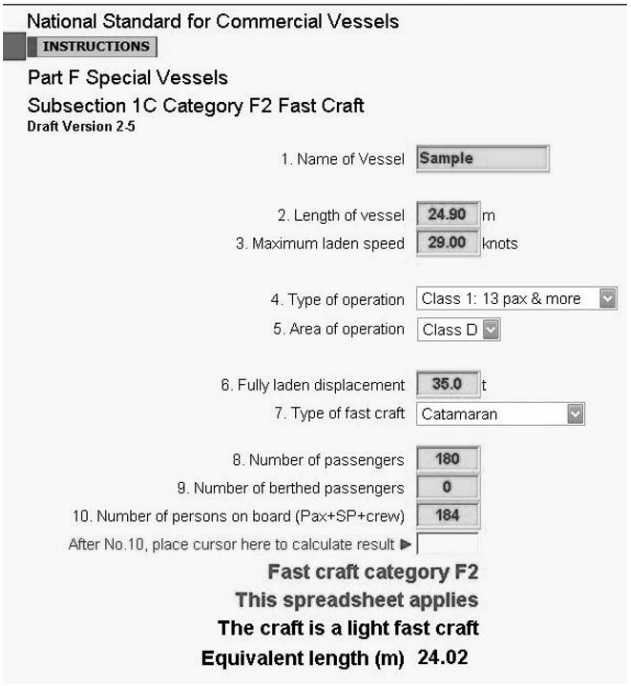
The National Marine Safety Committee (NMSC) has developed an online 'Standards Assistant' to help Australia's marine industries to quickly, easily and accurately find information on relevant safety standards covering their operations. The 'assistant', available on NMSC's website, pinpoints the exact sections of draft or final standards which apply to vessel types and operations.

NMSC Project Manager, Mori Flapan, who developed the 'assistant', said that it answered a major NMSC challenge of providing the right balance between a standard which is both simple to use and with the depth of technical detail required to cover a wide range of vessels and operations. "For example, many commercial operators just want to find out what they need to know for the safety of their boat", he said.

The new system is accessed by clicking the 'Standards Assistant' icon in the latest section for public comment on Fast Craft draft standard F2 on NMSC's website at www.nmsc.gov.au/yoursay_2.htm.

For further information contact NMSC Project Manager, Mori Flapan, or Communications Officer Rosemary Pryor on (02) 9247 2124

Rosemary Pryor



Input screen for the new Fast Craft Assistant (Image courtesy Mori Flapan)

INDUSTRY NEWS

Maxsurf Upgrade

Maxsurf, the well-established suite of hull-design software from Formation Design Systems, has recently been upgraded to Version 12. The upgrade adds a number of enhancements, including user productivity enhancements, links with Rhino, expanded VBA support, updated parametric transformations, automated generation of workshop drawings, enhanced heeling-arm criteria, and expanded online help.

It is now possible to customise the user interface for all Maxsurf applications. You can now create and customise your own toolbars and buttons to give instant access to your most-frequently used commands with a single mouse click. Another enhancement is the option to be able to dock, auto-hide or float the Maxsurf Assembly window.

More Maxsurf users are also using Rhino in conjunction with Maxsurf, and so import and export of Rhino models is now catered for, preserving information like surface names and colours, and surface trimming. FDS recommend using Maxsurf for the major hull surfaces which require fairness, and then Rhino for superstructure modelling and other features.

The ability to write scripts using Visual Basic programming language and to control Maxsurf from applications which support scripting (such as AutoCAD, Word or Excel) has been extended to Hydromax, Seakeeper and Hullspeed. A number of examples is included.

The parametric transformation facility in Maxsurf has been updated to provide additional functionality. Parametric transformations can now be performed on the forward and aft sections without affecting any parallel midbody, and the midsection coefficient and topside flare at the position of maximum beam can now be specified.

Workshop's primary role in the initial parametric definition of structure has been further extended into the generation of standard production drawings. Shell expansion drawings may now be generated, showing the girth expansion of all

structural parts. Stringer inverse bending lines aid production in the generation of the correct curvature of stringers, and shell plates can now be defined across the centreline (a welcome feature for the development of deck, bow cone and transom plates).

One of the key strengths of Hydromax is its extensive range of stability criteria, including a large pre-defined library which allows for customisation. The criteria dialogue now allows the user to define a heeling arm which can then be cross-referenced into any number of criteria. The definition in a central location ensures that all criteria which use that heeling arm use exactly the same settings.

FDS has recently launched a brand-new website which offers a wide range of useful resources, updated regularly, to all Maxsurf users with a current subsription at www.formsys.com.

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

Order Success for Wärtsilä DF Engines in LNG Carriers

In the first two months of 2006, Wärtsilä Corporation won orders for a further 16 Wärtsilä 50DF dual-fuel engines to power four LNG (liquefied natural gas) carriers contracted in Korea.

In January Wärtsilä was awarded an order to supply two sets of four Wärtsilä 50DF dual-fuel engines to Daewoo Shipbuilding and Marine Engineering (DSME) of Korea. These engines will be installed in two dual-fuel-electric LNG carriers contracted by Bergesen Worldwide Gas of Norway, and are the first Wärtsilä 50DF dual-fuel engines to be ordered by DSME.

In February Hyundai Heavy Industries and Hyundai Samho Heavy Industries of Korea ordered two sets of four Wärtsilä 50DF dual-fuel engines to power two dual-fuel-electric LNG carriers for Mitsui OSK Lines (MOL) of Japan.

These latest contracts bring the total orders to 104 Wärtsilä 50DF engines for 26 dual-fuel-electric LNG carriers. "In very many of the LNG carrier newbuilding projects worldwide, dual-fuel-electric machinery has been preferred over traditionally-applied steam turbine machinery and other machinery alternatives," said Jaakko Eskola, Group Vice President of Wärtsilä Ship Power. "Higher efficiency and thus lower fuel consumption and a higher degree of redundancy are the keys to the unrivalled success of dual-fuel-electric machinery."

In November 2005, Wärtsilä received its first dual-fuel engine order from Japan. Mitsubishi Heavy Industries will install four Wärtsilä 50DF dual-fuel engines each on two 157 000 m³ LNG carriers for MISC of Malaysia, formerly known as Malaysia International Shipping Corporation, and will thereby become the first Japanese shipyard to apply dual-fuel-electric machinery. Jaakko Eskola said "Japan is the second-largest producer of LNG carriers after Korea, so this order is an important milestone. The fact that these are the first dual-fuel engines for MISC, one of the major LNG carrier owners/operators, makes this contract even more notable."

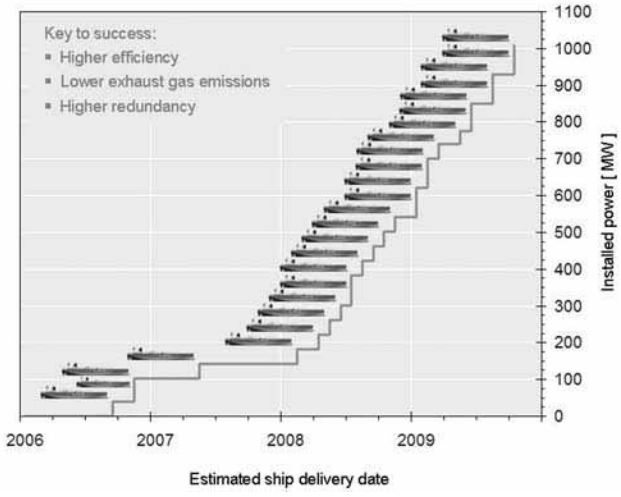
The other orders during the last six months of 2005 came from Korea. Samsung Heavy Industries ordered five sets of four Wärtsilä 50DF dual-fuel engines to power one 155 000 m³ LNG carrier for Kawasaki Kisen Kaisha ("K" Line) of Japan, two 155 000 m³ LNG carriers for A.P. Møller of Denmark, and two 155 000 m³ LNG carriers for Chevron of the USA. Hyundai Heavy Industries ordered two sets of four Wärtsilä 50DF dual-fuel engines to power two 155 000 m³ LNG carriers for Teekay Shipping of Canada.

Jaakko Eskola points out that "the big players in the LNG segment have all opted for Wärtsilä dual-fuel engine technology." The 26 dual-fuel-electric LNG carriers currently on order in the world, all featuring Wärtsilä 50DF dual-fuel engines, are being constructed in France, Korea and Japan for A.P. Møller (six ships), Bergesen Worldwide Gas (two ships), BP Shipping (four ships), Chevron (two ships), Gaz de France (two ships), Kawasaki Kisen Kaisha ("K" Line) (three ships), MISC (two ships), Mitsui OSK Lines (two ships), Nippon Yusen Kaisha (NYK) (one ship) and Teekay Shipping (two ships).

Orders for smaller engines types

In addition to these Wärtsilä 50DF dual-fuel engine contracts, Wärtsilä also received orders for the slightly smaller Wärtsilä 32DF dual-fuel engine type. DSME ordered a twelve-cylinder unit to complement the steam turbine machinery installation on a 151 000 m³ LNG carrier with onboard LNG regasification installation (LNG-RV) for Exmar of Belgium. West Contractors of Norway ordered one set of four six-cylinder units to power a dual-fuel-electric offshore supply vessel for Eidesvik Shipping of Norway.

"Dual-fuel engines have so far been selected for onshore power plants, floating production, storage and offloading installations (FPSOs), offshore supply vessels and LNG carriers," said Jaakko Eskola. "On the back of our success in those market segments, we are currently experiencing increased interest is applying the same dual-fuel machinery concepts in other market segments, ranging from floating storage and regasification units (FSRUs) to ferries, tugs and even cruise ships".



The Wärtsilä 50DF dual fuel engine is a popular choice for LNG new construction — 104 Wärtsilä 50DF engines ordered have been ordered for LNG carriers so far
(Chart courtesy Wärtsilä)

The LNG carrier *Provalys* built at Alstom Chantiers de l'Atlantique is equipped with three 12-cylinder and one 6-sylinder Wärtsilä 50DF engines
(Photo courtesy Wärtsilä)

Wärtsilä 46F Engines for New Viking Line High-speed Ferry

Low operating costs and increased payload capacity will be gained by the choice of Wärtsilä main and auxiliary engines for a new high-speed RoPax ferry between Helsinki, Finland, and Tallinn, Estonia.

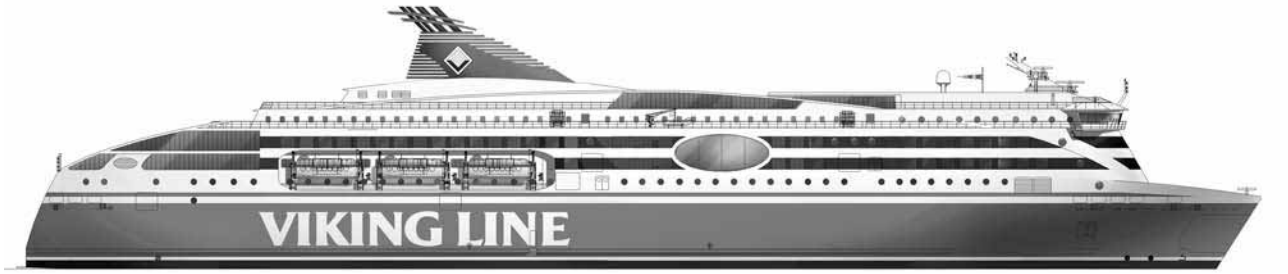
Wärtsilä Corporation was awarded a contract in March 2006 to deliver the power plant for the new ferry contracted by the Mariehamn, Finland, based shipping company Viking Line Abp at the Helsinki shipyard of Aker Yards. The ferry will be delivered in January 2008.

For this ferry, Wärtsilä will deliver four eight-cylinder Wärtsilä 46F main engines, each of 10 000 kW output at 600 rpm, and three 8-cylinder in-line Wärtsilä Auxpac 20 generating sets, each of 1350 kWe output.

The 2500-passenger ferry will have dimensions of 185 m length overall, 170 m length between perpendiculars, 27.70 m breadth and 6.55 m design draught. She will be built to Ice Class 1A Super for year-round navigation in the Baltic, and will have a service speed of 25 knots. The ferry is intended to provide fast comfortable trips with a modern range of dining and shopping facilities for passengers, and to meet the increased need for transport capacity, especially for passenger vehicles.

The Wärtsilä 46F engine features a high power concentration, enabling 40 000 kW to be delivered by four engines with a minimum number of cylinders while giving substantial benefits in minimum engine height and breadth. The low weight of these engines will enable the ferries to have an increased payload capacity compared with alternative engines. The engines will be equipped with catalysts to minimise NOx emissions in the exhaust gases.

The main criterion for selection of the Wärtsilä 46F for the main engines, however, was that the engines' fuel consumption can be optimized for the complex operating profile, with frequent variations in engine power during the crossings between the ports of Helsinki and Tallinn. The fuel consumption of the engines will be optimised for both their constant-speed operation while entering and leaving ports, and their variable-speed operation during the passages across the Gulf of Finland.



The new high-speed RoPax ferry by Viking Line will be equipped with Wärtsilä main engines and generating sets for low operating costs and increased payload capacity
(Image courtesy Wärtsilä)

Evolution is the Solution

Transport Seating Technology is proud to announce the successful testing and certification of the Evolution Seat earlier this year. The Evolution marine high-speed ferry seat can now add IMO-HSC Code to its already successful benefits. The International Marine Organisation High Speed Craft Code is the internationally-recognised standard for marine passenger seats which is conducted under rigorously controlled testing to examine the materials, structure, design criteria, strength and above all, safety.

Evolution has achieved ultimate comfort by the combination of unique moulded foam, shape, design and technology. Compound curves have replaced traditional uncomfortable designs, integrated suspension mesh absorbs vibration, and the built-in lumbar support is a standard feature which provides ultimate comfort. The Evolution is available in reclining or fixed models.

Mr Rodney Ferguson, the managing director of TST, who has designed and built two aircraft, has incorporated aircraft technology and lightweight materials into the design and construction of the Evolution Seat. The unique 'No-Weld' all-aluminum frame provides a fatigue-free factor where the strength-to-weight ratio enables the seat to be certified for international waters.

'Quick Release' covers are the latest benefit for the operator. This new design incorporates a special clip for removing covers quickly and simply. The operator can change soiled covers within minutes.

Options include upgrade reclining kit, seat belts, armrests, magazine holders, pockets, grab handles, folding table and life-jacket holders. A variety of fabrics is available which meet the IMO-HSC code.

Mr Ferguson has announced that they will be bringing out two new versions of the Evolution series, hinting that they will be competing at the upper world export market. Since IMO-HSC Certification, TST has received numerous requests to develop a new luxurious seat, incorporating the latest technologies without a huge price tag.

For further information visit www.transportseating.com.

Wärtsilä Engines for RCL post-Panamax Cruise Ship

Wärtsilä Corporation received an order in February to supply environmentally-sound diesel engines to Meyer Werft in Papenburg, Germany, for the new post-Panamax cruise ship contracted there by Royal Caribbean Cruises Ltd (RCL) and to be operated by Celebrity Cruises, a subsidiary of RCL. The ship is due for delivery in autumn 2008.

Wärtsilä will deliver four 16-cylinder Wärtsilä 46 engines having a combined power of 67 200 kW. The engines will be arranged in a diesel-electric power plant supplying all propulsion and electrical requirements of the vessel.

The Wärtsilä engines will be equipped with common-rail fuel injection systems. The common-rail systems ensure that the engines have no visible smoke at any power level while also meeting international regulations for NOx emissions.

The ship is the first of a new class of 117 000 GRT cruise ships which are able to carry 2850 passengers in 1425 cabins. It will be both the first ship operated by Celebrity and the first built at Papenburg which exceeds 100 000 GRT. It will have overall dimensions of 315 m long by 36.8 m wide.

Although these are the first Wärtsilä medium speed engines for Royal Caribbean Cruises Ltd at Meyer Werft, Wärtsilä has supplied engines for a number of other RCL cruise ships, including the Voyager and Freedom classes.

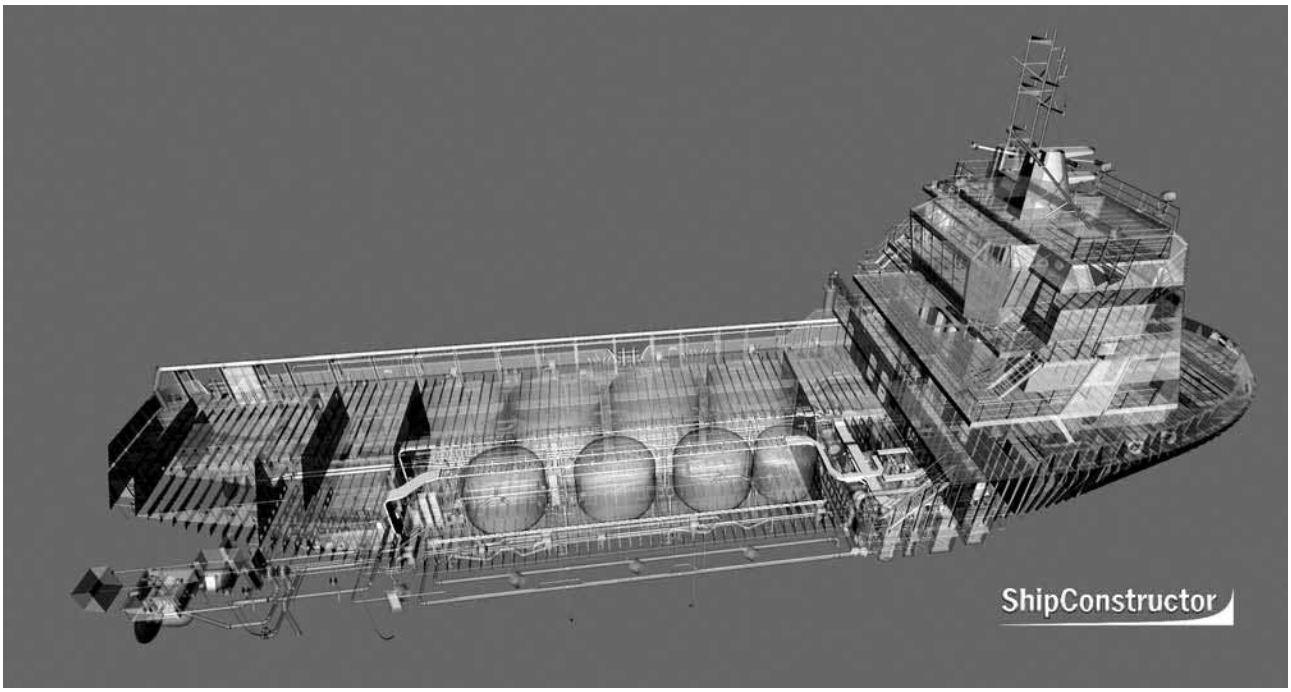
Shipyard Design Enhancement Project Focuses on Electrical Design

ShipConstructor Software Inc. announced in April that it is aggressively pursuing the needs of the international shipbuilding base by responding to industry desires to examine and develop the specifications for an electrical design module package. The project was recently selected for funding by the National Shipbuilding Research Program (NSRP) as an additional part of the larger Second-Tier Shipyard Design Enhancement Project II. The project, headed by Bender Shipbuilding & Repair Co., Inc. of Mobile, Alabama, includes an impressive cross-section of the shipbuilding industry including seven shipyards and four naval architectural firms.

This project is an extension of the ongoing Second-Tier Design Enhancement Project II, which has already leveraged solid communication and support across all of the team members, assisting in ShipConstructor Software Inc.'s development of ShipConstructor 2006 with the revolutionary Database Driven Relational Object Model™ (DDROM™), currently undergoing extensive testing with project team members and key ShipConstructor™ users worldwide. This same level of communication and collaboration will be available as the needs and requirements of the users are examined to best define the specifications of the electrical design module.

The aim of the project is to examine the requirements and user needs to then generate the detailed development specifications of an electrical design module for integration into the ShipConstructor software suite. This module will allow designers to take advantage of the advancements already made by ShipConstructor Software Inc. in streamlining the design and production process, and allow for rapid development of a product model. Coupled with the new DDROM technology, this presents a boon to the sophistication and possibilities of utilizing ShipConstructor.

The development of an electrical design module will allow electrical designers to enjoy the same tight integration and familiar user interface that other disciplines have already enjoyed using ShipConstructor. They will be able to work within the product model along with the rest of the design team, in the same database and model, increasing efficiency and collaboration amongst design teams.



Electrical Design will soon be part of the ShipConstructor™ software suite.
(Image courtesy Bender Shipbuilding & Repair Co., Inc. and Guido Perla & Associates, Inc., USA)

MEMBERSHIP

Australian Division Council Meeting

The Australian Division Council met on the afternoon of 14 March, with teleconference links to all members and the President, Robin Gehling, in the chair. Matters, other than routine, which were discussed included:

- Accreditation of Naval Architecture Courses: Further contact would be made with Mr Spalj in regard to support and assistance for Sydney Institute TAFE courses.
- Membership Matters: Dr Thomas had prepared a flyer for distribution to final year students and recent graduates of the Australian Maritime College, setting out the continued benefits to be derived from Institution membership.
- Senate Inquiry into Naval Shipbuilding in Australia: The President reported that he had lodged with the Senate Committee a submission on behalf of Council following valuable comments from members of Council. The document having been submitted has now become a confidential committee document protected by Parliamentary Privilege and cannot be released without permission of the committee.
- Australian Division Prizes: Council resolved to continue the prizes awarded to a final-year student in Naval Architecture at The University of New South Wales and the Australian Maritime College with the monetary value of the prizes to be considered when considering the Division's budget for 2007.
- RINA/EA Joint Board: A meeting of the Joint Board had been held in February 2006 when it was reported that the NPER competencies had been finalised and accepted by the NERB and arrangements would be made on the appropriate web site in order for persons to apply for registration.

  NERB Extension to Sub-professional Groups had been discussed and this matter would be raised by the President with the Chief Executive of RINA.

  The Heads of Agreement between RINA and EA, as extended, is due to expire later this year and EA is proposing entering into an Agreement of Cooperation with RINA. Council will be following closely the conditions and terms of any such agreement and will need to approve of any document prior to signing on behalf of RINA.
- Pacific International Maritime Conference 2006: Council was pleased with the outcome of the conference, attracting some 345 delegates and the number of papers presented. The Organising Committee has already commenced work on the Pacific International Maritime Conference 2008 to be held in Sydney between 29 January and 1 February 2008.

The next Australian Division Council meeting is scheduled for Wednesday 21 June.

Australian Division Annual General Meeting

The Australian Division held its AGM on the evening of 14 March in the Harricks Auditorium at Engineers Australia, North Sydney, attended by eighteen with the President, Robin Gehling, in the chair.

The President spoke briefly to his Report, previously published in the February issue of *The Australian Naval Architect*, and he thanked members of the Council of the Division for their support and who had contributed significantly to the business of the Division.

The Financial Statement and Auditor's Report were received and adopted without questions.

The Secretary announced the names of members appointed to Council by their respective Sections, each for a term of two years commencing from the conclusion of the AGM. They were:

Western Australia	Mr R. Best
Queensland	Mr C. Hutchings
New South Wales	Mr C. Boulton
Australian Capital Territory	Mr J. Lord
Tasmania	Dr G. Thomas
Victoria	Dr S. Cannon
Other members of Council are:	
President	Mr R. Gehling
Secretary	Mr K. Adams
Treasurer	Mr A. Soars
Immediate Past President	Mr B. Chapman
Members	Mr J. Black
	Mr W. Bundschuh
	Mr P. Crosby
	Mr J. Jeremy
	Mr M. Smallwood
	Mr G. Taylor

Before closing the meeting, the President thanked all members of the Australian Division for their personal support of the Institution, Council and Sections of the Division.

Keith Adams
Secretary

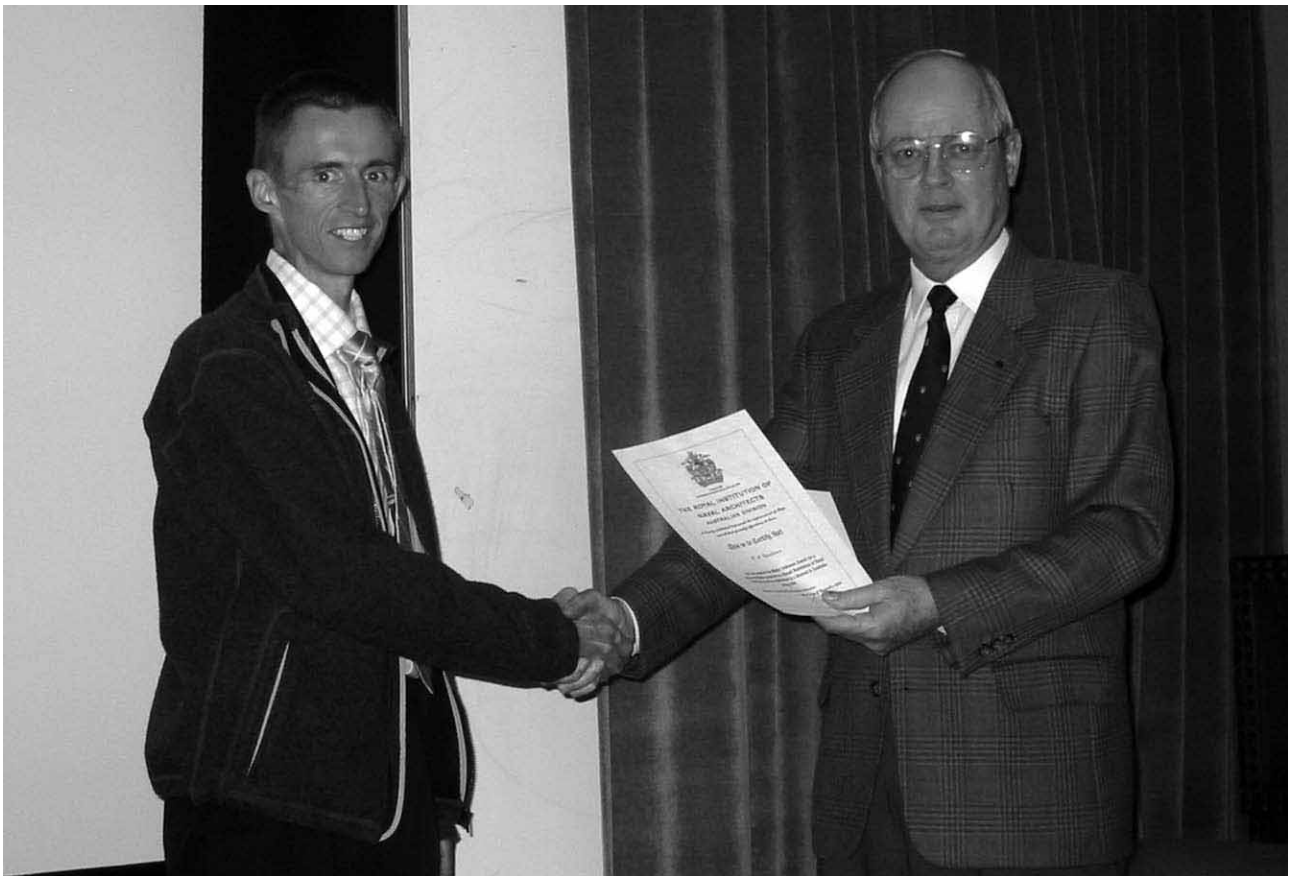
Vale Barry Edwards MRINA

It is with great sadness that the Royal Institution of Naval Architects records the passing of a long-standing member Mr Barry Edwards. Barry was a well known and admired member of the maritime industry in Tasmania before his retirement and continued his involvement for many years.

Barry spent many years working as Superintendent of Survey, with the Tasmanian Navigation and Safety Authority (now Marine and Safety Tasmania, MAST) and later as Superintendent of Engineering with North West Shipping and Towage. Barry will be greatly missed by family, friends and colleagues.

Stuart McDonnell

THE WALTER ATKINSON AWARD 2004



Craig Gardiner receiving the Walter Atkinson Award for 2004 from Australian Division Immediate Past President, Bryan Chapman, at the RINA Victorian Section/IMarEST Victoria/Tasmania Branch joint technical meeting on 13 April 2006
(Photo courtesy Sri Ranasingha)

RINA Members and CEng

RINA Headquarters has recently compiled a listing of members who have obtained Chartered Engineer (CEng) status through RINA and I have been forwarded the listing of members of the Australian Division who are currently on the register. I am aware, however, that there are members of the Division who have gained CEng status through other affiliations such as their membership of IMarEST, formerly called IMarE.

I would be pleased if members who have obtained CEng status through IMarEST would inform me, either by email to kadams@zeta.org au or by sending a note addressed to me at PO Box 976 EPPING NSW 1710, so that a comprehensive listing of such Australian Division members might be made.

Keith Adams
Secretary

NAVAL ARCHITECTS ON THE MOVE

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

Bronwyn Adamson has moved on from Austal Ships, and had a pit-stop with family in Sydney before heading for the USA and Europe in mid May.

Campbell Baird, a recent graduate of The University of New South Wales, has taken up a position on a prawn trawler, now in the Gulf of Carpentaria for the banana prawn season.

John Benjamin has moved on within the ADI Limited organisation, and has taken up the position of Technical Manager Naval Systems at Garden Island, Sydney.

Dave Beresford has moved on from Det Norske Veritas, and has taken up a position as Senior Engineer with ABS Pacific in Sydney to set up and manage the approval centre.

Craig Birdsall, a graduand of The University of New South Wales, has taken up a position as a naval architect with Det Norske Veritas in Sydney.

Phil Brown has moved on from the Anzac Alliance and has taken up the position of Director-General, Minor War Vessels, at the Russell Offices of the Department of Defence in Canberra.

Aaron Carle, a graduand of The University of New South Wales, has taken up a position as a naval architect with Austal Ships in Fremantle.

Greg Chivers continues with his roving lifestyle, working on yachts between the Mediterranean and the Caribbean, and is currently on board the 35.2 m luxury world-cruising sailing yacht *Magdalus Terzo*. Friends can check out Greg's palatial "office" at http://www.luxuryachts.net/yacht.asp?y=magdalusterzo.

Graeme Collins has moved on within the organisation of the property developer for whom he works in London, doing mainstream architecture, and is now head of the design team. He says that he has designed a ten-storey residential building on the Thames from the ground up, plus two multi-million-pound houses, and is now project managing the construction of one of them.

Sean Cribb has moved on from ADI Limited at Garden Island and has taken up a position as a naval architect with McAlpine Marine Design in Fremantle.

James Fenning has moved on from Austal Ships and has taken up a position as a Project Engineer with Clough Ltd in Perth, working in the oil and gas industry.

Michael Halkes, a graduand of The University of New South Wales, has put his career in naval architecture on hold until 2008 so that he and Richard Knight can concentrate on qualifying in the 49er skiff class for the 2008 Olympics in Beijing. He says that from now on he'll be training full-time in Europe for their summer and then coming back to Sydney and Melbourne for our summer. He has created a website at www.hk49er.com which friends can check out for details, current news updates and the regatta schedule.

John Hayes, a recent graduate of The University of New South Wales, has taken up a position as a Marine Surveyor with the Department of Planning and Infrastructure in Fremantle.

Peter Henry, a recent graduate of the Australian Maritime College, has taken up a position as a naval architect with the Centre for Maritime Engineering of the Defence Materiel Organisation in Sydney.

Yvoir Hingee has moved on and has taken up the position of Managing Director of Hit Air Australia, marketing jacket-type airbags for equestrians and motor cyclists; the jackets can be checked out at www.hitairaustralia.com.

Anthony Krokowski continues as Senior Naval Architect with Marine Safety Queensland, and has moved from the head office to the Pinkenba office in Brisbane.

Tony Laubreaux continues consulting as Laubreaux Marine in Noumea, New Caledonia.

Regina Lee, a final-year naval architecture student at The University of New South Wales, has taken up a part-time position as a naval architect with the NSW Maritime Authority in Sydney while she completes the requirements for her degree.

Mervyn Lepper continues working for the family company, Suilven Shipping, in Suva, Fiji. Mervyn says that he recently took their ship, *Suilven*, to Devonport, New Zealand, for dry docking; he planned the whole thing and was responsible for everything during the docking, including budget and a few surprise repairs.

Constantine Ling, a recent graduate of The University of New South Wales, has taken up a position as a project superintendent with Bumi Armada Navigation in Miri, Sarawak. The company provides services for the oil and gas industry, and offshore support/anchor handling vessels for rigs and FPSOs, and is one of the largest in Malaysia.

Robert McConachie, a graduand of The University of New South Wales, has taken up a position as a naval architect with the Centre for Maritime Engineering of the Defence Materiel Organisation in Sydney.

Brett Morris, a final-year naval architecture student at The University of New South Wales, has taken up a part-time position as a naval architect with Lloyd's Register Asia in Sydney while he completes the requirements for his degree.

Giang Ngo moved on from G.A. Glanville and Co. (Naval Architects), and took up a position as a naval architect with One2Three Design in Sydney for some time, and has now taken up a position as a naval architect with Transport SA in their Ship Survey and Engineering Department in Adelaide.

David Pryce resigned from skippering *Westernaustralia.com* in the Clipper round-the-world yacht race while in the lead when the whole fleet pulled into Subic Bay in the Phillippines for necessary keel work. He is now in Yamba, refitting his own 21 m schooner for Antarctic expeditions.

Ethan Seah, a recent graduate of The University of New South Wales, has taken up a position with the Ministry of Defence (Singapore) under the Republic of Singapore Navy (RSN). He says that his current posting is as the Naval Combat Officer, Assistant Navigating Officer (equivalent to a Seamen Officer in the RAN) with the rank of Captain aboard a minesweeper. He has been travelling quite a bit

recently, attached to the Germany Navy for a month around Europe and another two months with the RSN sailing to Taiwan.

Craig Singleton, a recent graduate of The University of New South Wales, has converted his part-time position as a naval architect with EMP Composites in Sydney to a full-time position.

Adam Solomons has moved on from Global Maritime in Norwich, UK, returned to Australia, and has taken up a position with Mammoet (Heavy Lift and Transportation) in Brisbane, working on module transportation for the Alcan Gove project in the Northern Territory.

Ramesh Watson, a recent graduate of The University of New South Wales, has converted his part-time position as a naval architect with Diab Australia to a full-time position.

Adam Williams has moved on from ADI Limited and has taken up a position as a naval architect with Det Norske Veritas in the Approval Centre, Sydney.

Dan Wupperman, a recent graduate of The University of New South Wales, has taken up a position as a shipwright at Noakes Boat and Shipyards at The Spit in Sydney.

Joon Chee Yew, a graduand of The University of New South Wales, has taken up a position as an assistant engineer at Jurong Shipyard Ltd in Singapore.

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

Phil Helmore

MISSING IN ACTION

Two members are missing in action. They are Mr M. Smith, Student member, last address 22/56 Houston Road, Kingsford, NSW 2032 and Mr G. van der Veen, Graduate member, last address 49 Forrest Street, Fremantle, WA 6160.

If anyone knows their present location, please let Keith Adams know on (02) 9878 4140, fax (02) 9878 5421 or email kadams@zeta.org.au.

FROM THE ARCHIVES

ADELAIDE SHIP CONSTRUCTION

John Jeremy

In the years immediately following World War II, Australia's ports depended on a tug fleet that was aging and, as time passed, progressively less able to meet the needs of the increasing size of ships visiting Australia. In the early 1950s over 50% of the tugs working Australian ports were over 30 years old and it was clear that a major replacement programme was needed.

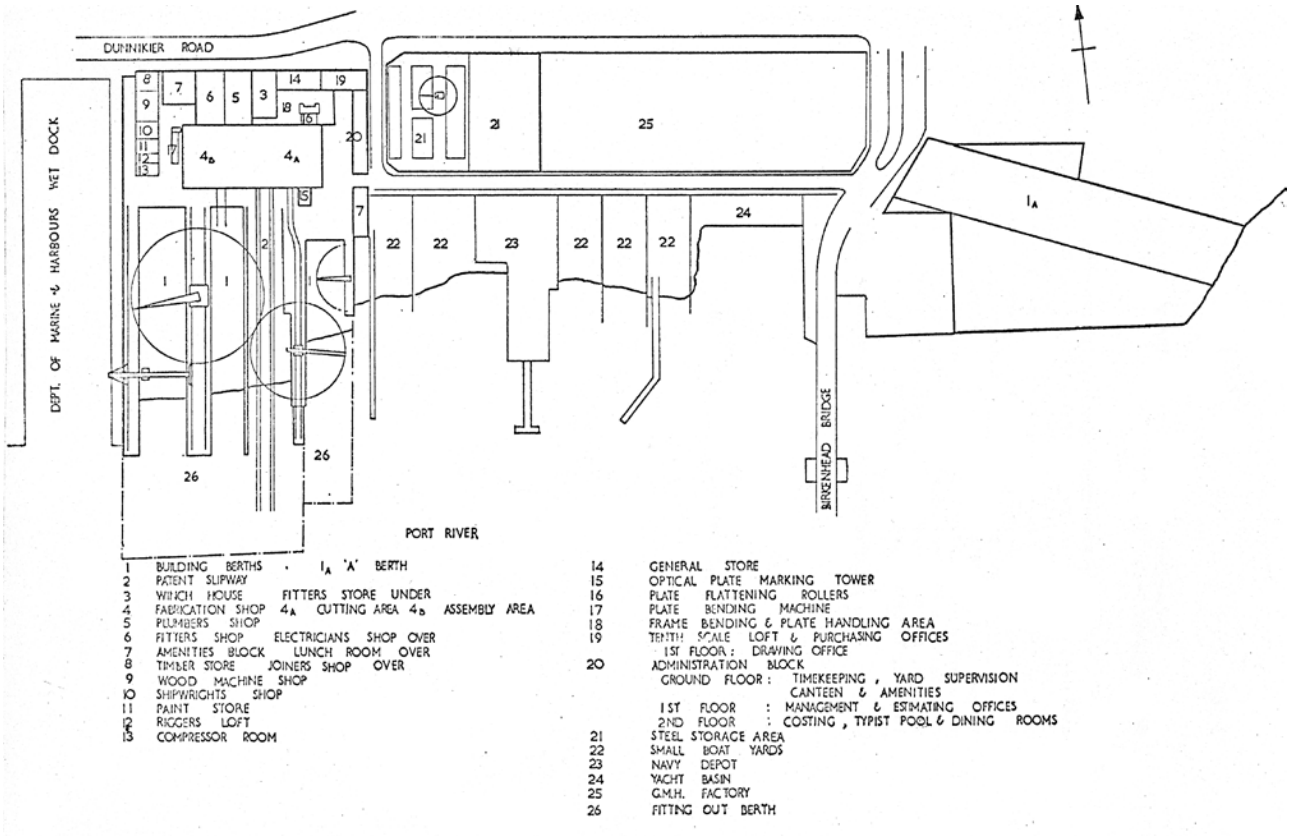
One of Australia's major tug operators, The Adelaide Steamship Company, was in the same situation as the other firms and recognised that there would be a demand for many new and more powerful tugs over the following decade or so, and the company decided to commence shipbuilding to meet this demand for themselves and others. The British company Burness, Corlett and Partners of Basingstoke had developed a range of very successful designs based on their patented Hydroconic hullform, and the Adelaide Steamship Company negotiated a sole licence for building these tugs in Australia.

In 1957 The Adelaide Steamship Company formed a new company in association with Seawork Limited of London, and Adelaide Ship Construction Limited was incorporated on 23 July that year. The Adelaide Steamship Company had operated a large patent slipway known as Fletcher's Slip at Birkenhead near Port Adelaide for some years which was adjoined by an area of land suitable for expansion then controlled by the South Australian Harbours Board. The company also had an engineering works in Port Adelaide which had originally been established for the maintenance of the company's fleet. The first orders received by the new shipbuilder were for two tugs, one for Waratah Tug and Salvage Company, and a second for Wallace Tugs. The keel was laid for the first tug in May 1958 and she was launched as *Warilla* on 12 February 1959. She was completed on 7 August 1959.

The shipyard was being established as this first ship was being built. When begun, the shipyard had only one building berth and a total area of about 2 acres (0.81 ha). In 1960 the yard was expanded to the east and another building berth constructed.

In 1962 The Adelaide Steamship Company bought out Seawork Limited, and Adelaide Ship Construction became a wholly-owned subsidiary. In 1964, as the workload grew, additional space was acquired for two more shipbuilding berths. A new fabrication shop was completed in August 1965 and in January 1966 the installation of a 45 t Whirley travelling crane was completed. By June that year, one of the two additional slipways, No. 4, was also finished and the first ship to be built in this new yard was completed during 1966.

In March 1968 the subsidiary company became a division of The Adelaide Steamship Company. That year also saw an increase in shipbuilding activity in Australia as oil search operations gathered pace around the coast, and No. 3 slipway was completed in May 1968 to give Adelaide Ship Construction the capacity to build offshore supply and rig-service vessels. This increased activity prompted a further increase in the size of the yard and space was leased for a



The layout of the Adelaide Ship Construction shipyard at Birkenhead, South Australia, about 1972
(Adelaide Ship Construction drawing)

fifth shipbuilding berth in an area known as 'A' Berth, some 400 m east of the main shipyard. Two large barges for the erection of oil well-head platforms were built on that site during 1968 and 1969.

Access to the shipyard from the sea about nine miles away was by the Port Adelaide River, which had a channel dredged to a depth of about 10 m. As finally developed, the shipyard had a total area of about ten acres (4.05 ha), with five building berths and two fitting-out wharves. The maximum size of vessel which could be accommodated on the slipways was about 151 m long by 30 m beam, but an opening bridge to seaward of the shipyard limited the size of vessel that could be built to 27.3 m beam. Fully employed the yard had a workforce of about 1000 people and, in addition to the hulls, designed and built switch boards and towing hooks and completed all fitting out including the main machinery.

Adelaide Ship Construction built 52 tugs, of which 47 were designed by Burness Corlett and Partners. Burness Corlett and Partners also designed a number of other vessels built by the company, including workboats, a derrick barge and a rig supply vessel. Other tugs built there were designed by the Australian Shipbuilding Board, Phillip F. Spaulding and Partners and Sea Transport Design. The development of the offshore oil industry resulted in orders for eleven ships from Ingram Contractors, including three large non-propelled platform-construction and pipe-laying barges and seven supply vessels.

By 1970 the pace of offshore development had begun to slow and the yard sought other markets and orders for larger ships. A competitive shipbuilder, Adelaide Ship Construction won an order for a coastal ship, *John Burke*, from John Burke Pty Ltd, a Dillingham company, despite Dillingham having their own shipyard in Western Australia. The 75.4 m cargo vessel was designed by Warwick Hood.

The largest ships built at the Birkenhead yard were the 6 500 dwt cargo vessels *Cape Arnhem* and *Cape York*, designed by Boulton and Hercus Pty Ltd. These ships, the last to be built in the yard, were intended to provide a fast liner service from east coast ports to the bauxite mining port at Gove. The last ship, *Cape York*, was delivered in September 1973.

Industrial problems during the construction of these cargo ships had resulted in considerable cost increases for the yard and, with the tug market largely satisfied and increased competition from developing yards like Carrington Slipways in Newcastle, the company decided to cease shipbuilding in Adelaide and the yard was ultimately closed down after the delivery of *Cape York*.

Between 1959 and 1973, Adelaide Ship Construction completed 75 vessels at the Birkenhead yard, of which a third were for The Adelaide Steamship Company and its subsidiaries.

References

Shipbuilding in Australia, Australian Shipbuilders' Association, November 1968, pp. 57–65.

History of the Company, Adelaide Ship Construction, ca 1968.

Adelaide Ship Construction, Buster J. Browne, *The Log*, November 1985, pp. 127–139.

The tug *Warrawee*, Adelaide ShipConstruction Ship No. 55, was completed in 1970 for Adelaide Steamship Industries Pty Limited. The 40.9 m tug had a bollard pull of 60 t and was designed by Burness Corlett and Partners
(Photo John Jeremy Collection)

John Burke, Ship No. 66, was completed in 1970 for John Burke Limited
(Photo John Jeremy Collection)

Cape Arnhem fitting out at Birkenhead. Her sister ship, and the last ship to be completed by Adelaide Ship Construction, *Cape York,* can be seen under construction on the slipway behind her
(Photo John Jeremy Collection)

Adelaide Ship Construction's Birkenhead yard from the air about 1971 with one of the Cape-class cargo ships underconstruction
(Photo John Jeremy Collection)

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