

# THE AUSTRALIAN NAVAL ARCHITECT



Volume 4 Number 4  
November 2000



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# THE AUSTRALIAN NAVAL ARCHITECT

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

Volume 4 Number 4  
November 2000

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## Cover Photo:

The barque *James Craig* under sail off Sydney Heads for the first time following restoration. (Photo Sydney Heritage Fleet)

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## From the Division President

At the time of writing this column a Malaysian container vessel, *Bunga Teratai Satu*, is firmly stuck on the Great Barrier Reef, and looks like being there for some time yet. [It was refloated on 14 November — Ed.] This is despite recent plans to blast part of the reef to facilitate the vessel's removal. Simultaneously it has been announced in Victoria that the relevant authorities are considering either deepening the approaches to the Port of Melbourne or developing a new port in Westernport Bay to accommodate the larger container ships expected in future.

These two incidents lead me to wonder if the environmental animosity towards tankers and those associated with them is about to be extended to container ships. While concern over the Barrier Reef incident has died down somewhat as the feared release of oil fuel or hazardous cargo has not occurred, this could soon resurface if there is even a minuscule release of such materials. The furore over the limited release of fuel oil when *Iron Baron* grounded a few years ago demonstrates that. When we add to this the expected arrival in service within a few years of 10 000 teu container ships, up to 350 m in length, and the necessity to develop new ports in environmentally-sensitive areas such as Westernport Bay, the potential for controversy is obvious.

The shipping industry has copped a fair amount of flak over the years from the environmental lobby, some of it eminently justifiable. At the same time a realistic perspective has to be retained. Most of the oil pollution in the oceans, for instance, is not from shipping but run-off from the land — the result of millions of small decisions and actions by individuals. Beating up on the shipping industry, no matter how good it makes people feel, will not deal with problems like this.

As naval architects, with key responsibilities in the marine industry, it is up to us to be aware of such realities and to promote a realistic attitude in the community. People in general, and the mass media in particular, love to have a demon. It is in our own interests to make sure that our industry is not that demon.

An avenue I had hoped to be able to use to pro-

mote the image of the marine industry was the agreement between RINA and IEAust, which has been discussed previously in this journal. When it was signed, this agreement seemed to offer many opportunities to RINA members, including the opportunity to promote the profession and the industry through the avenues offered by IEAust. So far the results haven't been all that great and I am hopeful that this situation can be improved over the remaining 12 months the Agreement has to run.

What do you think we should be trying to get from this agreement? Do you want reduced fees, or more professional development opportunities, or the ability to be listed in a special naval architecture classification on the NPER, or .....? The full text of the Agreement is accessible on the RINA web site. Why not take a look at it then let me know what you think we should do with it.

While you're in a thinking frame of mind, you might like to think also about the Division Council membership for 2001. The By-Laws of the Division say that half the Division Council must be elected directly by members of the Australian Division. The time when this must be done is rapidly approaching, and early in 2001 the Secretary will be mailing out notices calling for nominations. I would very much like to see the six vacant positions filled via a process of nomination and election rather than have them filled by appointment by the Council itself. After all, one of the features which the restructuring of a few years ago was designed to eliminate was the appearance of an Old Boys' Club or a closed shop.

Finally I want to flag the forthcoming visit to Australia of Trevor Blakeley, the Chief Executive of RINA. He will be visiting NSW, Queensland, Tasmania, the ACT and Western Australia, and I expect that the committees in those various sections will organise suitable functions during his visits. If you think that RINA's service to its members could be improved, then here's your opportunity to put your two-bob's worth in where it counts.

*Bryan Chapman*

## From the Chief Executive

### Election of Robert John Herd as an Honorary Fellow of the Institution

In a professional life which has extended over almost half a century, Bob Herd has given exemplary service to both the maritime industry in Australia and to The Royal Institution of Naval Architects. It is therefore with great pleasure that I write on behalf of the Council to inform the members of the Australian Division that Bob has been elected an Honorary Fellow of The Royal Institution of Naval Architects.

As the Chief Naval Architect of the Australian Commonwealth Department of Transport, Bob made a significant contribution to ship safety through his involvement with the formation of maritime policy and legislation, which included representing Australia at the International Maritime Organisation. His expertise was widely sought and highly valued at numerous marine enquiries including such tragic events as the loss of the destroyer HMAS *Voyager*.

During his long professional career, Bob participated in many marine panels and committees covering almost all sectors of the maritime industry in Australia, where his experience and knowledge were much sought and highly valued. Such experience and expertise were also very much appreciated by the students of the Royal Melbourne Institute of Technology where he was a lecturer for many years. He has actively supported the development of younger naval architects and remains a role model to the present day.

Bob's service to the Royal Institution of Naval Architects in Australia has been equally long and distinguished. He has been a member of the Institution for almost 50 years, and a member of the Australian Division Council for nearly 25 of those years. He is a past President of the Australian Division and throughout his time has been an active member of the Victorian Section, serving on its committee on numerous occasions and in various posts. He has also been an active participant in many Australian Division conferences.

Without the contributions which members make through the time they give to the Institution's committees and its Sections, and their support for its activities, the Institution could not function as the highly-respected international professional institution that it is today. The maritime industry also benefits from the dedication of those who give their time and experience to improving safety and professional standards in so many ways. Such individuals are exemplified by Bob Herd, whose selfless and dedicated service to both the Institution and the maritime industry in Australia over many years is recognised by his election as an Honorary Fellow of the Royal Institution of Naval Architects, joining those other 86 distinguished Honorary Fellows elected since 1860 when the Institution was founded.

It is hoped that Bob and his wife will be able to attend the Annual Dinner of the Institution, in London next April, when he will be presented with his Diploma of Honorary Fellow. I am sure that all members of the Australian Division, and particularly his friends and colleagues in the Victorian Section, will join with me in congratulating Bob on his election as an Honorary Fellow.

*Trevor Blakeley*  
*Chief Executive*

### Editorial

During September and October, two major events in Sydney distracted many of us from normal life. Despite many dire predictions of disaster, the Olympic and Paralympic Games were an outstanding success.

Whatever one's views of sport and the politics of the Olympics, there is no doubt that staging the Games is a huge undertaking and an enormous challenge for any nation. Many people and industries throughout Australia contributed to the success of the Sydney Games over many years of preparation. For those of us who participated, the rewards were varied, but for me it was the pleasure of working as part of a large team with a common objective to complete the job very well. Just like building a ship, in fact.

Of course, in any project of that size, there are bound to be problems. There were initial transport

hitches, the influence of politics (of all kinds) at various levels and, of course, that hitch with the cauldron during the opening ceremony (I never completely trust micro-switches). The test of any organisation is its ability to manage these problems as they arise and carry on as if nothing had happened. That happened in Sydney and, as the days passed, we proved once again what many of us believe — that given leadership, good management and (of course) money there is little that Australians cannot do.

Throughout the preparations there was frequent debate about the legacy of the Games. The debate continues today as, for example, the Olympic Sailing Marina (due to be removed by March 2001) lies empty and subject to speculation about its possible retention. Certainly, there is a substantial legacy in the form of magnificent sporting venues around Sydney, some of which will never be used again as intensely as they were during those two weeks in September. But I would like to think that there are other long-term benefits. The power of the volunteer was clearly demonstrated during the Games, yet every day volunteers make a major contribution to our society. Perhaps that contribution might be better recognised and encouraged in coming years.

Possibly the most valuable legacy is a realisation that we are a modern, capable and friendly nation that is capable of meeting any challenge at least as well as anyone else. There are plenty of other examples that demonstrate this fact, but few receive the publicity given to the Games. We face many challenges in coming decades, including the defence of Australia, controlling salinity in the Murray-Darling basin, finding new sources of power for the next century and beyond, and reducing our greenhouse gas emissions, to name but a few. We need to stop wringing our hands and get on with the job.

*John Jeremy*

## Letters to the Editor

Dear Sir,

I note with interest the opinion expressed by Rob Dunbar in his presentation to the ACT Section on *Anzac Ship Design Development*. He expressed

concerning at the lack of customer involvement in the early stages of the Anzac Ship Design. I could not agree more with Rob's opinion. From my involvement with the Anzac Ship Project during the early stages of design, there was definitely a 'hands-off the design' policy adopted by the project from the onset. The policy was to pass all of the design responsibility and any resulting blame squarely on the contractor. In other words the Department of Defence was driven more by contractual demands than engineering needs.

When will Defence wake up to the fact that, with large multi-billion dollar projects, it is of paramount importance that the customer and the contractor work very closely together with a high degree of trust on both sides? A problem shared is one that is usually more readily solved and reduces any possible contract implications. There are still many lessons that our so-called Defence project managers and administrative hierarchy have yet to learn. Maybe it is up to the naval architects and practising Engineers to emphasise this aspect more so than they have in the past. It could even be a worthy subject for a future RINA technical paper.

*Brian Robson*

[Rob Dunbar's presentation has attracted considerable interest. We have reproduced the paper he presented at Sea Australia 2000 in this edition of *The Australian Naval Architect* — Ed.]

Dear Sir,

I am a third-year naval architecture student at The University of New South Wales. Among the reasons I have chosen this course are the design skills I can gain and the challenges the course offers. Being a naval architect, I will be developing simple ideas into specific designs, down to the details and the dimensions of each nut and bolt. Not many engineers have this skill, and even fewer can use the skill well. With the existence of great potential in the field of water transportation, there is a high likelihood of success. So far, my understanding of the shipping world has greatly expanded, and is still growing.

It is no surprise that Australia, being the largest island in the world, is the leader in the fast ferry industry. However, in view of the vast amount of the earth's surface which is covered with water, I do not understand why shipping technology is not revolutionising faster than it is. I believe that there should be more awards for excellence in ship design to encourage more new and better ideas. A good example would be *Solar Sailor*, which incorporates a creative propulsion system combined with the latest technology to optimise the performance, while protecting the environment by using renewable energies.

This has been my ambition for a long time; to challenge the traditional world with modern technologies and to come up with ideas to help the community. That is why I am studying to be an engineer and a naval architect.

*Hason Ho*  
UNSW Student

Dear Sir,

I would like to draw to your attention to a problem I have recognized as a third-year undergraduate naval architect. That is, we seem to be something of a very rare species indeed! I certainly do not have any objection to the small class numbers, as it provides the students with the opportunity to interact with their lecturers on a one-to-one basis, which is almost unheard of these days in the tertiary education sector.

However, I fear that, if this trend continues, then the naval architecture course at UNSW may be under threat. Aside from this, the Australian ship design and shipbuilding industry needs 'new blood' continually coming through if it is to remain strong and prosperous in the future.

We need to raise the general level of awareness of what naval architects actually do.

I am positive that, if school students could make an informed decision about the naval architecture course, then more of them would choose to study it.

*Greg Shannon*  
UNSW student

Dear Sir,

As I prepare to embark upon my career as a naval architect, I think it is useful to take stock of naval architecture as a profession. It is important to look at where we have come from in the last century, and where we are heading as we move into the new millennium. [Next year — Ed.]

The dawn of the twentieth century saw naval architecture in a golden period, and shipbuilding was at the cutting edge of technology. Merchants needed bigger, faster ships to keep up with demand for trade from the colonies. Ocean liners were getting bigger, faster and more luxurious as more and more people wanted to travel. The naval race between Britain and Germany was at its peak.

However, the invention of the aircraft changed all that and, as the century progressed, the aircraft took over as the principal means of national and international travel. While never really threatening merchant shipping, aircraft made travel by ship seem slow and laborious.

The last twenty years has seen a revolution in marine technology. The development of high-speed craft has allowed sea travel to compete seriously with air travel over short routes, while providing more space and comfort for the passengers. The use of high-speed ferries is still highly restricted by sea conditions, but the continued development of ride-control systems will open up more routes to ferry operators. Naval architecture is heading into a new and exciting age of development, particularly in the area of high-speed craft and, as Australia is a leader in this field, we are well placed to take advantage of it.

*Nicholas Hutchins*  
UNSW Student

Dear Sir,

I have recently noticed the increasing use of canting keels in large monohull racing yachts, particularly the Open 60 class. These keels have obvious performance advantages over a traditional fixed keel, as they enable a yacht to sail flatter, hold more wind and hence sail faster than a similar fixed-keel yacht by reducing the angle of heel. This is achieved by the keel pivoting off the

centreline of the yacht, providing a greater righting moment than a fixed keel. On top of the performance advantages these keels possess, they also improve a yacht's safety through improved stability. In the event of a 180° capsize the yacht can be righted by canting the keel. The righting moment (GZ) curves I have seen for boats fitted with a canting keel contain no negative righting-moment region, right up to 180° angle of heel, clearly showing the improved safety provided by the device. I have also seen pictures of a fully inverted Open 60 yacht righting itself by canting its keel. This type of yacht has inherent problems in righting itself from a capsize due to its large flat decks and very flat, beamy stern region of the hull.

I foresee canting keels becoming an integral part of racing-yacht safety equipment in the not-too-

distant future as the technology improves and the cost of such a device drops to a more accessible level. If the rule-makers decide against including canting keels in certain races due to their performance advantages, then perhaps a passive system, that does not cant until the yacht heels to the angle of capsize, would be acceptable in that it prevents yachts from capsizing or staying capsized while providing no performance improvement in normal conditions.

The survivability of a crew on a disabled yacht that can right itself is surely better than that of a crew on a yacht that capsizes and remains inverted, and this is why I expect canting keels to become an integral part of sailing yacht safety equipment.

*Martin Johnson*  
UNSW Student

Some of the luxury motor yachts moored in Rozelle Bay in Sydney during the Olympic Games  
(Photo John Jeremy)



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# NEWS FROM THE SECTIONS

## ACT

On Thursday 17 August Mr Phil Brown, General Manager of Tenix Shipbuilding (WA), presented a paper *Philippine Coast Guard Search and Rescue Vessel* to a combined meeting of RINA, IMarE and MARENSA members at Campbell Park Offices. The presentation included the design process, design features, performance and video footage of the boat along with some discussion regarding in-service support and crew training. This presentation was previously given to the WA section of RINA as reported in the last issue of *The ANA*.

On 6 September Mr Rob Gehling presented a paper *Prevention of Pollution by Oil Tankers — Can We Improve on Double-hulls?* at Engineering House in Barton. Readers will recall that this paper was published in the August edition of *The ANA*. Rob spoke to the paper, providing some additional information including data regarding losses of oil tankers with increasing age.

*Bruce McNeice*

## Queensland

The Queensland Section held its quarterly committee meeting on 5 September at the Yeronga Institute of TAFE which was followed by the usual technical meeting. Matters addressed at the section committee meeting included the Advanced Diploma of Engineering (Naval Architecture) course, input to *The Australian Naval Architect*, and a report on the Gold Coast Boatbuilding/Naval Architecture course, which will not proceed. Again the meeting was short and purposeful.

Over fifteen members and visitors in Brisbane and two in Cairns with teleconferencing facilities attended the technical meeting. The meeting embraced the theme *Getting to Know Your Business* whereby Brian Robson, Stuart Ballantyne, Brian Hutchison and Ron Wright spoke for approximately fifteen minutes each, advising the meeting of their professional background and current business interests. Mr Rod Harris,

marketing and advertising consultant, also made a presentation to the meeting regarding the history, design and restoration of his forty-seven year-old wooden vessel. This presentation was both colourful and entertaining.

The next Queensland Section technical meeting will be held at the Gold Coast Institute of TAFE at 1830 on Tuesday 5 December. Interstate members and visitors are most welcome to attend this meeting. The subject of the technical meeting has not yet been finalised.

*Brian Robson*

## New South Wales

The NSW Section Committee met on 17 August and, other than routine matters, discussed the Sydney Marine Industry Group Christmas (SMIX) Bash, the visit to the 98 m wave-piercing catamaran *Incat Tasmania* in Darling Harbour in October, joint meetings with IMarE (Sydney Branch) and IEAust (MARENSA), revisions to the technical meeting program for 2000, the efficacy of the technical meeting program for 2000, the technical meeting program for 2001, the cost of the Harricks Auditorium venue, sponsorship possibilities, and the proposed visit of the Chief Executive in February.

The NSW Section Committee also met on 13 September and, other than routine matters, discussed the Sydney Marine Industry Group Christmas (SMIX) Bash, the IMarE (Sydney Branch) reaction to the proposal of joint meetings with IEAust (MARENSA) and the proposed IMarE/IEAust MoU, the cost of the Harricks Auditorium venue, the proposed visit of the Chief Executive in February and his attendance at an AD Council meeting, the technical meeting program for 2001 in detail, sponsorship possibilities, and the supply of news from the NSW Section for *RINA Affairs*.

The NSW Section Committee also met on 17 October and, other than routine matters, discussed the Sydney Marine Industry Group Christmas (SMIX) Bash in detail, the IMarE (Sydney Branch) reaction to the proposal of joint meetings with IEAust (MARENSA) and the proposed

IMarE/IEAust MoU, the cost of the Harricks Auditorium venue, the technical meeting program for 2001 in detail, and sponsorship possibilities.

George Spiliotis of Germanischer Lloyd (Australia) gave a presentation on *Application of Class Rules for WIG Craft* to a joint meeting with the IMarE attended by twenty-three on 23 August at Eagle House. WIG craft is the UK name for wing-in-ground-effect craft, also known as wingships in the US, as ekranoplans in Russia, and as flareboots in Germany. [These are entirely different to wing-in-ground effect craft (note one less hyphen), because the effect of a wing in the ground is that the craft is going nowhere fast! — Ed.]

The principle is simple: using a low aspect-ratio wing sufficiently close to the ground (or other surface) that the surface modifies the flow over the wing, and the wing is said to be operating in ground effect. The modified flow generates a higher pressure on the underside of the wing, generating more lift, and the drag on the wing is reduced, so that WIG craft require less power to maintain height and speed than craft not so operating. George showed an interesting graph of cost/tonne/n mile vs speed, with displacement craft having a low unit cost up to 30 kn and aircraft having a high unit cost above 200 kn. WIG craft fill the substantial gap in between, with a medium unit cost between 60 and 200 kn.

This was followed by a video on the history and development of these craft, leading up to and following the pioneering work of Alexander Lippisch and the subsequent development by the Russians. One of the main problems is to have enough speed to take off, as it requires a large amount of power to overcome the drag from the water to get the craft into the air.

In 1998 Germanischer Lloyd accepted an application for classification of an eight-seat WIG craft for a shuttle service in Australian coastal waters. This is therefore the first such craft to be classed, and GL has developed a safety concept with formal risk-assessment techniques, and involving compliance with the ISM Code as a condition of class. The structure has been checked against both the GL rules for high-speed craft and the British hovercraft safety rules. The class notation for

*Flightship 8* is  $\Sigma 100AS\ WIG-A\ WH\ 0.5/2.0\ EXP,$   
 $\Sigma MC\ WIG-A\ EXP$ , where the 0.5/2.0 notation refers to significant wave heights for operations. Initial sea trials are scheduled for October 2000 on a lake in The Netherlands, to be followed by trials off Cairns, Qld, in specified wind and sea states.

In conclusion, George said that the safety of WIG craft involves the consideration of engineering and safety issues, and GL has had excellent cooperation from AMSA. The responsibility for complying with the requirements is on the owner, and the Queensland Department of Transport will impose and oversee GL's class requirements, making them mandatory.

Tomas Hertzell of ABB Alstom Power gave a presentation on *Experience with the GT35 Gas Turbine in Marine Propulsion* to a joint meeting with the IMarE attended by thirty-one on 27 September at Eagle House. Thomas began his presentation by asking why gas turbines are used at all, since marine diesels are effective and can run on heavy fuels. He then examined some of the criteria for commercial activities (low operational cost, high availability and high revenue generation), and the selection factors for marine propulsion (specific fuel consumption, fuel quality and hence price, power/weight ratio, space required, operational availability and emission performance).

Marine propulsion has, for the past twenty-five years, been dominated by diesel engines. However, gas turbines have now found a market in high-speed ferry applications, as a result of the growth in both size and speed. Higher speeds and sizes need greater power. With diesels this would require installing additional high-speed engines, or switching to larger medium-speed units, but both of these options would lead to a reduction in payload capacity, and this is where gas turbines enter the picture.

Marine gas turbines come from three principal sources; aero-derivative (such as the LM2500), light industrial (such as the GT35, which is more robust than the aero-derivatives, has lower efficiency and lower power/weight ratio, but compensates for these with more fuel flexibility) and heavy industrial/utility.

A gas turbine has significant advantages over a diesel in terms of its power/weight ratio which is typically 0.09–0.10 kW/kg for a medium-speed diesel and 0.125–0.25 kW/kg for a high-speed diesel, compared with more than 0.5 kW/kg for a gas turbine. Also, a gas turbine installation is more compact than a diesel plant of the same capacity. The gas turbine does not require daily maintenance activities and has longer service intervals which, in general, allows additional daily service hours for a higher degree of utilisation of the vessel. A gas turbine can be completely removed and replaced within 24 hours.

With the introduction of more stringent emission requirements, in particular for  $\text{NO}_x$ , a gas turbine has a further advantage due to the possibility of controlling the  $\text{NO}_x$  formation in the combustion chamber, without resorting to external clean-up. With a standard burner, the gas turbine has a  $\text{NO}_x$  output of around 5–6 g/kWh, compared to 10 g/kWh for a diesel. With dry low-emission (DLE) burners, the gas turbine can reduce this to 2–3 g/kWh. Further, the exhaust gases are practically invisible (even at idle) for the gas turbine, but nothing like invisible for the diesel.

The main disadvantage of the gas turbine compared to the diesel engine is its lower efficiency in the smaller output (up to 15 MW) range. However, the gas turbine compensates for this with the use of IF30, a low-cost fuel mix of around 70–75% IF80 and 25–30% light distillate, a mixture which is typically 30% cheaper than the fuel required by high-speed diesels and aero-derivative gas turbines.

Thomas went on to speculate about the future of gas turbines, which looks good in the high-speed ferry market due to the quest for size and speed. The most promising area for further use may be for combined gas/electric systems (COGES), where the gas turbine is used as the prime mover for electricity generation, and the electricity can be used for propulsion and/or auxiliary systems.

The general level of interest in Thomas' presentation is indicated by the fact that question time took up almost as much time as the actual presentation!

A ship visit was arranged on 5 October to Incat

Australia's 98 m wave-piercing catamaran *Incat Tasmania* which was moored in Darling Harbour, on charter to AusTrade's Business Club Australia, for the duration of the Olympic Games. Approximately eighty-five naval architects and marine engineers availed themselves of the opportunity to see over the latest, and largest, wave-piercing catamaran from Incat Australia. The starboard half of the lower vehicle deck was fitted out as a replica of Old Hobart Town, complete with The Shipwright's Arms hotel, ship providers and chandlers, butchery, bakery, blacksmith's, coffee shops, and a prison cell, all serving as offices and living quarters for the Incat staff during the stay in Sydney.

The tour started with the main and mezzanine car decks, including the flow-through ventilation system, wound up to the passenger decks (which are huge without their seating) where the Hales Trophy was on display, and checked out the bridge and control stations. The helm was of particular interest, being a wheel of about 60 mm (yes, mm not cm!) diameter built into the starboard arm-rest of the captain's chair! A walk aft of the bridge to inspect the dry vertical exhausts (something of a departure from previous practice of wet exhausts in between the hulls) which are said to be whisper quiet. The tour then wound down to the port engine room to inspect the two twenty-cylinder Ruston 270RK diesels (painted gold for the Olympics) which drive Lips 120E waterjets through Reintjes gearboxes. The auxiliaries are mounted transversely at the forward end of the engine room, one above the other so that, in the event of flooding, the upper one will still be operational.

The visit was arranged by Mr Joe Natoli, Sales Manager for Alstom Australia who supplied the Ruston engines for the vessel and who, personally, led some of the tour groups. We extend our thanks to him and to Incat Australia for making the visit possible.

Peter Curtain of Curtain Bros (Qld), the designers, builders, owners and operators of the new PNG Dockyard in Port Moresby, gave a presentation on *The Design, Construction and Operation of the New PNG Dockyard at Port Moresby* to a joint meeting with the IMarE attended by twenty-nine on 25 October at Eagle House. The Curtain Bros Group, based in Townsville, are civil,

mining and general construction engineers. They have been established in Papua New Guinea for some 33 years and have carried out several major construction contracts in the mining, pipeline, and road-building fields there. They saw a need for a dockyard in the area, as labour costs are low and the area is at the crossroads of the Pacific to South-east Asia shipping lanes. They arranged for a ninety-nine year lease on the site, Motukea Island, a fifteen-minute drive around the bay from the city centre of Port Moresby in the north-west corner of Fairfax Harbour.

Construction began in 1998, with the levelling of the 6 ha island into a 55 ha industrial area, of which the dockyard now occupies over 12 ha. Dynamic compaction of the fill (continual dropping of a 6-tonne mass from a height of 13 m) was required under the maintenance bays and hard-stand areas. Access to the site is now by a single causeway, and security is simple. Curtain Bros worked with marine consultant Peter Madsen, of Madsen Giersen in Brisbane, who had had no previous experience of dockyards, but also had no preconceived ideas. He had, however, had plenty of experience on wharves and other marine structures, and all of that was useful.

Phase 1 of the dockyard, which has been completed, includes a slipway capable of taking vessels up to displacement 5300 t, length 125 m and beam 25 m. Slipping is done on a wedge-car system, where the longitudinal cradle is wedge-shaped in profile, the top is level and the underside is at the slope of the ways of 1:15. There are two winches, offset from the ways to allow direct transfer of vessels forward, and the wires are led from the top of the drums, rather than the bottom. The working wire on an eight-part purchase is 44 mm, and the main wire on a three-part purchase is 68 mm and is hooked up only for vessels exceeding 3500 t. The transfer cradles run on top of the wedge-car and, when hauled up, can transfer a vessel to any one of five maintenance bays. At each bay, fully reticulated fresh water, salt water, compressed air and electricity supplies, sand blasting and airless spray-painting machines are available. Water is a problem in Port Moresby, and the dockyard has installed its own desalination plant. There is no provision yet for containment of blasting residue, but the Department of the Environment is showing in-

terest.

The dockyard currently employs some 200 PNG nationals and third-country tradesmen under the supervision of expatriate managers. Fully-serviced office facilities are available for visiting owner's representatives and certification personnel. The dockyard has been operational since 4 July 1999 when they slipped the ro/ro vessel *Coral Trader* (ex *Bass Reefer*) and, to date, has slipped over 80 vessels ranging from 100 t prawn trawlers to a 3000 t ro/ro vessel. In addition to the wedge car there is a mobile shiplift which was built by Carrington Slipways and is capable of lifting vessels up to 180 t. The project has cost approximately \$25m to date.

Phase 2 of the project will expand the facility with two graving docks, the first for Panamax-sized vessels, and is expected to begin construction in 2001.

Peter illustrated his presentation throughout with slides showing the various stages of construction, and kept the audience rivetted with the details of the project, the problems they faced and how they overcame them on the run. Peter flew in from Brisbane on an afternoon flight and, following his presentation, caught an evening flight back. A well-deserved vote of thanks was proposed by Darren Peh and carried with acclamation.

[Eagle-eyed readers of *Naval Architects on the Move* for February 2000 will realise that Ian Stevens, ex Darwin Ship Repair and Engineering and laconic NT correspondent for *The ANA*, is now managing the PNG Dockyard — Ed.]

*Phil Helmore*

## Tasmania

A series of seminars have been held since April 2000 under the banner of AMC/RINA. On 21 July Dr Damien Holloway of Johnstone McGee & Gandy Pty Ltd gave a presentation on *Motions of High-Speed Craft in Time-domain Simulation*. On 7 August A/Prof. Lawrence Doctors presented *Influence of Hull Configuration on the Motions of Catamarans*. Mr David Lyons of Lyons Yacht Designers presented *Contemporary Sailing Yacht Design* and *Contemporary Composite and Sandwich Laminate Design as ap-*

**The Australian Naval Architect**

*plicable to Small Craft* on 11 August, and Mr Anthony Hayden of ESSO Australia Pty. Ltd presented *The Offshore Oil and Gas Industry in Context of Esso/BHP's Gippsland Production System* on 18 August.

Mr Graham Jacob, research scholar at the University of Tasmania, Hobart, spoke on *Survey of Small Craft and the USL Code* on 8 September, and Mr P King and Mr D Simper gave a lecture on the Navy Systems Branch's use of *Modelling*

*and Simulation in Support of Maritime Development Activities* on 6 October. In association with the monthly meeting of the RINA Tasmania Section a visit to Incat Tasmania made on for 5 October to view the WIG craft.

A successful workshop on Yacht Design was held on 29 and 30 July 2000.

*Prasanta Sahoo*

## COMING EVENTS

### Queensland Section

There will be a technical meeting at the Gold Coast Institute of TAFE at 1830 on 5 December. All are welcome.

### ACT Section

There will be a sailing day and BBQ on Lake Burley Griffin on 9 December. Further information is available from Bruce McNeice on (02) 6266 3608 or e-mail [bruce.mcneice@defence.gov.au](mailto:bruce.mcneice@defence.gov.au).

### NSW Section

The inaugural Sydney Marine Industry Christmas (SMIX) Bash will be held on Thursday 7 December on board *James Craig* alongside Wharf 7, Darling Harbour from 1700 to 2200. All in the marine industry are welcome, and partners are particularly welcome. There will be a nominal charge of \$10 per head, and numbers are not unlimited, so book now with James Fenning on (02) 9427 2822 to reserve your place(s). You may pay at the gangway, or put your cheque in the mail to him at Incat Designs, 1 Mafeking Ave, Lane Cove NSW 2066. As they say in the slipway business: no cash, no splash!

### MarTec 2001 Conference

The Australia/New Zealand Division of IMarE will host the third international maritime conference at the Plaza International Hotel, Wellington, New Zealand, from Monday 19 to Wednesday 21 November 2001. The conference is being organised by the Wellington Branch in conjunction with the

Sydney Branch. The theme of the conference will include latest developments, high-speed craft, fishing vessels, yachts and all aspects of the marine industry. Details are being developed; watch this space. Further information may be obtained from Mr Barry Coupland, phone +64-4-385 0408, fax 385 9258 or email [barrian@actrix.gen.nz](mailto:barrian@actrix.gen.nz).

### PACIFIC 2002 International Maritime Conference

Fresh from the success of their inaugural Sea Australia conference, the organisers are already planning the second, the Pacific 2002 International Maritime Conference, to be held in conjunction with the Pacific 2002 Exhibition and the Sea Power 2002 Naval Conference. All will be held at Darling Harbour, NSW, from Tuesday 29 January to Friday 1 February 2002. The International Maritime Conference is being organised by the Royal Institution of Naval Architects, The Institute of Marine Engineers, and the Institution of Engineers, Australia, with a steering committee under the chairmanship of John Jeremy. Further details may be obtained from John on 9326 1779 or email [pacificimc@tourhosts.com.au](mailto:pacificimc@tourhosts.com.au).



## GENERAL NEWS

### Australian Customs Service Patrol Boat Fleet Completed

With the completion of the Australian Customs Service's fleet of eight new patrol boats by Western Australian shipbuilder Austal Ships, Australian coastal surveillance capability has been significantly boosted. The Commonwealth of Australia contract was signed in May 1998, with each 38 m vessel being completed on time as scheduled throughout the contract. The last three vessels were delivered in August 2000.

Commenting on the new fleet, Australian Customs Service National Manager of Border Operations, Peter Thomson, said 'That eight highly technical vessels could be delivered not only on time and on budget, but also to such a high standard, is a credit to Austal. Austal should be commended not only for the innovative design of the patrol boats, but also the professional way in which they have managed the construction.'

Since the first of the Bay Class patrol boats entered service in February 1999, they have proved to be a great success and, as part of their every day work, have been involved in major drug interceptions, interception of suspect illegal entrant vessels, surveillance and search and rescue. Significantly, *Holdfast Bay* played an integral role in the largest cocaine haul ever in Australia off the coast of NSW in February 2000.

With the completion of the delivery program, Austal and the Australian Customs Service have entered a new phase of their relationship, with Austal providing a comprehensive maintenance program for the vessels at the various Australian ports and regions in which they operate for a period of 3½ years. The Commonwealth has the option to extend the maintenance service period to ten years.

The new patrol boats are *Roebuck Bay* (completed in February 1999), *Holdfast Bay* and *Hervey Bay* (completed in August 1999), *Corio Bay* and *Botany Bay* (completed in February 2000) and *Arnhem Bay*, *Dame Roma Mitchell* and *Storm Bay* (completed in August 2000).

### Commonwealth Acquires Full Ownership of the Australian Submarine Corporation

The Federal Government announced on 30 October that the Australian Industry Development Corporation (AIDC) had signed an agreement for the acquisition of the remaining 51.55% equity in the Australian Submarine Corporation (ASC).

The equity will be acquired for \$43.49 million and it was expected that the acquisition would be finalised later that week. Shortly thereafter, all of the share capital in ASC was to be transferred to direct Commonwealth ownership.

The Minister for Finance and Administration, John Fahey, said that the impending acquisition was the first stage of a reform process expected to lead to ASC's onward sale to the private sector.

'The acquisition is a critical step in ensuring that the Collins project is brought to a satisfactory conclusion and that the capability exists to support submarine repair, refit and enhancements in the long term', Mr Fahey said.

The Government considers that these changes will be beneficial to ASC's future, recognising that the build phase of the Collins Class project is nearing completion and that the company is currently in the process of transformation to a smaller-scale maintenance and support operation.

The Minister for Industry, Science and Resources, Senator Nick Minchin, said the Government wishes to maintain and enhance the considerable skill base that has been established at the ASC due to the company's importance to Australia's submarine capability.

The Minister for Defence, John Moore, said that an immediate step would include a review of future contractual arrangements between the ASC and the Commonwealth for the support of the Collins Class Submarines.

As a first stage in this process, three international firms, BAE Systems PLC, Newport News Shipbuilding Inc., General Dynamics Corporation, and

two domestic companies, ADI Limited and Tenix Pty Ltd, have been invited to take part in a funded study which will canvass options for the future arrangements.

These participants have been selected on the basis of their whole system submarine construction and support experience or their substantial Australian naval shipbuilding and repair expertise.

It is envisaged that other Australian and overseas companies with relevant experience will be given the opportunity to discuss aspects of the study with participants.

The Ministers said that the resultant study reports will be used by the Commonwealth in refining and developing better and more sustainable arrangements for future support of the Collins Class Submarines and will also assist in developing a privatisation strategy for the ASC.

Senator Minchin and Mr Fahey said that a new Board for the ASC would be announced once the Commonwealth had taken full direct ownership and control of the company.

## Defence Community Consultation Team Report Released

On 9 November the Minister for Defence, John Moore, released the outcomes of the first national consultation process on Defence, *Australian Perspectives on Defence: the Report of the Community Consultation Team*.

The Community Consultation Team (CCT) comprised The Hon. Andrew Peacock, (Chairman), Dr David MacGibbon, Mr Stephen Loosley and Major-General Adrian Clunies-Ross (Retd).

‘The Community Consultation Process (CCP) was the first of its kind by any Australian Government, an innovative and highly valuable approach to policy development on important defence and security issues,’ Mr Moore said. ‘The feedback received is contributing to formulation of the upcoming Defence White Paper, which will map out Australia’s defence requirements and policies for the next 10 to 20 years.’

## Key findings of the CCT report

The CCT Report is divided into seven main chapters. Each chapter has a number of key findings that reflect the main conclusions on the issues that it covers.

### Strategic fundamentals

Most people believe that the first and foremost task for the ADF is the defence of Australia. An integral part of this belief is an expectation that the ADF, alone or with coalition partners, should be able to undertake significant operations within the region, particularly in our nearer region. Many participants argued that the most immediate threats are non-military, namely illegal immigration, drug smuggling, attacks on information systems and terrorism.

Participation in peacekeeping operations, particularly in the region, is strongly supported as being in Australia’s interest. There is strong support for the US alliance and the majority view is that we should strive for as much self-reliance as possible within the context of the alliance.

### Structure and capabilities of the ADF

Most people believe that the ADF should be structured to maintain a war-fighting capability for the defence of Australia and its interests. They argued that such a force could readily be adapted for other roles, such as peacekeeping, but the reverse is not true.

Most people argued for a better resourced Defence Force and that a properly equipped and balanced force structure provides the best way of coping with all eventualities and supported the need for a highly capable ADF. Specifically, there was notable support for:

- the Army being able to sustain combat operations in two separate locations;
- the Navy retaining a blue-water capability based on surface combatants and submarines;
- replacing and expanding the patrol boat fleet;
- maintaining highly-capable combat aircraft;
- maintaining a capability edge in key areas,

including intelligence, surveillance and reconnaissance capabilities.

## **Reserves**

The public strongly supports the concept of Reserve forces being full partners in the ADF, particularly to help sustain operations. Most people believe that there are too many impediments at present for Reserve forces to meet that objective. The public expressed strong support for measures that would make it easier to deploy Reserves, and deploy them quickly. Greater incentives for reservists and their employers are also strongly supported and there is support for a Cadet scheme, funded and controlled by Defence.

## **Industry**

There is strong public support for a sound, competitive domestic industrial base as a key element of the national defence effort. There is also widespread concern about the decline in Australia's manufacturing capability, the de-skilling of Australia's workforce, including the ADF, and about industry's capacity to support and sustain ADF deployments.

Industry groups see themselves as a fourth arm of defence capability. Defence industry wants predictability and direction to allow it to plan in a sustainable manner and wants to see a strong industry aspect in the forthcoming Defence Policy Statement that includes a clear articulation of the longer-term requirements of both Government and industry.

## **Defence spending and efficiencies**

The public supports an increase in defence funding but expects greater discipline in defence expenditure.

## **Interests of regional Australia**

Regional Australia has great pride in our Defence Force and identifies strongly with the local Reserve units. Some communities were concerned that our sea and air borders may be being breached and would welcome an increased ADF presence across the north.

The presence of Defence in regional Australia provides considerable economic and industrial

benefit to the local region and there are very strong links between many local communities and the ADF bases.

Efforts should be made to improve community awareness of the activities of Coastwatch and their linkage with the Regional Force Surveillance Units.

## **The process**

The consultation was wide ranging and went well beyond the limited number of academic specialists, media commentators and interest groups who usually dominate the defence and security debate. It extended over nine weeks — running from 6 July to 7 September 2000.

The Community Consultation Team attended 28 community meetings in capital cities and regional centres. Meetings were also held with state and territory governments, interest groups, business and industry associations.

## **The community response**

The response was tremendous. Over 2 000 people attended the 28 community meetings. More than 1 150 written submissions were received and well over 60% were from individual citizens. The secretariat received 5 316 email messages and 3 674 telephone calls and voice-mail messages. Over 17 000 hard copies of the discussion paper were distributed. As well, there were 6 453 downloads of the discussion paper from the web site.

Copies of the Report are available at <http://www.defence.gov.au/consultation>.

## **RINA submission to CCT**

The Australian Division of RINA made a submission to the Community Consultation Team. The submission is available at <http://www.rina.org.uk/au>.

## **Pacific Patrol Boat Project Extended**

The Prime Minister has announced that the Pacific Patrol Boat (PPB) Project will be extended for a further 25 years.

Welcoming the Prime Minister's announcement,

**The Australian Naval Architect**



the Defence Minister Mr John Moore said 'Mr Howard's announcement is a significant boost to Pacific countries which need help to protect their fisheries. This assistance from the Government and people of Australia will help those nations build a more prosperous future.

'The PPB Project is a great example of the very important work Defence does in the region. It is the most successful Defence cooperation project we have undertaken and is a powerful symbol of Australia's strategic partnership with the South Pacific region.

'The patrol boats provide Pacific Island countries with a visible and effective maritime surveillance capability, as well as a search-and-rescue capability. They are considered by the nations that have them to be a very valuable asset.'

With the first Pacific Patrol Boat due to reach the end of its planned 15 year life in 2002, Australia has offered to extend the life of each of the 22 Pacific Patrol Boats so that they are able to operate for a total of 40 years. This life extension program will extend Australia's involvement in the project out to 2027 at an estimated cost of \$350 million.

The life extension program will involve a major capital upgrade to each boat, and Australia will continue to provide training, advisory and maintenance support over the period of the life extension program.

## Queensland News

NQEA have almost completed trials on the 85m hopper suction dredge *Brisbane* for the Port of Brisbane Corporation (see the last issue of *The ANA*) and is expected to be delivered one month early. NQEA also has a 30 m low-wash catamaran under construction. Subsea has a 24 m aluminium cruiser under construction while Cairns Custom Craft are well advanced with the construction of a 21 m dive boat. Tenix (in conjunction with Tropical Reef Shipyard) are progressing the RAN LCH life-of-type project with work beginning on the third of the class to be upgraded, HMAS *Tarakan*.

Brian Robson

## New South Wales News

### New Design

Commercial Marine Design in Daley's Point are designing a 2 000 t gravel carrier for operation from a quarry to a crushing plant on Kaipara Harbour, on the west coast of the north island of New Zealand, north of Auckland's Manukau. The vessel has a length of 58 m, beam 16 m, depth 4 m, and will be powered by twin 450 kW main engines driving 1.8 m diameter propellers in MARIN No. 37 nozzles with four rudders having high-lift flaps, for a service speed in the loaded condition of 8 kn.

### New Construction

Warren Yachts in Kincumber is building *Slipstream*, a three-deck GRP megayacht, of length OA 44.3 m, beam 8.53 m, and draft 2.1 m, with accommodation for 12 guests and 12 crew. She will be powered by twin Caterpillar 3412 diesels, each developing 1350 kW at 2300 RPM, driving 1060 mm diameter five-blade highly-skewed Teignbridge propellers for a cruising speed of 15 kn. The vessel carries enough fuel for trans-Atlantic range at a speed of 12 kn. The principal naval architect is Ed duBois of Lymington, Hants., England, and all the engineering has been done locally by Ocean Innovations, i.e. Brad English and Steve Nicholls.

### Around and About

DIAB in Sydney are manufacturers of sandwich core materials Divinycell, Klegecell and end-grain balsa. These materials are a central part of composite sandwich technology as applied to small and medium craft design. Richard Stanning has joined DIAB as their Technical Services Engineer and will provide a very effective boost to technical support services. As a shipwright, and degree qualified in Business (Manufacturing Management), his previous position was as Technical Officer with the Cooperative Research Centre for Advanced Composite Structures. Richard has specific knowledge in the area of composite materials processing, and this will add to DIAB's existing strengths in Australia and New Zealand to assist naval architects, boatbuilders and shipbuilders

to correctly specify and apply composite materials in their structures.

The first of the new SuperCats, *Mary MacKillop*, is named after Australian Mary MacKillop who was formally pronounced “Blessed”, the final stage before sainthood, by Pope John Paul II in 1995. They were designed by Graham Parker Design and built in a joint operation by Transfield at Seven Hills, and Bass Boats and ADI Projects at Garden Island. The vessel was used during the Olympics to ferry athletes and VIPs between Circular Quay and the Olympic Park wharf at Homebush Bay. *Mary MacKillop* has since been making crew training runs and intermittent commercial runs to Manly. She is scheduled to begin regular operations to Manly and other destinations around Sydney Harbour by the end of November. It is expected that the SuperCats will replace the existing Jetcats in the short term and the traditional Freshwater-class ferries in the long term. There will be a full report on the SuperCats in the next issue.

The world’s largest solar-powered vessel, *Solar Sailor*, has been operated on Sydney Harbour by Captain Cook Cruises since early July, and was

selected as the VIP vessel for witnessing the progress of the Olympic Torch down Sydney Harbour. This vessel was also designed by Graham Parker Design, and was demonstrated to overseas visitors during the Olympics with a view to selling the technology to builders and operators worldwide. She is now back in operation with Captain Cook Cruises, and can accommodate 40 passengers for sit-down barbecue cruises, and 80 passengers for cocktails or sightseeing cruises. For bookings, phone Captain Cook Cruises on 9206 1122 or visit their web-site [www.captcookcrus.com.au](http://www.captcookcrus.com.au).

Ships in port for the Olympics included *Deutschland*, *Nieuw Amsterdam* and Kerry Packer’s yacht *Arctic P* (ex ice-class savage tug *Arctic*) berthed at Garden Island, *Crystal Harmony* at the overseas passenger terminal at Circular Quay, *Norwegian Star*, *Clipper Odyssey* and *Seaborne Sun* at No. 5 Darling Harbour, and *Incat Tasmania* at No. 7 Pyrmont.

*Incat Tasmania* is the latest and largest vessel from Incat Australia, 98 m long and capable of carrying 900 passengers and 260 vehicles at more than 40 knots. She was chartered by AusTrade’s

Visiting passenger ships *Norwegian Star*, *Clipper Odyssey* and *Seaborne Sun* alongside in Darling Harbour. (Photo John Jeremy)





*Incat Tasmania* at Wharf 7, Pyrmont. (Photo John Jeremy)

Business Club Australia and moored at No. 7 Pyrmont for the duration of the Olympics, where she provided a venue for showcasing Australian manufacturing capabilities to the world. More than 16 000 guests from nearly 200 countries visited the vessel and attended BCA functions on board the vessel. A RINA/IMarE inspection of the vessel was arranged (see separate report in *NSW Section News*). On her last day in Sydney, *Incat Tasmania* took 200 government, military and private VIP guests on a trip from Garden Island outside Sydney Heads. The voyage demonstrated to the guests that, with minor modifications, today's commercially-available high-speed vessels can be used for defence, military and other applications. On her return voyage to Hobart, *Incat Tasmania* called at Port Welshpool, Vic., the first fast ferry to call there since the Welshpool to George Town, Tas., service ceased more than seven years ago. A welcoming crowd of more than 2 000 local residents inspected the vessel and affirmed the local community support for the reintroduction of a Bass Strait crossing to service the area.

*Australia II*, the challenger who won the America's Cup from the USA off Newport, Rhode Island in 1983, has been the main feature of the Australian National Maritime Museum's Leisure exhibition since opening in 1991. The mast and sails have been removed, and the hull was rolled out the northern end of the building on 10 November, in preparation for her voyage by sea to Fremantle. She is returning to the place where she was built, to become the centrepiece for the new

portside building, due to open in 2002.

The Leisure exhibition retains the world water speed record holder *Spirit of Australia* and the veteran 18-foot skiff *Britannia*, which will be placed into a new context and have new stories told about them. A new display, featuring remarkable voyagers, will focus on adventurers in sailing, kayaking and swimming. The centrepiece will be Kay Cottee's *Blackmore's First Lady*, in which she made the first non-stop solo circumnavigation. Other features of the exhibition will be the Sydney to Hobart yacht race, concentrating on the first race in 1945, the disastrous 1998 race, and *Winston Churchill*; kayakers Peter Treseder (Australia to East Timor and back in 1993), and Oskar Speck (Germany to Australia from 1933 to 1939); and long-distance swimmers Susie Maroney and Annette Kellerman.

The model which paved the way for the successful hatchcoverless container ships now plying the world's routes has been donated to the Australian National Maritime Museum by the pioneers of the concept, Advance Ship Design in Sydney. The concept was the brainchild of the late Fred Ellis, and was developed by the company directors, including Don Gillies, Tom Fisher and Des Wittwer. Their model was built in a garage, and they tested it on Lake Macquarie, NSW and, subsequently, at the China Ship Research Centre in Wuxi Province of the People's Republic of China. The result was *Bell Pioneer*, the world's first hatchcoverless container ship, designed by Advance Ship Design

and built by the Teraoka Shipyard in Japan for the Irish-based Bell lines. *Bell Pioneer* is 114 m long and carries 300 containers in six tiers. There are now at least fifty hatchcoverless container ships in operation.

*Batavia*, a flagship of the Verenigde Oostindische Compagnie (the Dutch East India Company), was wrecked in the Abrolhos Islands (on what is now known as Batavia Reef), fifty miles off the coast of Geraldton on her maiden voyage in 1629. The

*Batavia* replica, currently visiting the Australian National Maritime Museum, was built by Willem Vos in Lelystad, The Netherlands, and was shipped to Sydney before setting a sail. Following her inclining in May, *Batavia* put to sea in October and set her sails for the first time off Sydney. The builder, Vos, was on board for the trials, and was delighted with her performance.

*Phil Helmore*

An uncommon sight off Sydney Heads on 4 October — *Batavia* and *Endeavour*.  
(Photo John Jeremy)



## OLYMPIC REFLECTIONS

John Jeremy

Suddenly, it is all over. The flame has been extinguished, the Olympic rings on the Bridge are out and the Paralympic flag has been lowered. A remarkable experience has come to an end.

If anyone had suggested to me five years ago that I would work through the 2000 Olympic and Paralympic Games as a volunteer, I would not have believed them. For me, it all began nearly three years ago when Charles Maclurcan asked if I would like to join the race management team he was putting together for the Royal Sydney Yacht Squadron. I was reluctant to commit, but then Charles said: ‘You realise that there are people who say that we can’t do it, and race management teams will have to be brought in from overseas?’

‘You’ve got to be joking,’ I replied. ‘What a lot of nonsense — of course we can do it!’ I was hooked. Then followed the team training and the practice, including two excellent test events in 1998 and 1999. I have lost count of the number of races we have run on the harbour for Olympic classes in preparation for the big events, but I suspect it is in the hundreds. The team settled into a routine, and the invitation to visit UDAC (the Uniform Distribution and Accreditation Centre) did not have the sense of occasion it

might.

The large numbers of people attending UDAC, and the efficiency of the operation (with a slightly military feel; I expected to be issued with a hat, fur felt, at any minute) foretold the size of the event we were about to experience. The colourful shirts were not what we might buy for ourselves, but at least we would be out of sight on the water!

The venue orientation at Rushcutters Bay Marina (RBM) was shorter than in 1998, but we were old hands — been there, done that — but the base had a new feel; there was something in the air! On 11 September (in full uniform) some of us assembled at Kirribilli to take the Squadron's committee boats *Gitana* and *Era* (chartered by SOCOG for the games) over to Rushcutters Bay. The first stop was at Garden Island for an underwater security check by Defence divers, then a search by police, who gave us a clean bill of health (and a compliment on our choice of refreshment stocks under the forward bunks). Then we proceeded under escort to the base to install electronics.

The large timing system (MTS) display dropped neatly into place on *Gitana* where it had been the previous year, but this time we also fitted a fore-and-aft flag gantry, complete with extra wind speed and direction gear. New equipment also included a computer for displaying and recording wind speed and direction and for Internet access to receive the latest weather forecasts provided by the Bureau of Meteorology from their facility at the base. Very modern, but actually, we never logged on.

On the Friday of the Opening Ceremony we were on the water practising our course changes and communications, and the following day we were allowed to give some competitors (Mistrals) a practice. Confident that we were ready, the events began on Sunday 18 September, with more Mistral races. Shock in *Gitana* when our meticulous gunner had some unexpected discharges with one of the RSYS guns. It had been overhauled and supposedly fixed after similar problems during the winter. It was taken out of use immediately, and the Sydney Amateur Sailing Club came to our rescue with another gun.

Tornado catamarans waiting for launching in the boat park at Rushcutters Bay.  
(Photo John Jeremy)





The Olympic Sailing Base in Rushcutters Bay.  
(Photo John Jeremy)

The SASC gun we borrowed was not of recent vintage. Unfamiliar with its tricks, our gunner had another accidental discharge (30 seconds after a start), into a plastic gear box (which suffered somewhat), setting fire to one of the gun bags. The resulting consternation and clouds of smoke in the cockpit even prompted one of the competitors waiting for the next start to ask 'Are you all right?' Luckily no protests or need for redress.

Concentration on detail was a high priority during this regatta, for the Olympic Regatta is like no other. The atmosphere gradually built in the early days, with the spectator boats allowed on the course area making line sighting difficult for the race officers, and the media providing new race-management challenges. 'Can you hold the next start for half an hour please? The helicopters need to refuel.'

The SOBO (Sydney Olympic Broadcasting Organisation) presence was a new experience for us. Microphones were fitted in the start boat (watch those questionable jokes) and in all the rounding marks (to pick up the polite calls for water!) Three large catamarans fitted with gyro-stabilised cameras with long lenses and several helicopters took the pictures. One of the helicopters acted a data link between the course area and Cremorne (thence by land-line to RBM to join the data provided by our team on the water via the MTS). From the RBM the vision and basic commentary went to Homebush for distribution to the world.

It really felt like the Olympics on 24 September when Course Bravo ran the last Mistral races in a beautiful south easterly wind (rare in this regatta) and bright sunshine. Medals were decided and we were telecast live throughout Europe, Britain and elsewhere (but not Australia). We also ran the final race for the 49ers, and greatly appreciated the gold, silver and bronze medal winners applauding the race management team during their post-race sail past. But the highlights were the final races for the 470 men and women on 28 September. We ran the women's race first, and held the men until it was finished to allow both to be telecast live throughout Australia. The wind was up to 20 kn from the north-east, perfect conditions for great racing. In *Gitana*, near Clarke Island, we could clearly hear the cheering from the large crowds on Bradleys Head, and the noise from the spectator boats when the

Australians won the gold medal in both events was magnificent. It was great to have taken part in such a perfect day.

On our last day on the water we ran the last races for the Europe dinghies in very difficult conditions as hot westerly winds battled a sea breeze. Despite a long wait between the first and second races, both races were good and, for us, a fitting end to the regatta. That afternoon IBM presented awards to the race management teams for electronic scoring (MTS) performance during the events, and we were very proud to receive the gold medal.

We weren't needed on the last day of the regatta, and used the time to dismantle equipment and return *Gitana* and *Era* to the Squadron. *Gitana* still carried the MTS displays and the gantry to be used during the Paralympic Games, although the electronic timing system for mark roundings was not to be used then.

The Bravo Course team set out to provide the competitors with the best possible race management of the highest world standard. Did we achieve our aim? Yes, I think so. Were we perfect? Well, no, but it is just possible that our mistakes went largely unnoticed. Quite by chance Charles Maclurcan and I met the senior Mistral official at RBM on our one day-off. When told of our part in the scheme of things, he said 'I want to thank you for a great job. That last women's Mistral race was not only the best women's race I have ever seen, it was the best Mistral race I have ever seen, period.' That is what it was all about.

470 action at Mark 4 on Course Bravo during a practice race.  
(Photo John Jeremy)





The Gold, Silver and Bronze medal winners in the 49ers leading the Bravo Course race management boats back to the marina. (Photo John Jeremy)

On 19 October we again took *Gitana* and *Era* to Rushcutters Bay for the Paralympics. Only one race management team was needed for these Games, and the base seemed deserted compared to the Olympics. The mood was not helped by the presence of Pickles auctioneers who were sticking labels on everything that didn't move for the great post-games auction. 'No! No, not that, we need it for the Paralympics!'

It soon became evident that we were privileged to be taking part in a very special event. Unlike the Olympics, competitors, volunteers and officials mingled freely, and the friendly atmosphere and team spirit throughout RBM together with the determination of the sailors (despite their differing abilities) made it a regatta to remember. The Bravo Course race management team was practised and relaxed, and everything worked like clockwork. The sailors proved as competitive and skilled as any (they included very experienced sailors), and racing in the two classes (the single handed 2.4mR and the three-person Sonar) was very close. Most of the medals were decided in the last races.

The Sydney Paralympic Games were the first to include sailing as a sport (it was a demonstration sport in Atlanta). By the medal presentation ceremony at RBM on Friday 27 October, it was clear that sailing had found a secure place at these Games. That presentation by the water as the sun set will remain a lasting memory. So will the exuberance of the Armenian Sonar crew when they came second in one race, and the young crewman (who has no arms) who executed a perfect high-five with his skipper — with his foot.

It is hard to come back to reality after such an intense experience. At the start I would not have expected to join tens of thousands of other volunteers, proudly wearing our colourful uniforms, in a parade through the streets of Sydney. To receive the thanks of so many strangers, to look up at the buildings of Sydney in the sun as people throw shredded telephone books over you, is a unique, moving experience. Thank you, Sydney, for giving us the opportunity to contribute to such a great success for Sydney and Australia.



# OLYMPIC SAILING — THE ISAF VIEW

By common consent, the best organised regatta ever. The 2000 Olympic Sailing Regatta, marking 100 years of sailing's inclusion in the Olympics, proved a superb event that produced eleven worthy gold medallists. A fantastic facility ashore, excellent race management afloat and a friendly cooperative spirit from all those involved made this the regatta by which all future events will be judged.

The weather of course played its part, with unseasonably light winds and clear skies persisting across the first ten days. Rain at the beginning of the second week was replaced by more sun and a little more wind later in the week. One thing which did live up to expectations was the trickiness of Sydney conditions. Big shifts and huge variations in wind speed from one side of the course to the other often negated any small boat speed advantages and, in the end, it was the tactically-astute and strategically-aware sailors who came out on top.

A total of 402 sailors from 69 nations competed in eleven different disciplines. A superb effort from the British saw them comfortably at the top of the medals table with three gold and two silver, followed by the host nation, Australia with two gold, one silver and one bronze.

Young and old alike were represented, with both ends of the spectrum competing in different events, with the youngest, at 18 years, Aleksandr Mumyga (Belarus) competing in the Laser fleet where he was placed thirty-second out of the forty-three entries. The oldest was, at 58 years, Eduardo Farre (Argentina) who competed in the Star Fleet.

Whilst there were no nations competing for the first time, there were several nations competing after an absence of several years including Iceland, Morocco, Peru and Sri Lanka.

Jenny Armstrong and Belinda Stowell, Gold medal winners for Australia in the 470s, crossing the finish line in their last race. (Photo John Jeremy)



In addition to what is unarguably one of the most attractive (if tactically challenging) regatta venues in the world, the sailors lucky enough to compete in Sydney also witnessed two of the most spectacular medal ceremonies ever seen. Presented in front of the Opera House in two sessions (on the second Monday and the final Saturday), the Olympic Rings adorning the famous bridge made a perfect backdrop to a perfect setting.

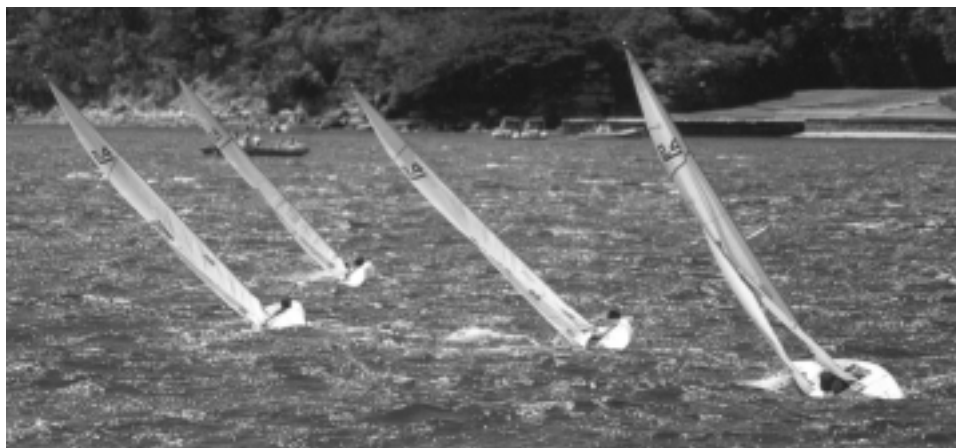
Athens has much to live up to in four years time.

*International Sailing Federation Web site*



Australia's Gold Medal winners Noel Robins, Jamie Dunross and Graeme Martin leading the Silver Medal winners, Germany, in a close Sonar race during the Paralympics (above).

2.4mR racing in a fresh breeze (below).  
(Photos John Jeremy)



# THE OFFSHORE RACING COUNCIL

David Lyons

The Offshore Racing Council (ORC) was established:

- to encourage racing by offshore yachts in general and, in particular, to regulate yachts racing under its rating rules throughout the world regardless of national interests, politics, race or religion; and
- to be the sole international authority, recognised by the International Sailing Federation (ISAF) for the establishment, management, amendment and administration of:
  - (a) the International Measurement System (IMS) and the IMS Regulations with the consent given by the United States Sailing Association;
  - (b) the ORC Club Rule;
  - (c) the International Offshore Rule (IOR);
  - (d) the International Level Class Rules (ILC);
  - (e) ILC Classes under IMS, Ton Classes under IOR and any additional classes developed under its rating rules;
  - (f) additional rating rules it may develop in the future;
  - (g) special regulations;
  - (h) measurement practice for all its rules; and
  - (i) championship rules for offshore classes.

For over a century yachting authorities on both sides of the Atlantic tried to devise a rule which fairly equated yachts of different sizes and speeds. The ancestor of modern rules was the Seawanhaka Rule of 1883 in the USA. This evolved into the Universal Rule of Nathaniel Herreshoff which was in use before the First World War. Similar developments were going on in England and the Boat Racing Association Rule of 1912 showed strong similarities to the rule ultimately adopted for the Fastnet Race by the Ocean Racing Club (ORC) in the late 1920s. At this time a major difference of approach surfaced. The British used girth stations to determine length and in 1928 the Cruising Club of America (CCA) used the British Rule with minor changes.

The use of a common rule on both sides of the Atlantic was short-lived and in 1932 the CCA produced its own rule which tended to be type-forming, containing, as it did, a number of 'base' dimensions. When ocean racing resumed after the Second World War the rules tended to diverge, in that the CCA Rule was adapted from time to time to encourage owners to build the sort of dual-purpose cruiser/racer that the club thought desirable. The Royal Ocean Racing Club (RORC) was less restrictive towards the development of the pure racing boat, such as *Myth of Malham*.

By 1961 it was clear that there were two very different rules, the RORC Rule for Europe and the Antipodes, and the CCA rule for North and South America. This situation was not to the liking of a number of European sailors who gathered in Bremen on 5 June 1961 at the suggestion of Rolf Schmidt of Germany. Later the same year delegates from four countries met in London and decided to form the Offshore Rules Co-ordinating Committee (ORCC). This committee worked throughout the 1960s and the original four countries (Germany, Great Britain, Sweden and the United States) were joined by Denmark, Norway, Finland, Holland, France, Italy, Australia, Canada and Belgium. The ORCC was chaired throughout by Buster de Guingand. They concentrated on trying to align the two rules in matters that were not of fundamental importance, such as the details of sail measurement.

In 1965 there were rumours that the 1968 Olympic Games might include an offshore racing class and in 1966 the ISAF asked the RORC and the CCA to try to frame one international rule. Both clubs agreed and at the April 1967 meeting of the ORCC an international technical committee was established. Olin

Stephens was the chairman and the other American representative was the designer Dick Carter. Europe was represented by Gustav Plym of Sweden and Ricas van de Stadt of Holland. The English measurers, David Fayle and Robin Glover completed the committee.

Between April 1967 and November 1968 the committee met on a number of occasions and the ORCC considered the draft of a new IOR at its November 1968 meeting in London. It was then unanimously agreed to recommend to all national authorities that the Rule should become operative in the 1969 season.

During 1968 and 1969 a Special Regulations Committee was established to carry out the same sort of process with special regulations of different countries that had been done with the measurement rules. A constitution committee was also set up to prepare a constitution for the new council which was to control the rule and was to come into being with the blessing of the ISAF. On 1 November 1969 the ORCC held its final meeting and approved the constitution for the new Offshore Rating Council.

The Council had, from the beginning, a close relationship with the International Sailing Federation whose President, Beppe Croce, was a Council member until 1981. Initially there was some slight suspicion of the role of the new Council and its somewhat limited function was denoted by calling it the Offshore *Rating* Council. However, by the mid-1970s the Council had shown that it had a secure place in the control of level rating as well as rated yachts and special regulations and in 1976 the Council changed its title to Offshore Racing Council.

*It is the spirit and intent of the rule to promote the racing of seaworthy offshore racing yachts of various designs, types and construction on a fair and equitable basis.* Thus began the introduction of the IOR. It was a laudable, if ambitious, aim.

The development of a common international rule had taken thirteen meetings and eight years but all felt that the effort was well worthwhile. The rule which emerged was based on the CCA approach to sail measurement and the RORC method of hull measurement. The biggest problem in 1969, as it is to the present day, was how to determine the vital *L* (length) measurement under a system which is based on the use of girth stations.

For the next three years the Council met at least twice a year and the International Technical Committee even more often. The work of adding finishing touches to the rule took the Council to San Francisco, La Rochelle and Portofino. After 1975 the Council reduced the frequency of its meetings to one a year in London each November. The IOR arrived just in time to catch the boom in international racing represented by the growth of the Admiral's Cup, the Southern Cross Cup and the Onion Patch series. The boom itself caused the serious problems that began to arise in rule management in the mid-seventies. Intense international competition encouraged designers to exploit the rule to the full and to produce highly-specialised racing boats. This was unpopular, particularly in the United States where many owners favoured the traditional compromise between cruiser and racer.

David Edwards, Chairman of the Council from 1970 to 1978, made a great contribution, not least in preserving a delicate balance between the interests, generally favouring rule changes to protect the existing fleet against early obsolescence. Rules were changed as loopholes were exploited.

This policy was followed and was generally popular until the mid-eighties when another surge of development in technology of both design and materials took place. The Rule gave excellent racing to the new designs and still accommodated the older yachts, but the changes which would have been required to make traditional cruiser/racers truly competitive with this new generation of light yachts were becoming too numerous to be acceptable.

In 1985, therefore, the Council decided to adopt the American Measurement Handicap System, renaming it the International Measurement System (IMS), as an alternative rule to accommodate traditional yachts, while continuing to manage IOR for the leading events and for the many other fleets which preferred to continue under that rule. In 1989, a policy of rule stability was adopted with respect to the IOR. This was

strengthened in 1990 by removing the possibility of designing new yachts to the Mark III, a formula which had originally been introduced to promote dual-purpose boats. Also in 1989, certain exotic materials were banned for IMS yachts and smaller IOR yachts in order to keep costs down and reduce unrated performance advantage. By 1990, IMS had become well established in various countries, notably the USA, Netherlands, Finland, Germany and Australia, and thereafter continued to grow steadily throughout the world.

The IOR Level Rating Classes (Ton Classes) were popular at the leading edge of IOR racing until keen racing owners gradually began to turn to IMS designs in the early nineties. Ton Classes had originated with Jean Peytel's idea to revive the old six-metre trophy, the One-ton Cup, for competition without time allowance between yachts rating 22 ft under the RORC Rule. The One-ton Class was followed in 1966 with the Half-ton Cup and the Quarter-ton Cup in 1967, both on the initiative of the Societe de Regates Rochelaises. In 1967 the Yacht Club Italiano started the Two-ton Cup and in 1974 the North American Yacht Racing Union presented the Jean Peytel trophy for the Three Quarter-ton Cup at 24.5 ft IOR rating. In 1973 the clubs who started the original Ton Cups generously presented the trophies and the right to administer the races to the ORC. In 1984 the Two-ton Class was discontinued and the maximum rating of the One-ton Class was raised to 30.55 ft. The One-ton Class became very popular at this new maximum rating and in 1990, following demand from competitors, the Two-ton Class was re-introduced with a maximum rating of 35.05 ft.

Following a two-year development period in the early Nineties, Council inaugurated the International Level Class Rule (ILC Rule) based on levels defined using the International Measurement System (IMS). Under the ILC system, levels are set by 'performance envelope' limits, i.e. performance limits at several points of sail in several wind velocities, ensuring close class racing on all courses. The first ILC World Championship was held for the ILC 40 in 1995. In the years immediately following, the rules for the full ILC family were developed, eventually including the ILC 25, 30, 40, 46 and ILC Maxi Classes. As the new classes emerged, they replaced the corresponding IOR Ton classes, the last ORC World Championship under IOR being held in the Quarter-ton Class in 1996.

Throughout this time, work has continued on the Special Regulations, the objects being to improve the safety equipment and, so far as possible, to standardise regulations in all countries. This has succeeded to such an extent that they are widely used in many countries. The 1979 Fastnet Race led to demands to strengthen the Regulations as well as to encourage increased stability in the yachts, and a special Council Meeting was held in Barcelona in 1980 to ratify these rule changes. There were also demands for a scantling rule to control the construction of hulls and spars. A guide was eventually produced by the American Bureau of Shipping in conjunction with the International Technical Committee and plan approval was made mandatory for yachts built after 1 January 1986 racing in Categories 0 and 1, and other yachts racing Category 2. The Special Regulations are today used worldwide, occasionally modified for local racing, and also used for many simplified rules such as CHS in France and the UK and PHRF in the US.

The ORC has indicated that it is pleased that its work and output has value in this way, and that ORC technology can have application for other systems which give good racing in many places. Moreover, the ORC always stands prepared to assist in any appropriate way with the needs of offshore racing yachtsmen anywhere.

It is the practice of the Offshore Racing Council to be an information resource for enquiries concerning offshore racing under any system. Questions directed to the Secretariat will receive prompt attention or be directed to the appropriate authority.

*David Lyons is a keen sailor and has designed more than fifty yachts. He has expertise in composite materials, especially sandwich construction, and is responsible for technical services with DIAB Australia. He is a member of the International Technical Committee of the ORC. He is currently completing his lectures to the final-year naval architecture students at UNSW on the design of yachts.*

# ***James Craig* – A Unique Ship for the Southern Hemisphere**

Hugh Lander  
General Manager  
*James Craig* Restoration Project

The saga of the restoration of the 19th Century barque, *James Craig*, reached its long-awaited conclusion alongside Wharf 7, Pyrmont, outside the new and permanent home of the Sydney Heritage Fleet, with the re-commissioning of the vessel at a special ceremony on Sunday 12 November.

*James Craig* set sail in the waters off Sydney on 12 August this year for the first time in nearly 100 years. She is a magnificent and wonderful addition to Sydney's fleet of old-timers and her return to active operations stands as a mighty tribute to all those who have participated in her restoration. Many people have played their part, and the project could not have proceeded without each and every one of them.

It all began with the original small band of true believers from the Lady Hopetoun and Port Jackson Marine Steam Museum, now known as Sydney Heritage Fleet. They had the courage and the vision to bring the abandoned and rusting wreck back from her lonely isolation in Recherche Bay, Tasmania, where she had lain for forty years. Then came the countless dedicated volunteers who followed in their

The magnificently restored *James Craig* in Athol Bight as flagship of the Sydney Amateur Sailing Club's 128th Anniversary Regatta on Sunday 5 November 2000.

(Photo John Jeremy)



inspirational footsteps, supported by the paid workforce of tradesmen and artisans who toiled to complete the project before the Olympic Games.

In telling the story of the recovery of the *James Craig* one must pay tribute to the generous individuals and corporations who have given financial and material support without which all other efforts would have been to no avail. It is through the magnificent efforts of all these dedicated people and generous companies that *James Craig* sailed again this year. She will be a source of pride for Australians and a signal to the rest of the world that we have had both the good sense *and* the good fortune to preserve such a valuable maritime heritage item for the enjoyment of all

*Clan Macleod*, renamed *James Craig* in 1905, was built as Yard No. 75, owned by the shipbuilders Bartram and Haswell in Sunderland, England. Her construction took place under the critical eye of a representative of Lloyd's Register of Shipping who meticulously surveyed her throughout her construction, finally granting her the classification Lloyd's 100A1 when she was launched. Contemporary reports state that *Clan Macleod* was 'fitted with every modern contrivance'. Her Official Number was 68086, and her signal flags, MRVJ.

The barque was constructed entirely of iron plates 1/2 an inch (12.7 mm) thick, rivetted onto iron frames and stringers. Her dimensions were length 179.8 ft and beam 31.3 ft. The depth of her hold was 18 ft from her main deck, which was laid with 3-1/2 in yellow pine. The 'tween deck was not planked, since she was not designed to carry passengers. In her reconstruction, however, the 'tween deck has been planked with oregon and celery-top pine to provide a spacious area for functions and for use during cruising.

The lower main and fore masts, bowsprit and lower yards were of wrought iron, and the mizzen was of pine. The main lower mast was 65 ft 6 in in height, with a diameter of 22 in at the deck. All three masts were stepped on the keel. The fore and main yards were 63 ft in length with a diameter of 15 in at the centre. She carried three hatches, the main hatch measuring 14 ft by 9 ft, the fore hatch 5 ft 6 in by 5 ft 4 in and the quarter hatch 7 ft by 7 ft.

Her topmasts were of timber, and standing and running rigging of iron and hemp. She was equipped with two sets of sails, one long boat and two lifeboats. She carried three anchors, with a total length of cable of 240 fathoms. To preserve the iron in her hull, the interior was coated with cement to the upper turn of the bilge, and painted above, while outside three coats of paint were applied.

During her service as an international cargo-carrying ship *Clan Macleod* made 23 roundings of Cape Horn. Whilst we do not claim this as a record it certainly must be regarded as a mighty achievement. Later, in her new role as *James Craig* under the ownership of J.J. Craig of Auckland, New Zealand, the barque made thirty-five round voyages on the trans-Tasman run, giving sterling, almost incident-free, service.

Her working life, however, came to an inevitable end and in the early 1930s she was destined to end her days. For the next forty years the once-proud three-masted barque lay abandoned in the sheltered but cold waters of Recherche Bay.

She was first refloated in 1972 and then again in 1973 and, at 0700 on 26 May of that year, the tow to Hobart, the first leg of her return trip to Sydney, began. It was not until Australia Day 1981, however, that this long trip back was to culminate in her triumphant re-entry through Sydney Heads.

Restoration and then conservation began, but the speed and thoroughness of the work was always dependent on there being sufficient funding to enable work to proceed. It still is.

Many tasks remain to be completed and they include the making and fitting of her deck furniture, installing the running rigging, and making and installing her windlass and capstan. Her final trim is still to

be completed. A full suit of 21 sails with a total area of over 1 100 square metres is being made for her in Perth by a traditional sail-maker.

A feature of the ship will be the captain's and officer's quarters, immediately below the poop deck, which will be fitted out with wood panelling, carvings, period furniture and the like, as it would have been in its heyday. As restorers of the ship we are very proud of our attention to detail. All 424 plates have been hot riveted, not welded, using over 50 000 rivets in the process. All nuts used on the ship have been specially made square headed as was the practice at the time when the ship was built — no hexagonal nuts for this restoration.

Work is well under way with the installation of equipment necessary to gain certification for sailing into and out of Sydney Harbour with passengers. In order to comply with modern navigation and safety requirements, *James Craig* has been fitted with engines, sullage tanks, and modern fire-fighting and fire safety equipment. 21st century navigation and safety devices are still to come. All will be installed in such a way as not to interfere significantly with her 19th century ambience.

Alongside the ship, two lifeboats are being built in the traditional manner. This is a work-for-the-dole scheme, proudly supported by Columbus Line Australia. Young Australians are re-learning the skills that once were commonplace along Australia's waterfronts. When completed they will proudly take their place aboard.

When the restoration of *James Craig* is completed, she will be one of only four operational 19th Century barques anywhere in the world and the only one in the Southern Hemisphere.

This magnificent ship is available as a unique and exciting venue for entertainment. Companies or organisations seeking the perfect venue for entertaining clients and visitors in one of the smartest locations close to the CBD should not miss a wonderful opportunity to use this vessel.

*James Craig* will be put to a variety of uses. For two months of each year she will go to sea taking paying passengers on an exciting ride under full sail. Some of the cruises will be day sail, whilst others will be three-day adventures. She will be surveyed to Class 1C under the USL Code for 100 passengers outside harbour, and 300 alongside or in the harbour. A crew of 25 or so will take her to sea. Her certificate of operation will limit her to journeys of 100 miles or so up and down the coast and 30 miles offshore. She will be required to be in sheltered waters overnight with passengers aboard. For the remainder of the year *James Craig* will lie alongside Wharf 7 at Pyrmont in Darling Harbour where she will be open for inspection as a museum ship.

*James Craig* is open to visitors between 1100 and 1500 hours, for the time being on Sundays only but, hopefully later on, on Saturdays too. Volunteers are urgently sought to help bring the story of this wonderful ship to visitors and, if you would like to become involved, then please contact the James Craig office.

More funds are urgently needed to finish the work and still more are required to set up the James Craig Foundation to provide the ongoing funding to ensure that never again does she sink into disrepair and desolation. Readers are encouraged to consider support of this vital project and, if able to help, they should contact the General Manager, Hugh Lander, on (02) 9298 3870.

For more detailed information contact Hugh Lander, or visit *James Craig's* website [www.seaheritage.asn.au/jamescraig](http://www.seaheritage.asn.au/jamescraig). The site is updated every day with a new photograph of some activity under way or just completed on the ship, and a new entry in the *Daily Diary* describing activities on the restoration project.



# FROM THE CROW'S NEST

## Bureau Veritas' *eRules 2000*

Bureau Veritas have recently released their *eRules 2000*, which is the short title of the latest version of *Rules for the Classification of Ships*, and these are now available from your friendly local survey office. The rules now include not only the rules for steel ships, but the rules for other hull construction materials as well.

## DIAB Scholarship for AMC

DIAB in Sydney are manufacturers of sandwich core materials Divinycell, Klegecell and end-grain balsa. These materials are a central part of composite sandwich technology as applied to small and medium craft design. DIAB has announced a scholarship to a final year undergraduate student in Naval Architecture at the Australian Maritime College. The first recipient is Colin Spence, who is undertaking the design of an IMS maxi charter yacht in composites as his final year Ocean Vehicle Design project.

DIAB is keen to expand its links with tertiary institutions in the interests of training and research. David Lyons, a well-known naval architect, manages the technical services function at DIAB and has just completed his inaugural course in Design of Yachts at The University of New South Wales, the principal focus of which is composite structures.

## Australian Software for Cammell Laird

The ever-expanding Cammell Laird group, which recently secured orders for the design and construction of small passenger and car ferries for the Norwegian operator Torghattan, has purchased five copies of Strand7, a general-purpose finite-element analysis software suite developed by G+D Computing of Sydney, Australia. [Grant Stephen of the University of Sydney and Don Kelly of The University of New South Wales — Ed.] Cammell Laird is initially using the system in association with its NAPA design software for the *Costa Classica* conversion. On-site training has been provided by

Imagineering, the distributor for the UK, Eire and Scandinavia.

NA, Jul/Aug 2000

## Lloyd's Technical Alert

The latest issue of *Classification News*, published by Lloyd's Register of Shipping, advises owners of new International Association of Classification Societies procedures for approving service suppliers. Service suppliers are firms which provide services such as thickness measurements, tightness testing of hatches, in-water surveys, maintenance of fire-extinguishing equipment, the results of which are used by LR surveyors in making decisions affecting classification. Service suppliers must achieve compliance with the new IACS requirements if they wish their services to be utilised beyond the IACS deadline of December 10, 2000. These requirements include a wide range of minimum standards, including levels of training for personnel and adequacy of equipment and facilities. A documented quality assurance system must also be in place. This IACS initiative aims to reduce the risk of inadequate levels of inspection, and should give owners and operators the benefit of increased levels of confidence in the quality and consistency of service levels from the suppliers they employ. *Classification News* may be accessed freely at [www.cdlive.lr.org](http://www.cdlive.lr.org).

*Classification News*, 09/2000

## Do You Need a Naval Architect?

At a recent well-attended marine-industry dinner, a high-profile shipbuilder used as the theme of his after-dinner speech the provocative *Do You Need a Naval Architect?* implying the contrary. Consideration might be given to whether this shipbuilder could have achieved the same without naval architects, and one in particular. Further, to the reason a recent industry award was made jointly, and to Dale Carnegie's wisdom in *How to Win Friends and Influence People*.

*Phil Helmore*

# EDUCATION NEWS

## Curtin University

The Western Australian government has approved, subject to negotiation of the final agreement, the funding of a Centre of Excellence in Marine Science and Technology at Curtin University. The Centre will conduct research and development in hydrodynamics, marine acoustics and underwater technology. Funding in excess of \$2 million over three years from the WA government, Curtin and industry sources will provide a substantial boost to research infrastructure. Vacancies will be advertised before Christmas for an Associate Professor in Hydrodynamics and a Professor in Marine Acoustics. The establishment of the Centre underpins a commitment to provide excellence in research and development for the marine industry.

Dr Jorgen Krokstad of Marintek, Norway, joined the Centre for Marine Science and Technology at Curtin in September for one year as a research fellow. He will be providing support in hydrodynamics research and teaching. This was the first step in an expansion of the Centre — marine acoustician Alexander Kritski joined the Centre in October and further appointments are expected next year.

PhD student Dougal Harris is nearing completion of his research on *Performance of Yachts in Following Seas*. Dougal will be presenting his work at the Chesapeake Sailing Yacht Symposium, USA, in January. On 2 November Curtin research student Stephen Cook presented a paper *Prediction of Catamaran Wave Loads* at the RINA conference *Hydrodynamics Without Integrals*, held at Fremantle in conjunction with Ausmarine 2000. Dr. Jorgen Krokstad of Curtin also gave a presentation, posing the question *Do we still need experiments?* The conference was chaired by Curtin research student Kim Klaka and well received by over 40 attendees.

Curtin University and Challenger TAFE (formerly South Metro College of TAFE) are jointly promoting the articulation of TAFE marine engineering students into the Curtin mechanical engineering degree, with marine options being offered next year.

The Centre for Marine Science and Technology has received an increasing number of enquiries from overseas students wanting to undertake research in naval architecture. At least one Norwegian student will start next year, with the likelihood of other European students also joining us.

Kim Klaka

## Australian Maritime College

The Bachelor of Engineering (Naval Architecture/Ocean Engineering) student final-year research project results were presented in a mini-conference format at AMC on Saturday 21 October.

The conference was opened by AMC CEO/Principal Dr Neil Otway and guests included A/Prof. Jon Hinwood of Monash University (as chief moderator), Mr Martin Grimm of the Department of Defence in Canberra and Dr Roger Neill and Mr Grey Wright of DSTO, Melbourne.

The projects were:

- |            |   |
|------------|---|
| L. Bryant  | <i>Broaching of fishing vessels</i>   |
| J. Davies  | <i>Wave impact forces on cylinders</i>  |
| X. P. Pham | <i>Wave resistance of catamaran systematic series</i>                           |
| A. Nolan   | <i>Self-righting of racing yachts</i>   |
| B. Duncan  | <i>Deck diving of catamarans in following seas</i>                              |
| S. Kelly   | <i>An investigation into roll-yaw coupling</i>                                  |
| G. Carter  | <i>An investigation into dynamic squat/bank effect in shallow water</i>         |
| A. Rashid  | <i>Predicting strength degradation of composite materials due to submersion</i> |
| J. Nolan   | <i>An investigation into the effect of hull form on wave wake generation</i>    |
| P. Duncan  | <i>Vortex visualisation in waterjet inlets</i>                                  |
| R. Peterie | <i>Welded strength of new alloys</i>  |
| P. Ivanac  | <i>Cavitation tunnel tests of a stub hydrofoil</i>                              |
| J. Butler  | <i>Motion prediction of high-speed displacement hullforms</i>                   |

The Australian Naval Architect

A conference dinner was held at AMC in the evening.

*Prasanta Sahoo*

## The University of New South Wales

### Undergraduate News

At the graduation ceremony on 17 October, the following graduated with Bachelor of Engineering degrees in naval architecture:

Shinsuke Matsubara	(Hons Class 2, Div. 1)
David McKellar	
Damien Smith	
Chris Tucker	

They are now employed as follows:

Shinsuke Matsubara	PhD degree at UNSW
David McKellar	Eptec, Sydney
Damien Smith	Austal Ships, Fremantle
Chris Tucker	Austal Ships, Fremantle

Congratulations to all.

At the School's annual undergraduate thesis conference on 20 October the following presentations on naval architectural projects were made:

Bronwyn Adamson	<i>Prediction of Cavitation on Marine Screw Propellers</i>
Sean Ilbery	<i>Wind-induced Trim on High-speed Catamaran Ferries</i>
Dougal Loadman	<i>The Effect on Wavemaking Resistance of Longitudinal Asymmetry</i>
Adam Solomons	<i>The Effect of Hull Material on High-speed Catamaran Ferry Performance</i>
Shaun Yong	<i>Economic Analysis of Very Large Container Vessels</i>

The RINA and BAE Systems jointly offered an award of \$500 and a certificate for the best presentation at the conference on a naval architec-

tural project. Assessment was made on the basis of marks awarded by School staff, with marks being standardised to remove the effects of marker variability. The award went to Adam Solomons for his presentation on *The Effect of Hull Material on High-speed Catamaran Ferry Performance*, and was announced by Mr Phil Helmore at the thesis conference dinner at the Randwick Labor Club on the evening of 20 October. His award and certificate have since arrived from London. Congratulations, Adam!

Also at the thesis conference dinner, the School's 179 final-year students made their annual award for Lecturer of the Year, inaugurated in 1995. This year the Lecturer of the Year award went to A/Prof. Richard Willgoss (who also won in 1998). Several light-hearted awards were also made, Comedian Lecturer of the Year going to Dr Ian MacLaine-cross, Kind-hearted Lecturer of the Year also to A/Prof. Richard Willgoss, and Superman of Four Years to Prof. Kerry Byrne. Congratulations to all.

The School is continuing its drive to place course materials on the Internet for student access, and the latest information is numerical answers to past examination questions. This has been done for some 1999 courses, and will be implemented progressively as these are made available. Supply of a photocopied handout has been done for some years in some naval architectural courses, and these will soon be added. To check out a sample, visit the School's website [www.mech.unsw.edu.au](http://www.mech.unsw.edu.au), click on Course Materials on the home page, click on the course number (e.g. MECH2412) and then click on M2412 final ans.

### Post-graduate and Other News

Also at the graduation ceremony on 17 October, Tony Armstrong received his Doctor of Philosophy degree for his thesis *On the Viscous Resistance and Form Factor of High-speed Catamaran-ferry Hull Forms*. Tony is now the Research and Development Manager for Austal Ships in Fremantle.

Two Australians attended the Twenty-third Symposium on Naval Hydrodynamics. Every two years, the Office of Naval Research in Washington, together with a host institution in the USA,

Europe, or Asia, organises the principal conference on ship hydrodynamics. This year, the symposium took place in Val de Reuil, France, and was hosted by the Bassin d'Essais des Carenes (the French Ship Model Basin) from 18 to 22 September.

Australian readers may be envious to learn that the French Government has invested 1GF (approximately \$250 million) in the development of the new test facilities at Val de Reuil. Currently, there is a total of ten hydrodynamic facilities, including towing tanks, a rotating-arm tank, and a bifurcated cavitation tunnel. The latter is unique in that there are two parallel working sections, either of which can be supplied from the main ducting of the tunnel. The new 600 m towing tank was officially inaugurated during the symposium.

The week-long conference attracted around 140 persons from many countries. Dr Jinzhu Xia from The University of Western Australia presented his paper *Prediction of Vertical-plane Wave Loadings and Ship Responses in High Seas*. This interesting report included comparisons between experiments and theory for the forces and moments acting on ships advancing with an arbitrary heading in waves. A/Prof. Lawrence Doctors of The University of New South Wales presented his paper *Steady-state Hydrodynamics of High-speed Vessels with a Transom Stern*, in which his theoretical predictions for resistance, sinkage and trim were shown to correlate well with experiments on ship models. In all, there were 63 papers devoted to all aspects of ship hydrodynamics. Interested readers may contact A/Prof. Doctors for copies of any papers on (02) 9385 4098 or email l.doctors@unsw.edu.au.

Ian Raymond presented his paper *Design Criteria for X-80 Steel Blast-tolerant Transverse Bulkheads for Naval Platforms* [Naval Ships — Ed.] at the 7th International Symposium on Structural Failure and Plasticity (IMPLAST 2000) on 4 October in Melbourne. This conference focusses on structural responses to medium- and high-velocity impacts and other such events, and attracted blast and impact researchers from around the world.

A/Prof. Ganghadara Prusty of the Indian Institute

of Technology, Kharagpur, India, gave a presentation on *Analysis of Composite Stiffened Panels for Ship Structures* to a meeting attended by thirteen on 9 October at the University of NSW. A/Prof Prusty has been working on the finite-element analysis of composite stiffened panels for his PhD at IIT. This presentation was timely, as the final-year students had just completed their course on composite structures which was introduced this session by Dr Mac Chowdhury.

Composites can offer superior performance over traditional materials in important areas such as cost effectiveness, high specific strength and stiffness, damage tolerance, etc. His formulation is based on the concept of stiffened shells and is equally applicable to the case of stiffened plates. He used an eight-noded isoparametric shell element in association with three-noded isoparametric curved beam elements, each with five degrees of freedom per node, for the formulation of the stiffened-panel element. This has the advantage that the stiffeners can be arbitrarily oriented, thus avoiding the usual limitation that the stiffeners be placed along lines of nodes. It is assumed that the laminate consists of a finite number of perfectly-bonded layers, and each layer is treated as homogeneous and orthotropic, with fibres oriented arbitrarily.

Composite stiffened panels have been analysed by the method and the results for stresses and deflections compare closely with the published results for several important test cases in the linear range where transverse deflections are assumed to be no greater than the laminate thickness. The next stage will be to relax the assumption of linearity, and allow large deflections with non-linear behaviour.

*Phil Helmore  
Lawry Doctors*

### **RINA Members!**

*The ANA is your Journal, and relies on your input. If you know of some interesting news, let the editors know; don't assume that, because you know, everyone else does too.*

*The editors can only publish what they receive or generate, so the more contributions the better to maintain the Australia-wide coverage.*

# AMC Model Test Basin

Gregor Macfarlane

In July 2000 the AMC Ship Hydrodynamics Centre commenced construction of Australia's largest model test basin for testing model ships and ocean engineering structures. Considerable progress has been made over the past three months, ensuring that the new building and basin will be completed on schedule in mid-November this year. Shortly afterwards, the facility will be commencing its first official project: a series of wave wake measurements for a number of ship models operating at high-speed in shallow water.

In April 2001, a multi-element wavemaker, consisting of 16 individual paddles will be commissioned within the basin. The wavemaker will be capable of generating the following waves:

- Regular waves at normal and oblique angles;
- Irregular 2D long, crested waves and irregular short-crested waves at normal and oblique angles; and
- Irregular 2D long, crested waves and irregular 3D short-crested waves in a direction normal to the wavemaker.

This new facility is ideally suited for conducting research and consulting for the oil and gas industry, and to further develop research into the wash generated by high-speed vessels, particularly when operating in shallow water depths.

The model test basin will provide staff and students with further opportunities to conduct research into the hydrodynamics of marine vessels and ocean engineering structures. It will also be regularly used for conducting experimental laboratory sessions within the Bachelor of Engineering degree courses in naval architecture and ocean engineering.

The new test basin complements the existing specialist facilities at AMC, which are used by industry as well as staff and students from universities all over Australia. The model test basin is 35 m long, 12 m wide, and has a flat floor and an adjustable water depth up to 1 m. It is equipped with a controllable electric winch to provide the capability of towing models at speeds up to 4 m/s.

Further information can be obtained from Gregor Macfarlane, on (03) 6335 4880, fax (03) 6326 6261 or email [G.Macfarlane@mte.amc.edu.au](mailto:G.Macfarlane@mte.amc.edu.au).

Progress on the construction of the new Model Test Basin at AMC.



## Ausmarine 2000

The fourth Ausmarine conference was held at the Overseas Passenger Terminal in Fremantle, on Tuesday 31 October to Thursday 2 November, and was entirely focussed on practical and real issues in the commercial marine environment. The conference was specifically designed and planned to feature industry people discussing real problems and practical solutions. The associated Ausmarine exhibition was located downstairs from the conference, and was open from 1000 to 1800 on each day of the conference.

The Hon. Peter Morris, former Australian Minister for Transport and a fervent campaigner for the Australian marine industry, again assumed the role of Conference Chairman, and carried it out with good humour and aplomb, as he did in 1998.

The papers presented at the conference included the following:

Stuart Ballantyne, Sea transport Solutions, *Development of a Small Gem of a Ferry Company in Moreton Bay.*

CDRE Sam Bateman, Centre for Maritime Policy, University of Wollongong, *Trends for Modern Navies Towards Surveillance, Patrolling and Peacekeeping.*

Ian Biner, General Manager Projects, Austal Ships, *Mini Cruise Ships.*

Jeremy Cresswell, *The World Offshore Support Vessel Market — with Special Reference to the North-west Shelf.*

Robert Dane, Chief Executive Officer, Solar Sailor Holdings, *Commercial Solar Transport.*

Dr Ing Thore Hagmen, Chalmers Institute of Technology, Sweden, *The Victoria Class of 12 m Fast Search and Rescue Boats.*

Rod Humphrey, Head of Approval Centre, Det Norske veritas, Sydney, *DNV Rules for Patrol and Naval Craft.*

Dr Lex Keuning, Delft University of Technology, The Netherlands, *Application of the Enlarged Ship Concept in a Dutch Coast-Guard Vessel.*

Klaus Nienaber, *Impact of Australian Fast Ferries on the European Market over the Past Ten Years, and Forecasting the Next Ten Years.*

LCDR Michael Purdy, Royal Australian Navy, *Development of Australia's Offshore Patrol Boat Programme.*

Stephen Schmidt, Managing Director, Naiad Inflatables, New Zealand, *Rigid-hull Inflatable Design and Development.*

Hagen Stehr, Chairman Stehr Group Fisheries and Chairman Australian Fisheries Academy, *Development of Tuna Ranching in Australia and the Floating Plant Needed for its Success.*

Asle Stronen, *Update on the Sleipner Disaster.*

Roger Tritton, Independent Consultant, United Kingdom and The Philippines, *The Perfect Patrol Boat for South-east Asia.*

Evert van Tellingen, Managing Director, Wijsmuller Bros, The Netherlands, *Ship Delivery — an Act of Piracy?*

The conference and exhibition were organised and executed with the efficiency and flair which we have come to expect from Baird Publications, and were a credit to all concerned.

## RINA at Ausmarine

The Western Australian section of RINA organised its own conference in association with Ausmarine 2000 on the theme of *Hydrodynamics Without Integrals*.

Five papers were presented:

*Seakeeping — the forgotten factor*, by Tony Elms, Seastate Pty Ltd;

*Progress in strip theory prediction of wave loadings and ship motion*, by Jinzhu Xia, University of Western Australia;

*Prediction of catamaran wave loads*, by Stephen Cook, Curtin University;

*Sailing dinghy design and optimisation*, by Damien Smith, Austal Ships; and

*Do we still need experiments?* by Jorgen Kronstad, Marintek.

All papers were interesting and at least two were controversial and encouraged a busy question time. Only one integral sign was spotted during the entire conference, although there was some cheating by using summation signs and some differential equations. Bound copies of the proceedings are available for \$25.00 from Jim Black on (08) 9410 1111 or email [eurosv2@attglobal.net](mailto:eurosv2@attglobal.net).

## Incat Coastal Patrol and Rescue Vessel Design

Following the success of the wave-piercing catamaran HMAS *Jervis Bay* in operations in East Timor, Incat Tasmania has been developing proposals for other military applications for these fast ships.

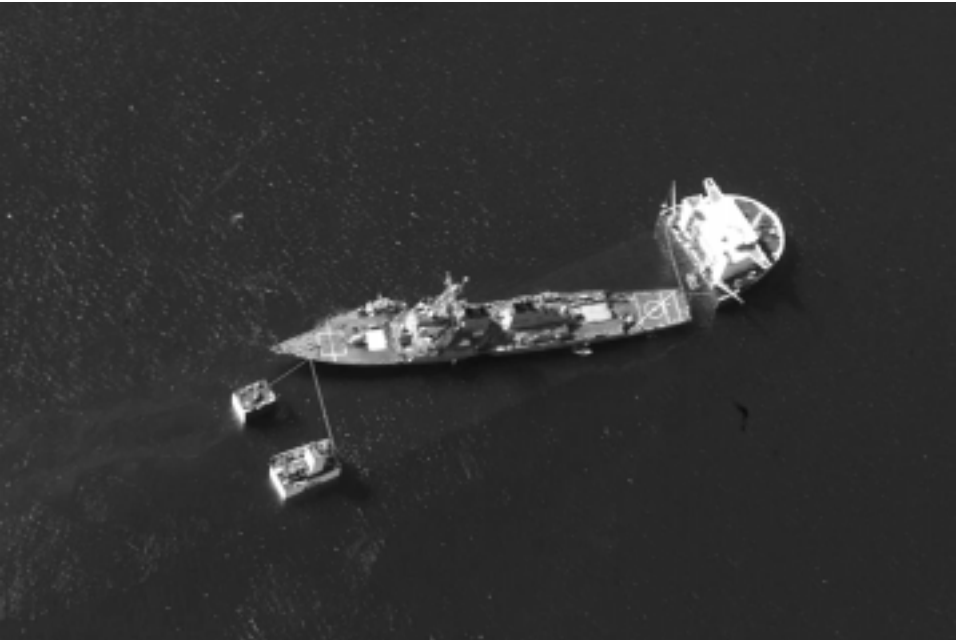
The Incat Coastal Patrol and Rescue Vessel has the flexibility to perform a multitude of tasks, and loading the required equipment for the specific mission, whether medical facilities, temporary accommodation, detention cells, messing facilities, relief equipment, stores, vehicles, rescue boats, helicopter equipment or high-speed interception craft. Fitted with a helicopter landing area and hoistable boat ramp for the deployment and retrieval of smaller 60 knot rapid-response craft, the patrol vessel's large deck area can also be used to carry containerised modules designed and fitted out for a wide variety of uses.



## RECOVERY OF USS *COLE*



On 12 October USS *Cole*, a guided missile destroyer of 8 422 t, was severely damaged in port at Aden, Yemen by a terrorist attack, with 17 of her crew killed and 39 injured. The US Navy contracted the Norwegian heavy transport ship *Blue Marlin* to carry the ship home. *Cole* was towed to sea to reach water at least 23 m deep for the loading operation. The ship was loaded at an angle to allow the sonar dome to overhang the dock-ship's side. Holes were cut in the dock-ship's deck to accommodate the







propellers. Despite considerable available ship repair capacity, the US Navy has decided to return *Cole* to her builders, Ingalls Shipbuilding in Pascagoula, Miss., for repair because of their experience with these complex warships and the extent of the damage. Repairs are expected to begin in January 2001 and take about a year to complete at an estimated cost of \$US150 million. (US Navy Photos)



# Investigation into Re-righting Tendencies of Modern Sailing Yachts

Jonathan Binns  
Research Student  
Australian Maritime College

This research program has been under way at the Australian Maritime College in Launceston for nearly two years now. The work within the project has built on the past experiences of the College from capsizing work and now includes study for a PhD student.

The main aim of the project is to improve the safety of modern sailing yachts by developing an understanding of the re-righting tendencies through physical and theoretical modelling with 'real world' correlation. Through using the models developed, the effects of hull form and stability parameters will then be investigated, resulting in scientifically deduced measures of sailing yacht safety.

As a part of this project, two forums were held on 2 and 3 October 2000 at the Royal Melbourne Yacht Squadron and the Royal Sydney Yacht Squadron.

Over 40 people attended the forums including designers, builders, sailors, researchers and representatives from safety authorities and regulatory organisations. The program of the forums was:

- an introduction to the science of self-righting;
- a brief overview of existing work and results;
- current and future stability standards as applied to the Australian fleet; and
- general discussion.

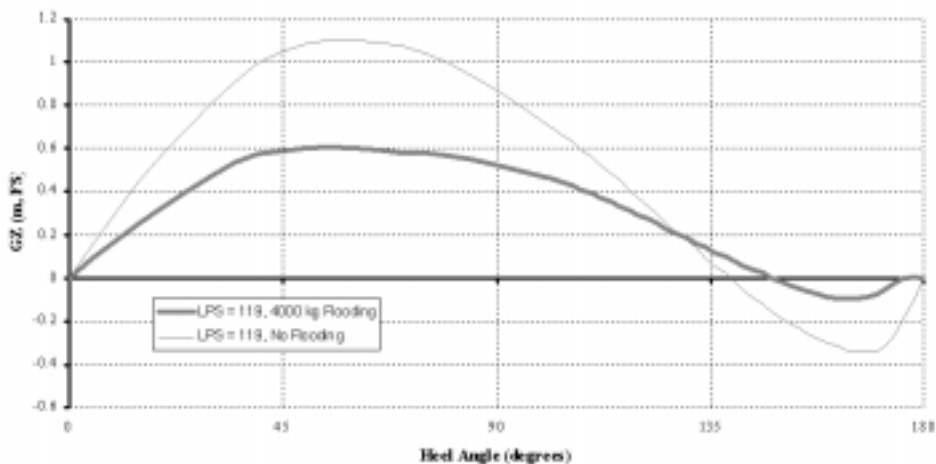
A large amount of audience participation in the discussion led the forums into extremely informative digressions.

One of the key issues to be raised at both venues was how a capsized yacht will be flooded. It is known from hydrostatic analysis that a flooded yacht, whether inverted or upright, will be less stable once flooded. Also sailing yachts are generally far from watertight when inverted; indeed, it is not unusual to expect a few tonnes of water to come on board when a yacht is inverted. From a design point of view, it is feasible that controlled flooding could help in bringing a yacht upright. However, the dangers involved with intentionally flooding a yacht are obvious and large safety margins would have to be included. The experiments so far have included some tests on the effect of flooding and, as a result of these forums, it would appear that much more work needs to be done in this area.

This leads on to another important aspect, that of changing the trim of the inverted yacht. Trimming by the bow can have a dramatic effect on reducing the stability, in either upright or inverted positions. This can be achieved by either flooding the bow, or perhaps a preferable option would be to add buoyancy at the stern of the yacht in the inverted position. It was pointed out by one of the attendees that such a system exists for some 'rubber-duck' style craft. However, the dangers were also pointed out in that the companion-way could be exposed to the free surface, thus allowing even more water in, and opening up the possibility of actually sinking the yacht.

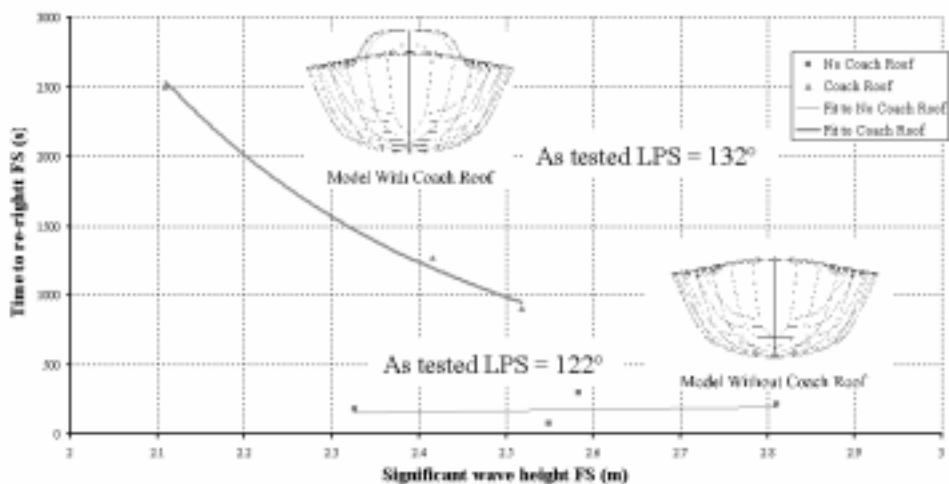
It was possible to detail a few anomalies exposed by the research, and these were discussed at length within the forums. For example, a case where increasing the limit of positive stability (LPS) has actually lead to an increased inversion time has been identified. Some ideas were suggested for this, such as the 'tripping' effects of profile areas and perhaps even free-surface effects from trapped air bubbles.

The 1998 Sydney to Hobart yacht race fleet was used to show the effects of numerous stability standards, exposing a few possible strengths and weaknesses if the standards were applied directly to this fleet. Screening formulas for regulations in the past have focussed mainly on capsize resistance, and the work of screening sailing yachts for their inverted performance has only just begun.



GZ righting lever curves with/without water on board (above)

Simulated inversion times showing increased LPS and increased inversion time (below)



# **Anzac Ship Design Development — Lessons and Suggestions For The Future**

Robert Dunbar  
Australian Marine Technologies Pty Ltd

## **ABSTRACT**

The major defence capital acquisitions of the 90s, the Anzac Ships and the Collins Class submarines have facilitated a huge investment in the capabilities of the defence industry in Australia. The construction phase of each of these programs is approaching its conclusion and, for some time, the defence industry has been manoeuvring in anticipation of future naval acquisition programs.

These major naval programs represented a chance for industry to develop both its capability and its credibility. Experience in the acquisition, including the design and construction of the Anzac Ships, suggests there is now a level of maturity and experience that should facilitate the development of enhanced approaches to future major naval surface ship construction programs.

The mechanisms, skills and relationships between the major players in the Anzac program should be evaluated with the goal of achieving the best possible result for the RAN in the new surface combatant (NSC) program. A revolution in the roles of each party in response to lessons learned from the Anzac Project is seen to be appropriate. The level of customer involvement envisaged in the design development for the NSC program is in stark contrast to the Anzac Project approach. For the full realisation of the potentially profound benefits, open dialogue is required between all potentially involved parties, as we seek to maximise the indigenous influence over the next major surface combatant.

This paper discusses aspects of the relationships of the parties to the design development of the Anzac Ships, discussing various examples along the way. The relevance of Anzac experience to the potential environment in which the NSC program may develop are discussed. With the fluid state and therefore unpredictability of naval acquisition programs, concluding remarks are limited to issues and observations, as an input to what is becoming a lengthy debate.

## **BACKGROUND**

### **The New Surface Combatant**

Discussion on the capability of Australian industry in relation to the NSC program requires, of course, an assumption that there will be such a program. There has been, and will continue to be, debate typified by the range of views offered by Goldrick, White, Griggs and Morton (1999). Further debate will and of course should continue, but according to Defence publications there will be a NSC project, involving:

... the acquisition of new destroyers to sustain surface combatant fleet capabilities, that is air warfare, undersea warfare, surface warfare, strike and command, control and communications functions, beyond 2013. (Dept of Defence 1999b)

We are witnessing overseas programs for the development of major surface combatants for battle space dominance and command in both blue and littoral waters. The USN SC21 program (DD21) and the European cooperative program producing the FGN F 124 and the RNIN LCF are current examples.

Notwithstanding the current debate here in Australia, it is a reasonable assertion that given an in-service date of 2013 (the Anzac program required greater than 13 years from commencement to first-of-class in service), a 'low volume' production run and a justified aversion to risk, that the NSC solution will to a significant extent emulate aspects of these current programs. It is conceivable that an NSC solution will

involve the utilisation of a current in-build platform, with the imposition of RAN-unique platform related requirements in parallel with the competition for and subsequent design integration of a RAN-specific combat capability.

Whilst silent on overall capability, the (Dept of Defence 1999b) report describes the NSCs as 'expected to be monohulled, conventionally powered and shaped to minimise signatures.'

The recent history of the Anzac Warfighting Improvement Program involving a potential extensive upgrade of a MEKO 200 Frigate of original design displacement of 3 180 tonnes, beyond its 'Tier 2' (Dechaineux and Jurgens 1990) Anzac Project design displacement of 3 600 tonnes, to around 4 000 tonnes is also expected to influence the way ahead for the NSC program.

Consequently, and taking some licence from speculation published in the defence press, the NSC could be a monohull of between 5 000 and 6 500 tonnes displacement, including a significant growth margin.

## **Indigenous Design**

Design, systems definition and development of warship system (hull), whole of capability, is 'an industry capability that is strategically important' (Dept of Defence 1999b)

When the history of the acquisition of major surface combatants is considered, particularly over the past forty years, it would seem that we have come a long way when our Defence Department declares the strategic importance to Australia of the capability for design, definition and development of whole of capability. Indeed, the quantum leap from the corresponding 1997 policy, where 'steady as she goes' as a country of repairers and maintainers was the cry, is remarkable.

From the above, combined with a historical view of major surface combatants acquisition (Earnshaw 1997), it is possible to conceive a master plan, with a structured transition from

- (a) the complete overseas sourcing of our major naval capability or the build-to-print in Australia of overseas designs (Q Class, Daring, Battle, River, DDG and FFG7 Class frigates and destroyers), followed by
- (b) a program of facilitating the development of Australian industry to 'Australianise' overseas designs (for example the Anzac Project), to
- (c) the maximum use of Australian industry for design studies and implementation in support of major capability upgrades to our current surface combatants (for example, Anzac Warfighting Improvement and FFG Upgrade programs), leading to
- (d) the establishment of an indigenous surface combatant whole-of-ship design capability.

Indigenous design as applied to a NSC solution could be a completely clean-sheet approach, or based on pulling together a maximum of proven technology and capability, or a program of design change to a proven, existing design. Regardless of the acquisition strategy, a high indigenous design content is seen as a logical extension of the capability and experience developed from the current major surface combatant program, the Anzac Ship Project. The greatest advantage of 'indigenous' is the degree of early customer input and customer/designer interaction possible, and the whole-of-life-cycle advantages that this offers.

The processes adopted for the Anzac Ship Project were a product of the environment existing in the 1980s, when the Australian naval construction industry was just recommencing after more than a decade of relative inactivity (Earnshaw 1997). The NSC project will be some 20 years out of phase with the Anzac Project. Different processes, relationships, capabilities and responsibilities will be appropriate, but it would be prudent to utilise Anzac experience in the determination of the way ahead. In fact it would be folly to do otherwise. The design, construction and support capability developed in recent programs (i.e. Australian-built FFG7 and Anzac) is a capability which has been purchased by the tax-

payers of Australia as part of the procurement cost of these surface combatants and, ideally, should not have to be bought again.

## THE ANZAC EXPERIENCE

Industry was first asked to respond formally to the Anzac Ship Project in 1986, when a Request For Proposal (RFP) was issued, generating some 22 responses ranging from in-service frigates to modified existing designs, even including an airship. Further discussion of the background and the issues at the time and beyond have been documented elsewhere (West 1989, Dechaineux and Jurgens 1990, Pine 1995, and Beck and Lord 1997), and the discussion was picked up in the subsequent project phase, the award of a Design Development Contract (DDC) to three of the RFP respondents in October 1987.

### Design Development Contract to Contract Award

In the DDC between the Commonwealth and Blohm + Voss Australia (BVA), a requirement for some 42 engineering changes were specified to the Blohm + Voss designed and built Portuguese Navy MEKO 200 PN baseline design. The substantial nature of these changes was demonstrated by the increase in design displacement during this period, from 3 180 tonnes to 3 495 tonnes. These engineering changes were investigated, processed, implemented and costed within a 13 week period, with BVA driven to ensure there existed no non-compliances with Commonwealth Requirements.

Early in 1998, the combination of BVA and AMECON, which emerged from the consortium of three who purchased Williamstown Naval Dockyard, was formed by mutual consent to proceed to the Request For Tender (RFT). This team was in competition with a combination of Royal Schelde and the Newcastle-based Australian Warship Systems. BVA and AMECON will hereafter be referred to by their current company name acronyms, AMT (Australian Marine Technologies) and TDS (Tenix De-

The sixth ANZAC frigate, *Stuart*, entering the water for the first time on 17 April 1999.  
(Photo Tenix Defence Systems)



fence Systems). The TDS response to the RFT involved TDS as potential prime contractor with full responsibility over bid preparation, with AMT responsible for the technical definition of the ship design solution and the development of the ship specification. The AMT role as design authority continued through the subsequent negotiations with the Commonwealth and beyond into the build contract, under subcontract to TDS.

Navy 'resident teams' of two engineers, one each from Australia and New Zealand, were established with each of the contractors in both of the DDC and RFT phases, to provide consistent interpretation of RAN/RNZN technical and operational requirements. To this end, a system of 'positive guidance' was implemented, whereby the contractor would record his question to the resident team for resolution in Canberra, where a judgement would be made as to the applicability of the response and therefore its communication to and 'sharing' with other contractors. In this way, consistent guidance was provided to all parties, channelled through the project office in the interests of probity.

The resident team personnel, located in Hamburg alongside Blohm + Voss and AMT personnel, were allowed free access to all design development activity and their presence was valued.

However, a competitive situation existed, and the almost non-existent flow of shared data arising from the queries of other contractors indicated, with no surprise, that a cautious approach was being taken to the process of 'positive guidance'. Furthermore, meaningful customer involvement in the high scope of configuration change during this short time scale, particularly during the DDC, would have required a significantly greater number of personnel, with a degree of authority not envisaged with the acquisition strategy.

Later in the RFT process, RAN officers (at the rank of CMDR) were assigned to the ship designer at its Canberra offices for advice on operational aspects. The advice was welcomed and enthusiastically offered but limited, again on the basis of probity, and the fact that the use of such advice could not take precedence over the conditions of the RFT. Typical Navy inputs at this time were in relation to RAN manning policy and practice, bridge and operations room arrangements and habitability policy guidance.

Of these, the manning policy advice was directly applied, the habitability guidance was applied to the extent possible within the space and cost constraints of the existing design and the bidding process, but the guidance on the bridge and operations room arrangements was not adopted at this time. Rather, with additional customer input and following a fuller analysis of design impacts, a derivative of this pre-contract advice was implemented during design development after contract award. It is now interesting, although not surprising, that opinions on the bridge layout continue to oscillate to this day between both ends of the scale, from acceptance of the current RAN advised solution, to questioning why there was any change at all to the layout of the baseline Portuguese Navy solution. Such is the nature of command.

Following the selection of TDS as the preferred prime contractor, came a period of contract negotiation and further ship specification development. It was at this late stage in the pre-contract period when the only Commonwealth-directed solution was implemented — the integration of the AN/SPS-49 2D radar and the Mk 41 VLS System. The timing of this direction resulted in some 35% of weight margin and 50% of margin for rise in VCG being depleted at this time, before contract award. This early approach to customer directed change is particularly relevant as the future growth potential of the Anzac Class is considered.

The Anzac Ship Specification as the contract basis for technical and performance requirements was developed by AMT during the RFT period. With respect to the requirement for 'existing design with minimum change' (West 1989), compliance with applicable Federal German Navy (FGN) standards was mandated, supplemented with specific RAN requirements according to RFT-specified criteria.

A detailed, solution-specific and indeed equipment-specific specification was developed as required by the RFT. However, following contract award, the Commonwealth retrospectively utilised the Anzac

Ship Specification as a function- and performance-based specification (Malpas 1993) in the evaluation of alternative equipment and systems in response to a quest for maximum ANZIP (Beck and Lord 1998). With the 'devil being in the detail', the acceptance of change on a functional and performance basis only to an existing detailed design solution, is an exercise not without risk, requiring a deliberate and focussed reverse-engineering approach. With current systems engineering practices, it is seen to be unlikely that this approach would be repeated in the future. Rather, the early establishment and definition of a functional baseline for the existing design would seem to be appropriate, as the basis for full traceability of configuration changes implemented for any reason — including, of course, changes to meet specific RAN requirements. In retrospect, such a baseline definition would have been a valuable addition to the DDC deliverables.

## **The Early Years after Contract Award**

The post-contract design development of the Anzac Ships saw the relocation of AMT technical personnel to Hamburg, resident within Blohm + Voss technical departments as an integral part of the team progressing the ANZAC Ship design. With the RAN background of the AMT employees, and in the absence of a specific and continuous RAN/RNZN technical presence, much was done by AMT to ensure correct interpretation of the ship specification in areas specific to RAN/RNZN requirements and practices, with many significant technical differences to the FGN Standards upon which the 'existing design' was based.

For the first four years of the Contract a Formal Design Review (FDR) was held at four-monthly intervals, either in Australia or approximately annually in Hamburg. These reviews were forums to present the evolving design, to identify and resolve concerns and deficiencies and to discuss and resolve issues such as ship specification interpretation and compliance. Prior to each review, AMT would submit available design documentation for customer review prior to the FDR.

FDRs were healthy forums within the limitations imposed by the frequency and intent of these meetings. For example, with the planning and formalities required, the lead time for issue resolution was quite long, and, in many cases, issues carried over as actions which in some cases rolled over to the next FDR. This was sometimes a source of frustration, particularly given the strong schedule pressures and difficulties with the provision of design input data at the time (Beck and Lord 1997), exacerbated by a lack of direct routine technical contact between the Anzac Ship Project Office (ASP) and AMT.

Prior to the contract there was communication from the Commonwealth regarding its intent to second a significant body of technical personnel with the ship designer, but these plans did not eventuate. Efforts by AMT to forge a Commonwealth 'technical authority' presence in Hamburg were fully supported by TDS, yet not taken up by the ASP. Rather, ASP arrangements consisted of the posting of a Project Director's Representative in Hamburg, during the early design stages, for the provision of advice on operational and other aspects within his discipline. He was also a point of contact for the ship designer to Navy in resolving technical queries. However, it did not provide the opportunity for a strong involvement by Navy technical personnel in design development which would have not only influenced the design towards specific RAN/RNZN practice, but also generated a greater customer understanding of the design basis and design philosophy of the Anzac Ships. Notwithstanding the inevitable staff movements over the ensuing period, such an involvement would have fostered a relationship that would be of value now in ensuring problem resolution and configuration change consistent with the design philosophy, or a situation where fully-informed decisions are made in cases where Navy wishes to depart from the design philosophy.

The above approach was substantially different to the B+V relationship with its customer navies in similar programs. In these programs, there is a strong and structured customer presence according to the respective stage of design, build, documentation development and training. The advantages of such



a program are many for all involved parties. For example, progressive customer design acceptance provides early customer visibility of the design, allows the greatest potential for early input and design change on a cost-neutral basis, and provides a residual design understanding for application to through-life support. Another example is the utilisation of the training program for the completion and validation of the set of onboard documentation — a cooperative approach of far greater efficiency and overall value than the hands off ‘turnkey’ approach sometimes characterised by a perception of poor quality of documentation and protracted delays in document validation.

Notwithstanding, there has been significant interaction between the parties in the identification and resolution of Anzac issues during the course of design development. In many cases there have been very successful outcomes, in others we see that better approaches could have been taken, but that is the value of hindsight.

In summary, there were perceived as well as real and policy driven impediments to customer input to the Anzac design.

## **ANZAC LESSONS**

Having made such an enormous investment in the capability and experience of both the private and public sector, it would be such a waste if the Anzac experience was not milked for every possible drop. Whilst the environment in which the Anzac program developed was quite different to that existing now, and most certainly different to that expected to exist in the time of NSC program development, the good and the bad of the past should be recorded, as one of many frames of reference for future actions.

Furthermore, ABR 6205 (1995) calls for the identification of ‘capability deficiencies’ to be an input into any new ‘major capability submission’ and regardless, it is just good sense.

Audits of the Australian frigate program have been conducted (Earnshaw 1997), although it is apparent that their focus was primarily on managerial and financial issues. With the different structure of responsibilities of the Anzac program there is scope for a significantly more far-reaching program of audits.

There is corporate knowledge in both the public and private sectors with first-hand experience of the Anzac program through its life cycle to date, although the numbers are steadily declining. However, it is inconceivable that a single individual or organisation can provide a succinct precis of the Anzac experience, but only a particular perspective, complicated by different recollections and perhaps vested interests in outside perceptions of its own performance in the program.

Notwithstanding, a significant body of life-of-program experience is available. Consideration should be given to a structured program of tapping this experience to develop a single document as a departure point from the Anzac program to the next major program. For example, a forum or perhaps several forums on particular aspects of Anzac experience are suggested, such as:

- Project Management
- Design Development
- Ship Performance
- Operational/Capability Feedback
- Support

It is expected to be difficult to get the stakeholders, such as the various Defence functional areas, the prime contractor, the ship designer and the other major subcontractors around the same table for a single forum. In fact, such an approach is unlikely to generate the full and open responses desired, suggesting alternative mechanisms. As an example, the Navy specification study (Gabb and Henderson 1995) has provided a valuable insight into the defence industry view of the quality of Navy requirements specifications, from a one-on-one survey of industry players, an environment of greater openness than a com-

bined forum.

A survey/interview approach could well prove to be the most effective means of recording Anzac lessons, with the result serving as a record of the collective views of the stakeholders. Significant skill and judgement would be required to extract a consistent and meaningful set of conclusions, with perhaps a subsequent 'right of reply' to give greater credibility to conclusions and a collective effort at a list of recommendations.

Of course, now that a document has been released outlining a perspective of lessons on the Collins Class program (McIntosh and Prescott 1999), it would be remiss not to incorporate these into any considerations for the future. There are clearly principles that apply equally to the surface ship world.

## **ANZAC INDUSTRY CAPABILITY**

When one considers the state of the naval shipbuilding and naval technology industry in Australia in the mid 1980s, its current state represents a remarkable and extraordinary degree of development. A brief word on some of the players:

Tenix Defence Systems has been responsible for making naval shipbuilding in Australia a profitable commercial concern, and for making naval shipbuilding in Australia a cost effective exercise for the customer by comparison with overseas sourcing (White 1995). Under its former entity AMECON, TDS purchased the former Williamstown Naval Dockyard in 1988 and implemented a process of restructuring that dramatically enhanced productivity for the Australian frigate construction program (Horder 1993), with an objective of attaining 'the productivity levels of the German designer/builder' (White 1995). The level of attainment of this goal is for others to say, but it is clear that the Anzac Ship Project has provided the catalyst for the construction of the next generation of warships in Australia.

Australian Marine Technologies was established in 1987 as the ANZAC Ship designer, clearly with the substantial support of Blohm + Voss. During the course of Anzac Ship design development AMT not only worked within Blohm + Voss to facilitate the progressive transfer of design activity to Australia, but it also aligned itself to the Blohm + Voss technical structure to progressively and seamlessly accept design responsibility during the build program until the delivery of Ship 02. The design subcontract responsibilities of AMT were substantially completed on the delivery of Ship 02, but AMT has been applying its background in ANZAC design in support of TDS, the RAN and RNZN and to ANZAC Ship In-service Support. AMT maintains its strong connection with Blohm + Voss, one of the world's most successful and respected naval ship designer/builders.

Others include Celsius Tech Australia (CTA), which has grown to consolidate as a major contributor to ADF command and control systems development and integration, Frontline Engineering, which has formed associations with a range of international suppliers such as Indal Technologies and Barthel Armaturen in pursuing other indigenous production activity in the region and James Hardie (now Wormald) in New Zealand, which has extended its Anzac association with Noske Kaeser to success as a supplier to the Huon Class Minehunter Coastal program and other programs.

Of course the list goes on, but what is important is that a 'pedigree' of local naval industry both hard and soft product suppliers has been developed. Also, if these suppliers respect their role in this local network then, notwithstanding technological developments, the RAN will be able to utilise standard Anzac equipment in future construction to considerable logistic support advantage. The RAN could consider the sort of program undertaken by the Federal German Navy in the progression from the F122 to the F123 and the F123 to the F124, where maximum commonality subject to revised capability requirements is a key issue.

## ISSUES WITH AN ALTERNATIVE APPROACH TO THE NSC PROGRAM

Clearly the Australian defence industry capability has reached a level of maturity that warrants a fresh look at the approach to future programs. However, whilst the breadth of industry capability has expanded over the years, there are still a great many areas where the depth of industry capability is absent. There will continue to be a need for support from the international scene, due to the obvious limitations in the domestic market in the design and construction of major surface combatants. A production run of three to four ships is not going to support the investment in the infrastructure of the USN DD21 program, for example.

For reasons stated previously, the nature of the degree of Australian industry design of the NSC will not be explored here. Rather, for the purpose of discussion, it will be assumed that an indigenous whole-of-ship design process would be applied to either an *abinitio* or existing design approach, or something in between.

A whole-of-ship design methodology should be established on the basis of *abinitio* design. Regardless of the NSC acquisition strategy, this methodology can be applied in the same manner from the first stages of the program. The result should be that the more mature the existing design, the shorter is the requirement's development, functional analysis and synthesis process, as documentation is available to populate the baselines established along the way.

The advantage of this procedure is that a tool for complete traceability of the implementation of configuration change in response to specific RAN requirements can be established and maintained. The management of individual elements of design investigation and redesign activity will be readily controlled. Trade studies on alternative capability, on alternative system installations or on the relative merits of the existing-design parent-navy standards against the impact and merit of imposed RAN standards can be traced back through a consistent hierarchy of requirements and complementary analyses. Additionally, the process can also massage the existing design package from first principles into one compatible with RAN support requirements, or it can from the very first stages influence RAN support requirements based on those inherent in the existing design. This is a particular issue with the Anzac program for example where the Anzac Ship design package and the in-service support concept are based on different work breakdown structures.

From experience with the Anzac program, one of the most important issues to addressed in any such future program is the early integration of industry and customer input to the process. It is firmly believed that such integration cannot happen too early.

The case for early industry/customer integration has been expounded over recent years in relation to USN programs. Indeed, for the LDP17 program Integrated Product Teams (IPTs) were in place at the feasibility stage (Keane and Tibbitts 1996). The difference here is that this and the DD21 programs adopted a 'clean sheet' approach following a high degree of concept exploration by the customer himself. We should in Australia learn from these programs and adopt an approach which is best for all aspects of our unique environment. Notwithstanding, the time for teaming is expected to be similar in the NSC program, being at the time of 'revisiting' the feasibility stage of a selected NSC proven design or perhaps earlier, utilising a structured systems approach.

A significant increase in the level of customer involvement in the design development of the NSC, compared to that for the Anzac Ships, would put a significant strain on the resources available for effective early design development in an IPT environment. A teaming arrangement involved in the development of a single platform design solution has some significant advantages. Whether these advantages, and also the degree of design disclosure required to effectively implement processes such as requirements and functional analysis on a 'proven design', influence the acquisition strategy towards an early decision on the design basis for the NSC is subject to a great many other considerations.

These include consideration of the policy of competition, the strategy for combat system source selection, the alternative design definition and development methodologies of prospective designers, the degree of either mandated or industry-driven applications of virtual prototyping, the different alliances and implementation strategies that may be adopted by potential prime contractors, etc.

To follow just one example, it is acknowledged by Beck and Lord (1997) that there was limited opportunity to adapt the Anzac detail design to radically-different build strategies, as in any case the detail design was derived from an internationally-competitive design/build package for the MEKO 200 PN (Beck and Lord 1997). A deliberate effort to fully understand the design/build strategy upon which the existing design is based is required, prior to either the adoption of a similar strategy, or the acceptance of adaptation to the design package to an alternate strategy. Clearly this is also an issue for early resolution.

Whilst other mechanisms no doubt can be developed, the satisfaction of the design authority issue raised in the recommendations to the Collins report (McIntosh and Prescott 1999) suggest either a separate direct contract between the ship designer and the Commonwealth, or design authority responsibilities with the prime contractor with the Commonwealth responsible for IV&V, either itself or utilising a third party. In the former case, the Commonwealth would find itself in the unprecedented position of having a high degree of early design ownership and a corresponding degree of design responsibility to the prime contractor. In the latter case, the interests of the Commonwealth will only be protected if the Commonwealth and/or its third-party delegate has an extensive degree of design knowledge.

Design knowledge is most effectively gained by 'doing', by working as an integral member of a genuine team environment.

## **CONCLUSIONS**

Whilst expressing some concern at the relatively low Inzac project will be regarded as a success, and a vital input to planning for future major Defence acquisition programs.

With the future direction for acquisition of the next generation(s) of major surface combatants unclear, it is inappropriate to reach any conclusions regarding a way ahead for design development. Rather, some of the views of just one individual are presented here, including a number of suggestions.

The broadest experience of the Anzac program should be documented from all relevant sources, including an attempt at collective conclusions and recommendations. These recommendations, treated perhaps with some caution, should be considered in the debate on the future for the NSC.

The relative merits of a strong Navy/industry relationship at the earliest possible phase (ie. not just lip-service to IPT principles) should be studied and openly discussed between all potential program stakeholders.

The definition of an indigenous whole-of-ship design development model should be considered for application over the range of acquisition strategy models. A corresponding strategy of Navy/industry relationship could be further tailored, specific to the whole-of-ship design development model, providing a basis for the definition of roles, responsibility, authority, etc.

The development of the design of major RAN capability is one of feast or famine. Whilst concern is often expressed for the continuity of the ship construction industry, the period of intense Anzac design development activity lasted for less than a decade, with the prospect of a decade of relative inactivity until the excitement starts again. There is potential to utilise the collective experience of the Anzac and other recent-past programs to develop a strategy and a model for the future for the mutual benefit of industry and Navy. Most importantly, there is potential to use this experience to define, regardless of the acquisition strategy, a model for the development of a total system solution for RAN whole-of-life

requirements. This is thought to be particularly relevant give the stated strategic importance of whole-of-ship design capability.

## DISCLAIMER

The views and opinions expressed in this paper are those of the author and should not be regarded as representing those of Australian Marine Technologies Pty Ltd. The author's views are derived from direct experience in the Anzac Ship Project and, in particular, with all aspects of the design development of the Anzac Ships with Blohm. + Voss Australia and, after its company name change, with Australian Marine Technologies.

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# INDUSTRY NEWS

## Clean ship power for Norwegian Coastal Express

Wärtsilä NSD Corporation has received an order for a complete ship power plant and propulsion system for a new ship for the Norwegian Coastal Express, the *Hurtigruten*, contracted by the Narvik-based shipowner Ofotens og Vesterdaalsens Dampskipsselskab ASA (OVDS) at the Norwegian shipyard Kleven Verft AS.

The contract covers the supply of two Wärtsilä 9L32 diesel engines, two Wärtsilä 6L32 engines, twin 3.50 m diameter CP108 controllable-pitch propellers, the main reduction gearboxes, two PropacRudders, and the control system for the engines and propellers. The 9L32 engines will have a maximum continuous output of 4 140 kW each at 750 RPM, while the 6L32 engines will give 2 760 kW each at the same speed.

The Wärtsilä Type 32 engines will be manufactured at the Wärtsilä NSD factory in Vaasa, Finland. The propellers, rudders and reduction gears are designed and manufactured by Wärtsilä NSD at Rubbestadneset, Norway.

The ship, to be named *Finnmarken*, is due for delivery in April 2002. *Finnmarken* will break new ground in her environmental achievements. She will be the first vessel of this type to receive the Clean Design class notation of Det Norske Veritas. Among its various requirements, the Clean Design notation of DNV calls for NO<sub>x</sub> emissions 40 per cent less than the limit set by the IMO regulation (MARPOL 73/78 Convention, Annex VI). This is met by equipping all four Wärtsilä Type 32 engines with direct water injection. Thus there is no need for installing catalyst units to comply with the emissions requirements. To ensure the least possible SO<sub>x</sub> emissions, the engines will burn marine special distillate, a type of marine diesel oil.

Besides being a passenger vessel with very high comfort requirements, *Finnmarken* is also a cargo vessel for which operating economy and punctuality are important. The ship power system is therefore designed for optimum performance with regard to noise and efficiency for a wide ship-speed range, from manoeuvring to full speed as she navigates in and out of several ports each day, along the fjord coastline of Norway. The vessel will have a service speed of 15.5 kn. The machinery is arranged in a 'father-and-son' configuration, with the twin CP propellers each driven by a Wärtsilä 9L32 engine and a 6L32 engine. The 9L32 engines are forward of the reduction gearboxes while the 6L32 engines are aft of the gearboxes and between the two propeller shafts. The 6L32 engines also drive variable-frequency generators on their free ends. In addition, a variable-frequency generator/motor is connected to a power take-off/power take-in gear in each gearbox. The frequency control system allows propeller speeds from 110 to 155 RPM.

The ship will operate for some 85 to 90 percent of the time at up to 16 knots, with less than half power. This service condition can be met by using just the six-cylinder engines for both propulsion and electrical power, with the propeller shaft speed set to about 135 RPM. The nine-cylinder engines alone will be used for higher ship speeds with the propeller shaft speed set to 155 RPM. Only one engine would be clutched into each gearbox at any one time. Particular attention has been given to the design of the propulsion system to achieve low noise and vibration levels. Thus, the Wärtsilä NSD propellers will be of the highly-skewed type and are designed for lower propeller-induced pressure impulses against the hull. The PropacRudders will further reduce propeller-excited vibration by reducing propeller cavitation and tip vortices. The PropacRudders will also make an important contribution to reducing fuel consumption. In tank tests at Marintek in Trondheim, the model with PropacRudders demonstrated some five to six percent lower fuel consumption over the speed range of 15 to 16 kn (the normal service speed range) compared with using conventional flap-type rudders.

# PROFESSIONAL NOTES

## National Recreational Boating Safety System to Become a Reality

The National Marine Safety Committee will progressively develop a comprehensive national recreational boating safety system covering compliance plates, buoyancy, on-board safety equipment and operator competencies for implementation within 12 months. This priority task will be steered by a special NMSC work group under a new work program, Recreational Boating Project 4 (Rec 4), to create a matrix of consistent national recreational boating safety requirements for implementation by state and territory jurisdictions.

NMSC endorsed the secretariat's submission on the system at its 31 August meeting in Adelaide, following relay of poll results which showed overwhelming support around Australia for national standards. The polls found that 93 per cent of Australia's recreational boat users and 91 per cent of Australia's recreational boat manufacturers want boats built to recognised standards.

Under the Rec 4 project, an integrated approach to recreational boating will be developed and will include:

*Compliance plates* — a nationally-consistent approach is to be finalised within 12 months in conjunction with industry and government stakeholders who will provide advice on which information, such as people capacity or mass, engine size and Hull Identification Number (HIN), should be included.

*Buoyancy* — nationally-consistent positive-buoyancy standards are to be decided by state and territory jurisdictions following a national workshop to be held later this year with industry sectors on development of buoyancy options and the best approach for their adoption.

*Equipment* — NMSC will release a discussion paper covering on-board safety equipment shortly as a final step towards securing the approval of Federal, state and territory transport ministers through the Australian Transport Council.

*Operator competencies* — agreed levels of minimum core operator competencies have recently been approved by the Australian Transport Council following extensive industry input and NMSC will publish these shortly.

NMSC chair, Colin Finch, said the special work group would identify boat sizes to be covered, examine options on whether the new system should be implemented through voluntary codes, self regulation or legislation, and the best ways to work cooperatively with and communicate outcomes to stakeholders. The new safety system answers the call in the Australian Transport Council's marine safety strategy for responsive and user-relevant consistent national standards to be developed and applied by all Australian jurisdictions. The Council decided earlier this year that positive buoyancy should be progressed as a priority issue as part of the program matrix to develop a national recreational boating safety system.

## NMSC Poll results

A key NMSC project, Recreational Boating Project 2 (Rec 2), was begun in March 1999 to assess whether stakeholders believe there is a need for national recreational boating safety standards.

Under Rec 2, NMSC commissioned Taverner Research to survey 35 000 recreational boat users around Australia in August 1999. Of the 5 500 respondents, 93 per cent thought there should be mandatory minimum design and construction standards, and 95 per cent were under the illusion that their boat was built to a safety standard.

There were similar results from NMSC's mail-out survey of manufacturers in late 1999 but, after

questions on the mail-out survey's methodology and scope, the Boating Industry of Australia (BIA) offered to help with a further survey this year. BIA's assistance enabled NMSC's pollsters, Market Survey Centre, to achieve responses from 119 (nearly 80 per cent) of Australia's 154 recreational boat builders in their August 2000 survey. Of these, 91 per cent called for a national standard, almost half of them because they said 'safety comes first'.

*Warwick Cooper*

## 14th ISSC

The 14th International Ship Structures Congress was successfully held in Nagasaki, Japan from 2 to 6 October, 2000. Australia was represented by:

Prof. Paul Grundy, Monash University, Member Technical Committee III.1 on Ultimate Strength;

Dr Jinzhu Xia, Centre for Oil and Gas Engineering, The University of Western Australia, Observer; and

Dr Mac Chowdhury, The University of New South Wales, Correspondent for Australia.

Unfortunately, Mr Tim Roberts, Incat Tasmania, Member Specialist Committee V.2 on Structural Design of High-speed Vessels, was unable to attend.

The new ISSC Chair is Prof. A. Mansour, University of California, Bekeley, and the next ISSC will be held in 2003 at San Diego, California.

The new Australian team comprises:

Prof. Paul Grundy, Monash University, Member TC III.1 (continuing); and

Dr Mac Chowdhury, The University of New South Wales, Correspondent for Australia.

I will be standing down as Correspondent at the next ISSC, and therefore invite nominations for this and any other committee positions for recommendation to the standing committee before the next congress. I would be pleased to answer any queries about the ISSC, its committees and what is involved. I can be contacted on (02) 9385 4119, fax 9663 1222, or email [m.chowdhury@unsw.edu.au](mailto:m.chowdhury@unsw.edu.au).

*Mac Chowdhury*

## Engineer's Salaries

The web-site of the Association of Professional Engineers, Scientists and Managers, Australia (APESMA) has sections of interest to engineers in their on-line salary surveys; the Professional Engineers Remuneration Survey and the Graduate Engineers Employment Survey. The graduate section shows graduate salaries for the last few years and can be freely accessed, and is of particular interest to recent graduates for what they can expect. The professional engineers section recently included a category for naval architects but, on an immediate pre-publication check, this could not be re-located and it is presumed that the site has changed. Watch [www.apesma.asn.au](http://www.apesma.asn.au).

*Phil Helmore*

## MISSING IN ACTION

The following members have not told Keith Adams of address changes, and he would welcome any information about their location.

Messrs Q. H. Dang, D. M. C. Firth, D. Mehta, and B. J. Neilson.

Contact Keith Adams on (02) 9876 4140, fax 9876 5421 or email [kadams@zeta.org.au](mailto:kadams@zeta.org.au).



# NAVAL ARCHITECTS ON THE MOVE

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

Doug Beck has moved on from Tenix Defence Systems and the Anzac ship project and is now consulting in Melbourne.

Phil Brown has moved up the corporate ladder, and has taken up the position of General Manager of Tenix Shipbuilding (WA) in Fremantle.

Ross Brown has moved on from the Sydney Institute of Technology where he has been teaching for twenty-four years. He taught in the shipbuilding trade course for fourteen years, and then took over as the head teacher of the course in naval architecture for the last ten years. Ross is now consulting in Sydney in the education and marine areas, with fingers in several pies, including a college to set up in Korea.

Goran Dubljevic has moved on from Sinclair Knight Merz on the Anzac ship project and has taken up the position of Engineering Manager with Logistics Technology International in Melbourne. LTI are believed to have exciting business prospects in the South-east Asian region.

Mike Fitzpatrick has gone mobile within Incat Designs, and is consulting long-distance from Prague in the Czech Republic for six to nine months.

Gary Goetz has moved on within Tenix Defence Systems in Melbourne, and has taken up a position in the Strategic Business and Development Branch.

Nikolai Ivanovic has moved on from NQEA Australia and has taken up a position with Austal Ships in Fremantle.

David McKellar, a recent graduate of The University of New South Wales, has taken up a position as a Project Manager with Eptec in Sydney. Eptec provide, among other things, painting services to Tenix Defence Systems on the Anzac ship project at Williamstown.

Brett Murrie has moved on from Riviera and has taken up a position with The Metacentre in Brisbane.

Rosetta Payne, a recent graduate of the mechanical engineering degree course at the University of Adelaide, was awarded Honours Class 1 and several academic prizes for her achievements. She has taken up a position as an engineer with Commercial Marine Design at Daley's Point, and will begin the third year of the naval architecture degree course at The University of New South Wales in Session 1 next year.

Trevor Rabey has moved on from his contract with Sinclair Knight Merz on the Anzac ship project, and has returned to consulting as Marine Challenge in Sydney.

Jacque Rovere has moved on from Geoff Glanville and Co. and has taken up a position as a hearing-aid technician with Australian Hearing in Cairns.

Glen Seeley has moved on from Sunsail and has taken up a position with Incat Designs in Sydney.

Peter Samarzia has moved on from the Australian Submarine Corporation and has taken up the position of Senior Naval Architect with the South Australian Department of Transport.

Dusko Spalj has moved up the ladder at Sydney Institute of Technology, and has taken over as head teacher of their advanced diploma course in naval architecture.

Jude Stanislaus is currently working with software developer Sparksoft in Sydney.

Graham Taylor, who has been consulting since he moved on from Holyman, is currently working with Incat Designs in Sydney.

Alistair Verth has moved on from Universal Design and Drafting in Adelaide and has taken up a position with North West Bay Ships in Margate, Tasmania.

Mike Warren has moved on within the Australian Submarine Corporation in Adelaide, and has taken up the position of Manager Naval Architecture.

David Whittaker has moved on within Australian Defence Industries (Major Projects) from the advanced composites project with the CRC for Advanced Composite Structures at Bankstown, and

has taken up a position as a naval architect with Refit Planning and Logistic Support Services back at Garden Island.

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*

## MEMBERSHIP NOTES

### AD Council meeting

The Australian Division Council met on 6 September, with teleconference links to all members and the President, Bryan Chapman, in the chair in Sydney. Matters, other than routine, which were discussed included the possibility of joint RINA/IEAust awards, RINA membership of the IEAust accreditation panel, the Australian Division's website; closer cooperation with the Kansai Society of Naval Architects, Japan; the joint RINA/IEAust board and the role of MARENSA, and a proposed amendment to the Rules for the Formation of Sections to require that either the chair or deputy chair be a corporate member.

The next AD Council meeting is scheduled for Wednesday 6 December.

*Phil Helmore*

Another example of first-class restoration, the 1897 yacht *Sayonara* approaching the finish line off *James Craig* during the SASC's 128th Anniversary Regatta on 5 November.  
(Photo John Jeremy)



## FROM THE ARCHIVES

With the barque *James Craig* featuring so prominently in this edition of *The Australian Naval Architect*, it is appropriate that she should also appear in *From the Archives*.

The photo on the right shows her under sail off Sydney in the 1920s, a sight soon to become familiar to Sydney-siders once more. (Photo Sydney Heritage Fleet)

Her transformation from the hulk that arrived in Sydney on Australia Day 1981(below) is remarkable and a credit to all those who have worked so hard over the last few decades to restore the ship. (Photo John Jeremy)



### FORENSIC NAVAL ARCHITECTURE

The next instalment in Bob Herd's regular series on maritime incidents we would all like to avoid, and their consequences, will appear in the February 2001 edition of *The Australian Naval Architect*.

