THE AUSTRALIAN NAVAL ARCHITECT

Volume 6 Number 2
May 2002

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THE AUSTRALIAN NAVAL ARCHITECT

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Cover Photo:

HMAS *Success* departing Sydney for trials in March after the completion of a major refit by ADI at Garden Island (Photograph John Jeremy)

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RINA Australian Division
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From the Division President

In this issue I want to talk about recreational craft safety.

A survey conducted for the National Marine Safety Committee (NMSC) a couple of years ago showed that roughly 90% of recreational-craft users wanted recreational craft built to some kind of standard. Roughly the same percentage also thought that they were in fact built to some kind of standard.

This is interesting, particularly as there is no obligation on the builders of recreational craft to meet any kind of standard. AS1799, *Small Pleasure Boats Code*, provides a standard for the design and construction of recreational craft up to 15 metres in length but it is not mandatory and it appears that any compliance with the Code in many cases is accidental rather than intentional.

In my view, this is an unsatisfactory state of affairs. Commercial craft must meet strictly defined requirements for their design and construction, particularly in the areas of stability, subdivision, damaged stability and hull construction. Similar-sized pleasure craft on the other hand are not obliged to meet any specific design requirements. This implies that the lives of recreational craft users and passengers are worth less than those of commercial craft passengers and crew.

The ultimate demonstration of the inadequacies of the present state of affairs must surely be the case quoted to me of a builder who is marketing effectively the same vessel as both a commercial and recreational vessel. The major difference between the two is that the commercial craft is fitted with ballast while the recreational craft is not!

Builders and designers are leaving themselves exposed to charges of professional and criminal negligence when they behave like this. In many cases the operators of recreational craft could clearly be described as uninformed, particularly when compared with the operators of commercial craft. It is only a matter of time for a designer or builder — rather than an owner or operator — to find himself in the dock facing charges of professional or criminal negligence arising from recreational boating fatalities.

Fortunately the news is not all bad. There does appear to be a fairly strong desire at government level to address this issue. I understand that several state governments want to move in towards developing and implementing standards for recreational craft design and construction and the National Compliance Plate Standard currently being developed by NMSC is a move in the right direction. Hopefully it won't take another major disaster involving the deaths of recreational boat uses — especially children — for the message to be heard in the places where it matters.

Bryan Chapman

Editorial

On 21 March the National Australia Bank placed the core companies of Incat Australia in receivership. Incat, which has a remarkable export record with its wavepiercing catamarans, at that time had not completed a sale for some fifteen months, and owed the NAB some $80 million. It also had a loan from the Tasmanian Government of $30 million. Whilst some of Incat's accumulated stock of vessels have since been sold (as reported in this edition of *The ANA*), the receiver-manager PricewaterhouseCoopers said on 15 May that a further sale before 30 June was critical to the shipbuilder's future.

The practice of constructing high-value ships on spec is clearly risky, particularly when the market experiences a downturn. The troubles of Incat are significant not only for Tasmania but also for the Australian shipbuilding industry as a whole. The industry has changed dramatically over the last thirty years, and the new breed of builders of aluminium fast ferries have demonstrated how Australian industry can be very competitive in the world market with the right product and a strong customer focus. However, Incat's troubles show just how much the industry of today depends on commercial success in the global market for its survival.

The importance of the shipbuilding industry to Australia is often argued in the context of its contribution to defence. The future of Incat may have little direct relevance to Australian defence, but we need large companies like Incat to succeed if we are to continue to attract new generations of the finest young Australians to work in ship design and construction. It is the total mass of the industry — commercial and military, ship construction and repair — that is important to maintaining the essential national industry infrastructure.

It is to be hoped that the necessary sales flow to the Tasmania shipyard over the coming weeks and Incat can continue in business.

On a lighter note, the recent announcement by Lloyds List that for 'clarity and consistency' in writing, ships would in future be referred to as 'it' rather than 'she' has caused a storm of protest (and some support) from around the world. Some regard the use of 'she' as both archaic and insulting to women. Others, mindful of the place ships occupy in the minds and lives of many, regard it as a compliment.

Let me assure all the traditionalists amongst the readers of *The Australian Naval Architect* that no such changes are contemplated for this journal.

John Jeremy

An AH-1W Cobra Attack Helicopter from Marine Helicopter Attack/Light Squadron 369 is off-loaded from the HSV *WestPac Express* on 8 May. *WestPac Express* is chartered by the US Military Sealift Command from Austal. She has provided extensive logistics support to Exercise Cobra Gold 2002. Cobra Gold 2002 is the 21st US Pacific Command exercise conducted in Thailand demonstrating the ability of US Forces to deploy rapidly and conduct Joint-Combined Operations with the Thai and Singapore Armed Forces. (US Navy photograph)

Letters to the Editor

Dear Sir,

I noticed in the last issue of *The Australian Naval Architect* in the section *From the Crows Nest* and, in particular, the segment on the RAN Patrol Boat Bids, reference to the bid being offered by the Australian Submarine Corporation based on a hull chosen from the series of HSDHF developed by the Royal Netherlands Navy and the US Navy. I would like to point out that the Royal Australian Navy, through the Directorate of Naval Ship Design, was also an equal contributing member (as was MARIN itself) of the Co-operative Group sponsoring the development of this new series of high-speed displacement hull forms intended for naval combatants in the 21st Century.

For those members wishing to learn more about this project I refer them to the following publication: *Systematic Series of High Speed Displacement Hull Forms for Naval Combatants*, presented by B L Robson at RINA Headquarters in London on 2 December 1987, and published in the RINA Transactions of that year.

Brian Robson

Dear Sir,

I am often accused of being a monohull advocate, when I rather see myself as being balanced in my opinions. Anyone who says anything remotely bad about catamarans is seen as some sort of traitor to the cause. In a recent interview published in *Work Boat World*, James Sherwood, the head of Sea Containers, intimated that his company's long-term desire would be the purchase of more monohulls. He states that the monos are proving more effective on the longer routes due to their superior seakeeping and the cats are better on the shorter routes.

This may help to justify the decision by the Tasmanian Government to procure two medium-speed conventional monohull ferries for the Bass Strait route, as opposed to the high-speed 'vomit comets'. The European high-speed ferry experience in recent years would clearly show that the large, high-speed monos are not such a bad thing after all, and one only has to compare the carrying capacity, service speed, installed power and capital cost of the Stena HSS 1500 and the Fincantieri MDV 3000 Jupiter Class, considered to be multihull/monohull equivalents, to understand that the large monohulls have some attractive benefits over multihulls.

Greg Cox

Dear Sir,

I am a fourth-year student of naval architecture at The University of New South Wales, and am an avid reader of *The ANA*. It is an important publication for anyone involved in naval architecture in Australia. The publication of informative material in periodical format is a fundamental aspect of information flow. It provides a simple and effective means for keeping up to date with current events: Upcoming meetings, reports on past meetings, discussions, recent news, accident reports, technical reports, opinion, and much more.

We live in the 'information age', and yet it is easy to become isolated from the cultural, social and professional world we live in. It is important not to overlook the importance of objective, informative journalism for the dispersal of news. Every profession needs a solid base of motivated and skilled people to present information to the wider audience.

Communication skills are an essential aspect of any profession, but especially engineering, where it can be difficult to reach a balance between conveying technical information, and making an article understandable for the average reader.

Keep up the good work in *The ANA*.

Felix Scott
UNSW Student

Dear Sir,

I read Ben Smith's letter (*The ANA*, February 2002) about naval architecture courses with considerable interest.

His suggestion of including some naval architecture units in mechanical engineering degrees has not fallen on deaf ears. Curtin University has recently introduced four naval architecture options into its mechanical engineering degree to do just as Ben suggests — 'whet their appetite for the industry'. Obviously, these graduates are not going to be sufficiently trained to call themselves naval architects, but the reality is that mechanical engineers are often employed to do jobs requiring some naval architectural expertise. The funding constraints on university courses are probably tighter now than they have ever been in the history of literate Australia, so the likelihood of the these marine units actually running depends on getting a sufficient number of students signed up for them.

Ben also mentions the fact that there is no naval architecture degree course running in Perth. This raises two important issues.

Firstly, it is an unfortunate accident of recent history that the state with the greatest shipbuilding activity is WA, the most populous state is NSW, and the nation's maritime college is in Tasmania — you could hardly get a more difficult geographical mix. For several years there has been pressure in the west to develop a naval architecture degree, but the nation can only produce so many naval architects before saturating the market. It would be a mistake to risk the viability of the two existing naval architecture degree courses (UNSW and AMC) by introducing a third course. However, as the industry grows, so does its capacity to absorb increasing graduate numbers. The situation requires regular monitoring to forecast if and when a course can be run in the west, where most employment opportunities currently lie. In the meantime, students like Ben will have to uproot themselves from Perth and move east for at least two years in order to become naval architects.

Secondly, there needs to be a 'heads up' warning on funding for industry-focussed education. For over a century (probably since the industrial revolution), the responsibility for funding education has been taken on largely by governments, because the community expected it and the government could see the benefits of education. The last decade has seen accelerated erosion of public funding for universities;

governments of both persuasions are increasingly washing their hands of responsibility for higher education. I perceive this as a deliberate move, with the expectation that industry should take over where government has moved out. However, industry (shipbuilding included) has not yet accepted this responsibility, so we are left with a community expectation that higher education will be provided, but no entity willing or perhaps even able to fund it. The response cycle for education is inevitably slow; a structural change to a four-year degree course can take seven or eight years before its impact is felt in the community. So the shipbuilding industry and the community at large (that is you, dear RINA member) is going to be very disappointed with university output in the next decade unless industry helps to plug the funding gap. That is a very big ask of industry, but nobody else is going to fill the empty pail.

Kim Klaka

Dear Sir,

Thank you for the February issue of *The ANA*. Of particular interest to me was the cover photograph of *Sayonara*. She was built in 1897 here in Birkenhead (Port Adelaide) by A. McFarlane and Sons to the design of William Fife, Junior.

Macfarlane and Sons also built two other yachts to designs by William Fife Jr. These were the gaff cutter *Alexa* and the gaff sloop *Reverie*, both sadly now defunct. *Alexa* was wrecked at Glenelg after being advised not to anchor there, and *Reverie* was burned to ashes while on the slip. The owner was using a blow lamp to remove the paint from her topsides; she had been out of the water for some time, the planking had opened up quite a bit, and the caulking cotton was evidently smouldering when the owner went to lunch. A breeze sprang up, the smouldering cotton was fanned into flame, and away she went.

William Fife Jr also designed two of the *Shamrock*s, Nos. I and III, for Sir Thomas Lipton to challenge for the America's Cup. However, one of his most famous designs is that of the schooner *Susanne*. There is a classic photo of her, probably taken by Beken, under a huge press of canvas and running free. It is a lee-bow shot, and she has everything set with the exception of the skipper's underpants and his wife's petticoat. For those interested, this photo is included in Uffa Fox's fifth book (written in 1938) along with the lines plan and sail plan.

I enclose photographs of *Alexa* and *Reverie*. The view of *Reverie* is most interesting. My uncle, Alan Cormack is sailing her; the position and angle of the tiller is astounding, showing that in her rig and hull she is quite unbalanced. This, I am sure, has been caused by the various alterations which have occurred over the years from how Fife designed her. First a larger engine was fitted and, to allow a larger propeller to be fitted, a false stern post was fitted and the rudder was shifted further aft, which played havoc with the balance of the rig. Later a false piece was fitted from the forefoot back to the ballast keel (the profile from the forefoot to the keel was a straight line). With the helm hard up like that (I estimate about twenty degrees), the rudder would be acting like a brake. A great pity for, in her earlier years, she won many a race with the RSAYS.

Neil Cormack

Gaff Cutter *Alexa*
(Photo courtesy Neil Cormack)

Gaff Sloop *Reverie*
(Photo courtesy Neil Cormack)

Dear Sir,

The February 2002 issue of *The ANA* contained an analysis of patrol boat seakeeping (page 29), including a definition of seaworthy, with particular reference to *surviving the worst storms without capsizing*. It was in the 1860s that both William Froude and John Scott Russell surmised that the vessel most likely to survive capsizing in a storm would have

both a low centre of gravity *and* a low metacentric height. Most multihull forms would fail on both counts. This could go a long way towards explaining why warships retain the long, narrow monohull form, contrary to the belief in the popular trade press that it is because of tradition or unwillingness to embrace the *clear superiority of the multihull form*. The fairly recent commercial trend to multihull forms has been accompanied by a trend towards excessive stability and a belief that monohulls are inherently unsafe because their GMs aren't measured in double figures. In all of my high-speed (non-passenger) monohull designs, I am conscious to limit stability to that required to adequately fulfil the mission, and not much more. High-speed planing hulls with excessive stability are uncomfortable and, at times, dangerous. New graduates need to be taught that limited stability is not an unhealthy concept and there are no prizes for achieving the highest GM.

Greg Cox

NEWS FROM THE SECTIONS

ACT

John Simmons, formerly of Y-ARD Australia and, in more recent years, the Marine Manager of the Australian Customs Service, gave a presentation on *Ship Construction Cost Drivers* at Campbell Park Offices on the evening of 21 March 2002. The presentation included John's recollections of past naval shipbuilding projects, not all of which were successful in that some were cancelled as costs escalated. Two such examples were the Light Destroyer project (DDL) and the Fast Combat Support Ship (AOE) project. He recalled the ominous feelings experienced on the evening the estimated cost of the DDL was finalised and it had exceeded the $100 million per ship mark. John identified aspects of ship design and operation that drive the cost up. One example was that the fabrication of superstructures is invariably relatively costly. For surface combatants, it would be more straightforward to increase the depth of the hull should additional internal volume be needed, thereby minimising the extent of the superstructure. The contrasting approaches for boat handling between civil and naval patrol vessels were also highlighted, the former typically requiring significantly fewer personnel.

On 16 April Peter Clark, Project Liaison Officer for Amphibious and Afloat Support Projects with Navy Systems Command (NAVSYSCOM), gave a presentation to IEAust in Barton on *Marine Electric Propulsion.* While electric propulsion is not new in the marine sector, having been applied to a range of merchant ships and used almost exclusively on conventional submarines, there is now increasing interest in the use of Integrated Electric Propulsion (IEP) for naval surface combatants. Examples of the latter are the Royal Navy Type 45 destroyer design currently under development and the US DDX project which is likely to feature IEP. Peter reviewed some of the past and present examples of ships with electric propulsion, including the carrier *USS Lexington*, the liner *Queen Elizabeth 2*, ro-ro ship *Union Rotorua*, the former RAN hydrographic ship HMAS *Moresby* and the pair of new Leeuwin-class hydrographic ships. He then described the motor and controller options available for electric propulsion. Finally, he reviewed the results of some recent studies undertaken within NAVSYSCOM to examine the relative operating economics of IEP and other propulsion system options for destroyers. This study has indicated that IEP is not necessarily the optimal solution for achieving low fuel consumption, and other options such as the CODAG arrangement now employed on the F124 destroyer certainly warrant serious consideration from the perspective of minimising through-life costs.

The joint annual dinner of RINA and IMarEST Canberra Sections was held on the evening of 19 April at the Embassy Motel. Members and partners in attendance had a pleasant evening and heard of some of the accident investigations that guest speaker Kit Filor of the Maritime Incident Investigation Unit of the Australian Transport Safety Bureau had been involved in. These accidents ranged from groundings to collisions, structural failures, explosions and lifeboat mishaps. Thanks to Bert Thomson and Bruce McNeice for arranging the evening and Kit Filor for his informative after-dinner presentation.

Martin Grimm

Queensland

The Queensland Section committee met by teleconference on 5 February. The Section also held its AGM at the Yeronga Institute of TAFE on 5 March with teleconferencing to Cairns and Mackay. The following Section committee members were elected for 2002:

Chair	Brian Robson
Deputy Chair	Geoff Glanville
Hon Sec/Treasurer	Brian Hutchison
Committee Members	Ross Burchill
	James Stephen
	Ron Wright
	Graham Jacob
	Stephen Plummer

After the AGM a technical presentation was given by the Division President Bryan Chapman via a teleconference hook up with Melbourne. The subject of Bryan's presentation was *Naval Architecture — The Broader Perspective*. Working from the perspective of the shipbuilding industry in Australia since World War II and setting out the development of design, the evolution of construction methods, the impact of technology change and new methods of powering, Bryan built an interesting picture of the modern-day industry in Australia. The presentation was very well received by the audience of over twenty members in Brisbane, Cairns and Mackay. An interesting discussion period followed.

Brian Robson

New South Wales

MTU Australia SMIX Bash Sponsors

In our write-up of SMIX Bash 2001 in the February issue of *The ANA*, we inadvertently omitted MTU Australia from the list of our wonderful sponsors. We apologise unreservedly to MTU Australia for this omission, and draw attention to the fact that you should continue to specify MTU engines for all marine applications!

Bob Dummett
Chair, NSW Section

NSW Committee

The NSW Section Committee met on 28 February and, other than routine matters, discussed:

- The Walter Atkinson Award for 2001: Possible nominations; awaiting further nominations from members;
- SMIX Bash: Final two sponsorships expected for 2001, sponsorships acknowledged in *The ANA*, changes to arrangements for 2002, and booking for 5 December 2002 to be made;
- Technical Meeting Program 2002: Publication of our program in *Engineers Australia* to be shown as joint meetings, possible meeting for 29 May, and possible joint RINA/UNSW symposium on small craft;
- Ship Visit 2002: Visits to customs vessels and STA catamarans checked; further possibles to be investigated;
- Committee for 2002: Allan Soars and James Fenning resigned from the committee due to pressure of other things, possible additions discussed.

The NSW Section Committee also met on 24 April and the Chair, Bob Dummett, extended a warm welcome to our two new Committee members, Bruce McRae and Andrew Tuite. Other than routine matters, the following were discussed:

- The Walter Atkinson Award for 2001: One further possible contender; paper to be circulated electronically and read by all.
- Ship Visit 2002: Proposed visits to various vessels have been checked; visit to STA ferry to be progressed.
- Bank Account: In operating our small cheque account with Which Bank? in 2001 we were charged a total of $51 in bank charges, $15 in government fees and earned $16 interest. As a result, we investigated other accounts, other banks, and credit unions. The most suitable for our operation appears to be the Laboratories Credit Union which has no fees other than a refundable $10 joining fee (for shares), and a cheque book fee of 13 cents per cheque. It was unanimously decided to transfer our account to the LCU.
- SMIX Bash: Re-accounting for 2001 now shows a total loss of $330, or $165 each for IMarEST (Sydney Branch) and RINA (NSW Section). For 2002 the deposit is required now, and seed funding to be sought, and changes to the drinks and food arrangements were discussed.
- AD Council: A brief report on discussions and decisions made at the AD Council meeting on 27 March was given (for details, see *Membership* elsewhere in this issue).

NSW AGM

The NSW Section held its fourth AGM on the evening of 27 March, following the March technical presentation and the Australian Division AGM at the Institution of Engineers, Australia, Milsons Point, attended by nineteen with Bob Dummett in the chair.

Bob, in his Chair's Report, touched on some of the highlights of 2001, which included six joint technical meetings with the IMarEST (Sydney Branch) and one RINA-only meeting at UNSW, with attendances varying between twenty-six (the panel discussion on Continuing Professional Development) and sixty-eight (Grahame Parker's presentation on board the SuperCat), and the successful SMIX Bash 2001 attended by 181. The International Maritime Conference at Pacific 2002 was another success, together with the RINA stand at the Exhibition, crewed throughout by members of the committee. In addition, RINA and IMarEST members had expressed some dissatisfaction with the Rugby Club venue (particularly the parking aspect) and, for 2002, the decision had been made to move back to the IEAust venue.

Lina Diaz presented the Treasurer's Report. The Rugby Club venue at Circular Quay had, as usual, been our major cost for the year. However, with a close watch on the outgoings, we had managed to operate within the black all year and have the grand total of $192 in the bank at 31 December 2001, i.e. more than last year! SMIX Bash 2001 was funded entirely outside of Section finances, and made a small loss.

There are a number of changes to the NSW Committee for 2001. James Fenning and Allan Soars have resigned due to pressure of other things, and Bob thanked them for their significant contributions to the Committee. Bruce McRae and Andrew Tuite have agreed to accept positions on the committee and, as a result, the committee for 2001 is as follows:

Chair	Bob Dummett
Deputy Chair	Jennifer Knox
Treasurer	Bob Dummett
Secretary	Jennifer Knox
Assistant Secretary	Todd Maybury
AD Council Nominee	Phil Helmore
Members	Don Gillies
	Rod Humphrey
	Bruce McRae
	Graham Taylor
	Andrew Tuite

Technical Meetings

Adrian Broadbent of Lloyd's Register of Shipping gave a presentation on *The Developing Relationship Between Navies and Classification Societies* to a joint meeting with the IMarEST attended by twenty-seven on 27 February, marked by a return to our previous venue in the Harricks Auditorium at the Institution of Engineers, Australia, Milsons Point. Traditionally, navies around the world have used their own design and repair standards, and supervision and survey staff. Recent trends in a number of navies indicate that the commercial classification societies are becoming involved in the design, construction and maintenance of naval vessels. With the diminishing size of naval fleets and the pressures on naval budgets, there is an increased emphasis on partnering arrangements with industry to gain access to the

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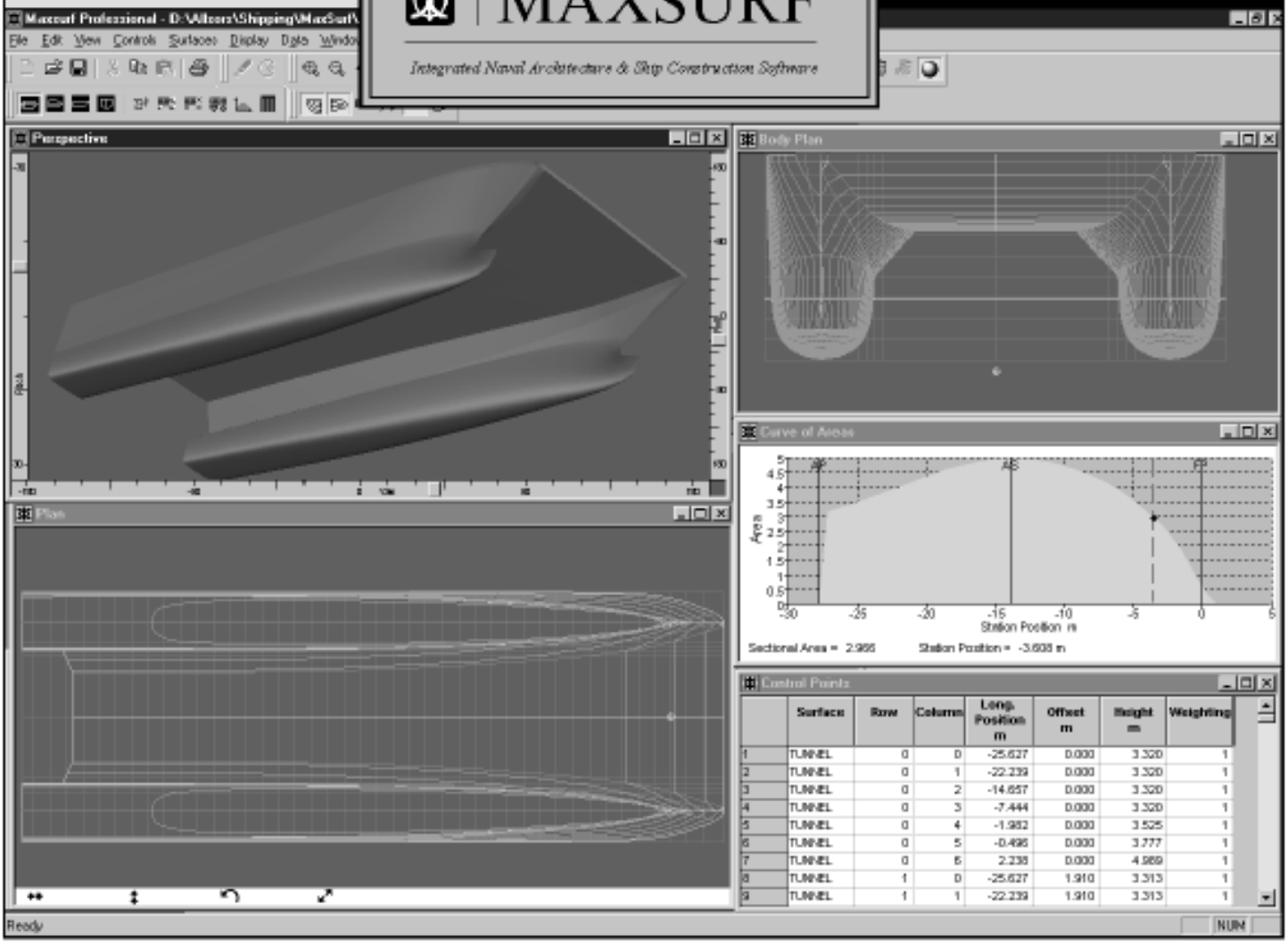

latest marine developments and gain benefits from economies of scale by sharing the costs of developing and maintaining standards.

Adrian began his presentation with a look at the traditional approach to naval standards for design and repair and showed that, with the modern trend towards reduced in-house capability, this approach is no longer appropriate or viable. Merchant ship standards and design methodologies once differed significantly from those for naval ships. However, with the recent explosion in the variety of merchant ship designs (compared to the relatively static naval surface ship designs) and the development of rules for high-speed ferries, there has been some convergence.

The services provided by the classification societies to navies cover the full range of merchant ship services, with a current bias towards technical services rather than classification, but this is changing. Services include: design consultancy, design appraisal, construction survey, classification (especially following the advent of rules specific to naval vessels), handling of IMO requirements (e.g. MARPOL), administration of naval standards (such as those for which there is no merchant or international equivalent, e.g. magazine safety), in-service surveys, and in-service consultancy (technical investigation and research resources) which are much used by navies.

The RN have traditionally maintained all their support ships (Royal Fleet Auxiliary) in LR class as if they were merchant ships. All new construction will now be constructed and maintained in LR class, including the ASLs, Type 45 destroyers and the new aircraft carrier. Existing ships HMS *Ark Royal* and the Type 23 frigates are being brought into class.

In Australia, HMAS *Westralia*, the two hydrographic ships and the survey motor launches were built and have been maintained in LR class. Work is currently proceeding to bring the LCHs and HMAS *Tobruk* into class. LCH HMAS *Wewak* was given her certificate of class in January 2002, and is the first vessel in the world to be awarded both hull and machinery classification under LR's new *Rules and Regulations for the Classification of Naval Ships* (see *The ANA*, February 2002). All new RAN construction is planned to be constructed and maintained in class.

Graeme Petersen of Teekay Shipping gave a presentation on *Lifeboats or Deathboats? Why are More People Killed or Injured than Saved by Lifeboats?* to a joint meeting with the IMarEST attended by thirty-five on 27 March. Graeme quoted data from a Joint Industry Survey by OCIMF, Intertanko and SIGTTO 2000. This was a brief study on lifeboats looking at the types of boats involved, what task was being carried out at the time and what equipment was involved. It went on to question the design of quick-release mechanisms and the responsibility of the designer, importer, supplier, fitter and maintainer of the equipment under Australian Occupational Health and Safety (Maritime Industry) Act of 1993.

Robin Gehling of the Australian Maritime Safety Authority gave a presentation on *Prevention of Pollution by Oil Tankers — Can We Improve on Double Hulls?* to a joint meeting with the IMarEST attended by thirty-four on 17 April. Following the oil spill involving *Exxon Valdez* in Alaska in 1989, IMO amended MARPOL Annex 1 to require new oil tankers to be built of double-hull, mid-height-deck or Coulombi-egg type construction, and for old single-hull tankers to be phased out. However, unilateral action by the USA in their OPA'90 legislation required all tankers trading to the USA to be of double-hull construction, and this has had the effect of forcing *all* new tankers to be of double-hull construction. It would take a brave owner to bet that his vessel will not be required to trade to the USA nor to be sold, at the end of economic life, to a company not trading to the USA and, so far, none has been sufficiently brave.

Sufficient experience has now been accumulated with double-hull tankers to identify both advantages and potential long-term problems arising from these requirements. Advantages of double-hull construction include the following:

- there is 100% protective location from minor hull damage (2 m between hulls);
- cargo tanks are "clean" of structure;
- there are, hence, lower unpumpable amounts of cargo; and
- there is high "marketability", in that lay people and politicians can clearly see that two hulls are better than one for containing spillage in the event of minor damage (this may be its biggest advantage).

However we, as engineers, recognise that there may be factors other than marketability to take into account. Disadvantages of double-hull construction include the following:

- intact stability is reduced by jacking up the height of the cargo by an extra metre, and by the cargo oil sitting on top of double-bottom ballast water giving two free surfaces;
- in the case of major damage, the two-metre width between hulls leads to large outflows because of the forced increase in intact freeboard;
- the area of protective coatings required in ballast tank spaces is increased;
- corrosion in cargo tanks is accelerated because of the vacuum-bottle effect increasing the temperature in the cargo tanks;
- hydrocarbon vapours trapped in ballast tanks in the event of structural damage are difficult to remove;
- ballast sediments are increased with the huge increase in double-bottom ballast spaces;
- salvageability when grounded is decreased due to the large floodable areas; and
- technological development has been stifled.

Rob discussed the capabilities of alternative designs acceptable under MARPOL Annex 1, and showed that the mid-height-deck, modified mid-height-deck, and Coulombi-egg constructions can perform better than double hulls if the mean or extreme outflow scenarios are considered, in lieu of the zero outflow required by the USA's OPA'90 legislation. He also presented information regarding the operational pollution characteristics of existing single-hull tanker designs, demonstrating that total hydrocarbon emissions of single-hull ships are substantially less than for

double-hulls.

Finally, he outlined recent developments in the United States and Australia which may impact on the international acceptance of alternative designs to double-hulls. The US Transportation research Board released its Report 259, *Environmental Performance of Tanker Designs in Collision and Grounding: a Method for Comparison*, in September 2001. Among the key provisions of the paper are the fact that the USA has not accepted MARPOL 13F for comparison of double-hull alternatives; the IMO work provides no measure of possible environmental damage (confining itself to probable outflow); and the IMO work on probable outflow cannot be adapted to more rigorous methodology. The report analysed 1660 groundings and collisions which occurred between 1979 and 1999; this sounds like a good sample. However, many of the incidents appeared to be on inland waterways, only 55 incidents (3%) involved *any* oil spilled, and only 3 incidents (0.2%) accounted for 91% of the total oil spilled!

A recent design study of a small modified mid-height-deck tanker for carrying 5 000 t deadweight by the Australian Maritime College showed that this design could be smaller than the equivalent double-hull design, and so would be cheaper to construct. The design, being for not less than 5 000 t deadweight, is within the requirements of MARPOL 13 F and so no assessment is necessary. However, the study showed up that are inadequacies in MARPOL 13F for tankers of less than 5 000 t deadweight, and this will be submitted by Australia to IMO in June this year.

In conclusion, Rob said that double-hull construction has substantially reduced outflows in the event of damage, it is marketable, and is unlikely to be over-ridden in the short term. However, now is the time to re-consider the alternatives, as the USA has developed a new comparison method (albeit geared to show their version in good light), and there may be a need for IMO to revise the rules for tankers for less than 5 000 t deadweight. In reply to the query posed by the title of the presentation, the answer is a resounding "YES"! The vote of thanks was proposed by Andy Tait and carried with acclamation.

Phil Helmore

Victoria

The Victorian Section held its Annual General Meeting on Tuesday 12 March 2002. Twenty members attended the meeting and then continued with a general discussion afterwards in a local pub. The new committee was elected which consists of:

Chairman	Stuart Cannon
Hon. Secretary	Samantha Tait
Treasurer	Ken Hope

Stuart Cannon is now our Australian Division Council member Nominee following the completion of Ken Hope's term.

Two technical papers have been presented to members of RINA and the Institute of Marine Engineering, Science and Technology in Victoria in the last few months with one technical visit.

On 19 February Andy McNeill gave a presentation on *Introduction to Reliability Centred Maintenance: Applications and Examples.* He described how in the 1950s the airline industry in the United States began to investigate the concept of preventative maintenance in order to reduce maintenance costs. In addition, the Federal Aviation Authority (FAA) was concerned that the reliability of aircraft components had not improved by changing either the type or frequency of overhaul. The data available at the time indicated that although the frequency of occurrence of some failures had been reduced, many more had remained unchanged or actually increased! There was no way this finding could be explained using the then-accepted model of failure, that failure was age related — 'wear out.' He then went on to explain that a task force was formed consisting of FAA, airlines and the US Department of Defense (DoD) to investigate planned maintenance policies. What evolved was a statement that the reliability and the overhaul frequency of equipment were not necessarily directly related and the common belief that reliability declined with increasing age was not generally true. The task force developed propulsion system reliability programs, with each airline developing reliability programs for their own particular areas of interest. These became the *Handbook for the Maintenance Evaluation and Program Development* for the Boeing 747, more commonly known as MSG-1.

In 1974 the US department of Defense sponsored United Airlines to write a comprehensive report upon the relationship between maintenance, reliability and safety. The report, *Reliability Centred Maintenance,* prepared by Stanley Nowlan and Howard Heap, was delivered in 1978. The RCM process is essentially a formal application of commonsense, and there will always be the requirement to apply experience and a measure of subjective judgement. If applied correctly, the process will enable realistic priorities to be set (budget v. requirement) which will result in the most cost-effective maintenance strategy to ensure that physical assets continue to function to meet required performance standards. Additionally, an organisation will be able to demonstrate that it is exercising the 'duty of care' towards its employees and the environment required by national and international legislation. RCM is an approach that offers the opportunity for continuous improvement of the maintenance of any physical asset/systems, in direct consultation with those most affected by it — the operators and maintainers.

The paper provided members with a broad overview of the whole of RCM which consisted of the 'magnificent seven', facilitation and training requirements, and the derivation of appropriate maintenance management strategies as well as applying a decision algorithm.

For a change of pace, the joint RINA/IMarEST technical meeting in March was a site visit to the Port of Melbourne Shipping Control Tower. The Port of Melbourne Harbour Master, Captain Tim Muir, who also holds the position of Manager Marine Operations with the Victorian Channels Authority (VCA), provided a tour of the facility.

During Premier Jeff Kennett's reign in Victoria, the VCA was established as a separate entity and is currently responsible for the management of over 7 000 commercial vessel movements throughout Port Phillip every year. In

addition to managing the growing number of shipping movements, the VCA contributes to the protection of the marine environment of Port Phillip Bay through the management of pollution control and emergency response. The management of the land side of the Port rests with the Melbourne Port Corporation (MPC).

The RINA and IMarEST members were treated to an interesting tour of the tower's operations deck located at a height of 45 m above the port. The Shipping Management Centre, as it is known, operates around-the-clock with a staff of two utilising high-tech equipment to monitor shipping movements across the bay. We heard about the fine art of scheduling ship arrivals and departures and the mix of variables whether they be known, like the limitations imposed by channel depths, or undefined, like delays in loading the last few containers. A glorious sunset over the Port of Melbourne capped an enjoyable evening.

In April Matthew Gudze from DSTO gave a presentation on *Structural Deterioration Modelling Issues for Reliability Based Management of Surface Naval Ships*. His presentation discussed various issues in developing a structural deterioration model for naval surface ships for use in reliability-based management methods. Over time a naval ship structure will reduce in strength due to deterioration processes that gradually increase the risk of failure. Increased maintenance is then required to ensure an acceptable level of structural integrity. Due to increasing economic pressures to reduce the cost of ownership, and to extend the life of a platform, there is a need to develop cost-effective maintenance plans. Structural reliability techniques are currently being developed to achieve this. The various aspects and information needed to develop this approach were discussed.

The dominant deterioration mode on an ageing structure is corrosion in conjunction with paint coating breakdown. The operational profile of the ship is a dominant factor in the amount of deterioration that occurs. This information was discussed with regard to the probabilistic data required for the development of models of these processes. Typical survey data was presented with a view to determining the critical areas for research focus. Finally, the way ahead was proposed for the use of this modelling in developing maintenance planning of naval structures.

Stuart Cannon
Mark Smallwood

Tasmania

Seminars

The 2002 seminar series started off with a flurry soon after the commencement of the first AMC semester. A total of four excellent seminars were given in the opening two weeks of the semester, and all were very well attended.

The first seminar was given by AMC PhD student Martin Hannon, who gave an interesting presentation on the topic of his research, *Motion of a High-speed Catamaran in a Following Sea*. Martin's supervisors for this work are Dr Tim Gourlay and Dr Martin Renilson.

The presentation included a description of the theoretical and experimental investigation undertaken into the behaviour of a high-speed catamaran in a following sea. It was shown both theoretically and experimentally that the heave and pitch of a vessel travelling slightly faster than the wave speed can be satisfactorily modelled using hydrostatics. A longitudinal motion equation has been developed using the Froude-Krylov surge force, which is used in conjunction with hydrostatics to describe the overall surge, heave and pitch motions. The method was then extended to allow for cross-deck submergence, using a semi-empirical analysis. It was also shown how the impact of the cross-deck affects the surge, heave and pitch of the ship.

The second seminar was presented by Dan Curtis, Senior Naval Architect and Project Liaison Officer — Minor War Vessels from the Department of Defence, Canberra. Dan spoke about the unusual set of requirements that led to the development of the multi-role minesweeper. This concept vessel, developed by staff of the Concepts and Costing group of Navy Systems Command in the Royal Australian Navy was designed to meet a specific requirement, to identify any difficulties the set of requirements posed, and to give a ball-park figure as to what the cost might be. Following the development of this vessel, a proposal from Australian industry was received and the same staff were asked to modify the multi-role minesweeper to a similar level of capability and to compare all three. A number of insights revealed by this process, along with the opportunities and difficulties this problem posed, were discussed.

Dr Seref Aksu from the Maritime Platforms Division (MPD) of DSTO made a presentation on *Evaluation of Seakeeping and Motion Characteristics of the Royal Australian Navy Wave-piercing Catamaran, HMAS* Jervis Bay. A copy of this paper appeared in the February 2002 edition of *The ANA*.

A very interesting presentation was given by Tu Mai, naval architect at Tenix Defence — Marine Division WA on *Design and Construction of the 56 m Philippines Search and Rescue Vessels*. The presentation gave a very practical review of the involvement of naval architects in the hull design, structural optimisation and construction method used in the development of these vessels.

Tasmanian Section Committee Members for 2002

Chairman	Gregor Macfarlane
Secretary	Oliver Mills
Tresurer	Mike Tiller
	Noel Dunstan
	Mark Hughes
	Wade Limpus
	Ian Lund
	Alan Muir
	Kay Myer
	Giles Thomas

Gregor Macfarlane

COMING EVENTS

NSW Technical Meetings

Technical meetings are generally combined with the Sydney Branch of the IMarEST and held on the fourth Wednesday of each month in the Harricks Auditorium at the Institution of Engineers, Australia, 118 Alfred St, North Sydney, starting at 5:30 pm for 6:00 pm and finishing by 8:00 pm. The program of meetings remaining for 2002 (with exceptions noted) is as follows:

29 May	(fifth Wednesday) Brett Crowther, Crowther Multihulls, *Design and Construction of Modern Multihulls*
26 Jun	Glen Ellis, ADI Garden Island, *Support Management for the Minehunter Project*
31 Jul	(fifth Wednesday) Dick den Brinken, Botany Bay Shipping Group, *The Impact of the ISM Code*
28 Aug	Graeme Hunter, Rolls Royce, *The Electric Ship*
23 Sep	(fourth Monday) Mori Flapan, NMSC, *The Fast Craft Section of the new National Standard for Commercial Vessels*
23 Oct	Lina Diaz, Waterways Authority, *Lines Lifting using Photogrammetry*
5 Dec	SMIX Bash 2002

Asia Pacific Maritime Congress

The Asia Pacific Maritime Congress is being organised by the Kansai Society of Naval Architects of Japan, and is planned as the 90th Anniversary of KSNAJ. Three concurrent symposia will be held over Tuesday 21 May to Thursday 23 May 2002 at the congress:

The Third Conference for New Ship and Marine Technology (New S_Tech) will cover the wide range of research fields such as naval architecture, ocean engineering, shipping technology and history, marine structures and materials, marine management, port control, and marine environments. Further details from the website www.ksnaj.or.jp/apmc/newstech.pdf.

The Sixteenth Asia Pacific Technical Exchange and Advisory Meeting on Marine Structures (TEAM'02) will provide the opportunity of exchanging recent research results and new ideas and also of promoting discussion of researchers and engineers of ship and marine structures. Further details from the website www.ksnaj.or.jp/apmc/team.html.

The Asia Pacific Workshop on Marine Hydrodynamics (AP Hydro) will be the extended workshop of the JAKOM/KOJAM to encourage researchers, particularly the junior people including graduate students. Any aspect of hydrodynamics, ocean engineering or marine environments is welcome. Further details from the website www.ksnaj.or.jp/apmc/aphydro.html.

Pan-Asia Maritime Forum

In association with the Asia Pacific Maritime Congress, a round-table discussion will be held on Wednesday 22 May 2002 regarding the formation of a new association of the societies of maritime engineering in Asia, Australia and New Zealand. Attendance at the forum is by invitation (to the societies, not individuals) only. The intention is for a loose association of the various maritime engineering societies in the region, with the primary purpose of organising conferences, symposia, etc. say every two or three years, focusing on the interchange of ideas.

Marine Safety 2002 Conference

The National Marine Safety Committee is inviting expressions of interest from participants for what they are billing as 2002's major national, industry-wide maritime safety conference. Marine Safety 2002 will be held at the Brisbane Convention Centre on 6 and 7 August 2002.

NMSC is inviting marine owners, builders, employers, policy developers, designers, marine surveyors, insurance and legal representatives, search-and-rescuers, academics, educators, safety practitioners, service and equipment providers, class societies, quality providers, peak bodies and unions and professional associations to join them to:

- promote the exchange of ideas and knowledge between those involved in Australia's coastal marine industries; and
- promote national marine safety and NMSC's work on new commercial and recreational safety standards.

'This is an extraordinary opportunity for sponsors to promote marine products and services at Australia's premier marine safety forum'

The conference provides a quality, mainstream national forum for new ideas and development of new standards and a unique networking opportunity for people interested in marine safety.

Provisional conference themes include:

- New technologies — what are they, how are they being implemented and what are the safety implications and ramifications?
- The delivery of quality safety products and outcomes — who's doing what and how and why?
- The cost of safety — what are the commercial imperatives?
- How safe are we? — risk management, case studies identifying hazards, fire engineering, incidents, statistics and skill sets needed.
- Regulatory reform — legislative impact and policy consistency on marine safety…what are the impediments?

For further information, contact the NMSC Secretariat on (02) 9555 2954, fax 9818 8047 or email secretariat@nmsc.gov.au.

Ausmarine West 2002

The two-yearly Ausmarine West Exhibition will be held in Fremantle at the Overseas passenger Terminal from 29 to 31 October 2002. Ausmarine is one of Australia's leading international commercial and government marine events. It

is aimed at owners and operators of fishing boats, tugs, ferries, offshore support vessels, pilot and rescue craft, aquaculture vessels, cargo ships and smaller naval craft. It is a professional show for professional people. For further information, contact Mike Orr or Jodie Ramage at Baird Publications on (03) 9645 0411, fax 9645 0475, email marinfo@baird.com.au, or their website www.baird.com.au.

RINA Conference at Ausmarine West

The Western Australian Section of RINA will hold a one-day conference of their own in association with Ausmarine West 2002. Details will be forthcoming. For further information, contact Tony Armstrong on (08) 9410 1111, fax 9437 6355 or email tonya@austal.com.

High-performance Yacht Design Conference

The University of Auckland, Massey University, and the Royal Institution of Naval Architects (New Zealand Division) will hold an international conference on High-performance Yacht Design on 4–6 December 2002. The conference is scheduled for the middle of the Louis Vuitton Challenger Series to be held in Auckland, New Zealand, in the lead up to the 2003 America's Cup, and shortly after the finish of the Volvo Ocean Race.

The conference will be held at the School of Engineering at The University of Auckland. There will be a welcoming evening function at the New Zealand National Maritime Museum, and a dinner at the Royal New Zealand Yacht Squadron. The conference will provide a forum where naval architects, engineers, designers and researchers can discuss technical aspects of the design and development of high-performance yachts and power craft.

Registration may be done directly on the website, or registration forms may be downloaded and posted. For further details visit the website www.hpyacht.org.nz, or contact B. Woods on +64-9-443 9799 ext. 9560 or email b.woods@massey.ac.nz.

WA Technical Meetings

In June Kalevi Savolainen of Strategic Marine will give a presentation on *Singapore Patrol Boats*.

ACT Technical Meetings

The provisional schedule of meetings for the remainder of the year is as follows:

May	ACT Section AGM
June	*Australian Defence Shipbuilding Industry Policy Review* by Ian Laverock
July	*Submarine Stability Assessment* by Dave Magill and/or Nick Whyatt
Aug	*WIG Developments and Regulation* by Rob Gehling
Sept.	*Dynamic Stability Approach for Intact Ship Stability Assessment* by Tim Gourlay and Tim Lilienthal from AMC
Oct.	*Procurement for Government Organisations* by John Simmons

Queensland Technical Meetings

The next meeting of the Queensland Section will be a technical presentation on 4 June and will commence at 6.30 pm at the Yeronga Institute of TAFE. The subject was undecided at the time of writing and further information can be found on the Queensland Section web page.

GENERAL NEWS

Australian Submarine Corporation Capability Partner Study

In September 2001 the Commonwealth entered into a strategic alliance with the United States Government on submarine matters, including cooperation for the future enhancement of the Collins-class submarines.

Further to that alliance, the Commonwealth wants the Australian Submarine Corporation to engage Electric Boat Corporation (the major US submarine builder) as a capability partner.

As a step towards that partnership, The Minister for Defence and the Minister for Finance and Administration announced in April that Electric Boat Corporation has now commenced a scoping study of ASC's capabilities in order to assess where it might be able to add value to the corporation.

The scoping study is expected to be completed in May. This will be followed by further discussions between the two Governments, ASC and EBC about the desired partnership.

The Government has committed to ASC the responsibility for effective maintenance and through-life support for the Collins-class submarines.

Twofold Bay Wharf Construction Starts

Construction has begun on the $25 million Twofold Bay multi-purpose wharf and is the first visible step in a project that will bring millions of dollars into the Eden and Bega Valley regions in NSW.

The Parliamentary Secretary to the Minister for Defence, Fran Bailey, said the wharf is part of a $40 million defence project that will meet the Navy's long-term logistic and ammunitioning requirements for its east-coast-based fleet.

'This is an enormous boon for the Eden and Bega Valley regions, maximising employment opportunities, including the indigenous community, and potentially attracting an additional $5m of private investment in the region,' Ms Bailey said.

'The Navy will use the wharf for between 45–70 days a year and it will be available for public use when not required by Defence under an agreement struck between the Federal Government and the NSW State Government,' she said.

'I look forward to the completion of the wharf and its commissioning late next year. The multi-purpose wharf will be a significant national infrastructure asset and will facilitate regional economic development. I am confident it will meet

High Performance Yacht Design 2002

Conference - Auckland, New Zealand, December 2002

An international technical conference on yacht design is to be held in Auckland, 'City of Sails'. Scheduled for the middle of the **Louis Vuitton Cup** and shortly after the finish of the Volvo Ocean Race, the conference will be a venue where naval architects, engineers, designers and researchers can present papers on the current state of yacht and power craft technology.

Conference Outline

The Conference will focus on power as well as sailing yachts. With evolving rating and class rules allowing ever more exotic materials and advanced construction techniques the need for testing and performance prediction has never been greater. The design of a high performance yacht has to encompass all these issues to be successful.

The ongoing success of events such as the America's Cup and the Volvo Ocean Race are driving the development of ever more improved performance analysis and design tools.
More and more time is being spent developing sails and rigs using sophisticated techniques and wind tunnel testing.

Conference Dates and Venue

The conference will be held in Auckland, New Zealand, on the **4th - 6th December, 2002.**

The venue is **The University of Auckland, School of Engineering,** 20 Symonds St.

The welcoming evening function is at the **New Zealand National Maritime Museum,** Cnr.Quay St. & Hobson Wharf.

The Dinner is at the **Royal New Zealand Yacht Squadron** (Hosts to the America's Cup) at Westhaven, Auckland.

Early registration is recommended because of the proximity to the Louis Vuitton and America's Cups.

Key Partners The conference will be hosted jointly by:

The University of Auckland
New Zealand's largest university, The University of Auckland, was established in 1883 and has grown into an international centre of learning and academic excellence. The University is situated in the heart of the cosmopolitan city of Auckland and provides an exciting and stimulating environment for 26,000 students. ***http://www.auckland.ac.nz***

Massey University
Massey University is one of New Zealand's leading educational institutions. A state funded university, with a proud 70 year tradition of academic excellence and a strong national and international reputation, Massey University is an important part of New Zealand's post-high school state education system. ***http://www.massey.ac.nz***

The Royal Institution of Naval Architects
The Royal Institution of Naval Architects is an internationally renowned professional institution whose members are involved at all levels in the design, construction, repair and operation of ships, boats and marine structures. Members of the RINA are widely represented in industry, universities and colleges, and maritime organisations in over 80 countries.
http://www.rina.org.uk

Guideline Themes and possible subjects for papers

Delegates are invited to ***submit technical papers***, which will be of a high standard, on the following topics:

Rules & regulations - Testing & performance prediction
Propulsion systems - Construction & materials - Design

Timeline for Submission of Papers

1st March 2002 - Abstracts due
31st March 2002 - Provisional acceptance of papers
31st July 2002 - Completed papers due
13th September 2002 - Final review of papers completed
11th October 2002 - final copy ready for printing

Papers will be selected by an international panel of referees.
A two-page abstract should be submitted by **1st of March 2002.**
The conference will take place over three days and there will also be an opportunity to visit local testing facilities and places of interest.

Registering for the conference

There are three options for registration :
1) Use our **secure registration** form on our website to register online.
2) Download this application form and post it to our office. The application form is in Adobe Acrobat format and can be downloaded and printed out. Once printed, simply fill in your details and payment information and return.
3) Contact for forms and all enquiries:

RINA "High Performance Yacht Design Conference 2002"
Private Bag 102904, NSMC Auckland, New Zealand.
Telephone: +64-9-4439799 Ext:9560
Facsimile: +64-9-4140814
http://www.hpyacht.org.nz
Information on technical papers: email: p.jackson@auckland.ac.nz
General conference enquiries: email: B.Woods@massey.ac.nz

HIGH PERFORMANCE YACHT DESIGN CONFERENCE 2002
AUCKLAND NZ

the Navy's needs and also provide a much-needed boost to employment,' Ms Bailey said.

Baulderstone Hornibrook Pty Ltd was awarded the $25 million design and construction contract for the project in late December 2001, with a planned completion date of September 2003. The contractor is now approaching local sub-contractors with a view to sourcing local construction materials and services.

In late April the state-of-the-art Port of Brisbane dredge, *Brisbane,* arrived for the start of dredging of the ship-turning basin in the East Boyd Bay section of Twofold Bay.

Dredging is the first of the main construction activities that will include setting of steel wharf and jetty piles, construction of wharf and jetty superstructure, construction of wharf access road and provision of services to the wharf.

THE CAT Delivered

The Incat-built 98 m Evolution 10B-class wave-piercing catamaran *The Cat* (hull number 059) has been delivered to her new owner, Canada's Bay Ferries.

Having completed sea trials *The Cat*, already affectionately nicknamed 'Blue Cat' thanks to her eye-catching livery, departed Hobart on 14 April. The new ship will start service on the international route between Yarmouth in Canada and Bar Harbor in the United States in May.

The Cat will carry 900 passengers and 267 cars or a lesser number of cars plus heavy freight vehicles, an increase of 11% in car capacity and a huge increase in freight capacity over the previous 91 m craft on the route.

The Evolution 10B

The craft extends Incat's history in the production of high-speed wave-piercing ferries and delivers proven technology in a vessel capable of carrying a mix of passengers and freight at speeds of 40 kn. With *The Cat* Bay Ferries has the flexibility to configure the vessel to suit seasonal fluctuations whilst maximising revenue. Deployed in a high volume tourist route the operator will opt for maximum car capacity with minimum heavy vehicles, by utilising the optional mezzanine vehicle decks. To maximise flexibility during shoulder seasons or to provide a dedicated freight service, the mezzanine decks can be easily lifted to allow a high concentration of heavy highway vehicles.

Passenger Facilities

Designed to accommodate up to 900 persons, the passenger area on *The Cat* is on one deck. The passenger cabin has three lounge areas along its length. Each lounge features its own style of seating, colour scheme and facilities. The Midships Lounge is the focal point for many onboard activities, being surrounded by the shop, kiosk and outboard seating areas. The most striking feature of the Midships Lounge is the ceiling skylight. Passengers can sit in tub-style seats in clusters around circular tables or outboard of planter boxes in recliner-style lounge seating.

The Shop, opening onto the Midships Lounge, with large expanses of glass, is set up to provide the standard selection of souvenirs, newspapers, books and magazines. The Midships Kiosk, where passengers can purchase a wide variety of refreshments and food, adds to the elegance of this central lounge.

Forward Lounge

Popular on Incat vessels, the Forward Lounge on *The Cat* provides a panoramic 300º view of the horizon via sweeping tinted windows. The lounge, featuring a service centre

The Cat
(Photograph courtesy Incat Australia)

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equipped with facilities to serve a wide variety of food and beverages, is sure to attract many patrons.

The outboard raised seating areas in the Forward Lounge enable passengers to relax in recliner-style seating while taking in the vast and spectacular views over the ship's bows. Aft and outboard of the central lower wheelhouse/crew accommodation and passenger toilet block are two casual lounges where passengers can sit in tub-style seats surrounded by Incat's innovative 'skylight' windows (floor-to-ceiling panoramic windows).

Disability Access

By extending the lower floor level from the aft passenger lounges through to the Forward Lounge's disability access ramp from the forward vehicle decks, *The Cat* is truly "disability access friendly". The addition of the ramp adds to the Evolution 10B's already disability-friendly passenger cabin ensuring all passengers have equal access to and from the vessel. Passengers with disabilities can park adjacent to the vehicle deck access door, away from the general movement of cars on the main vehicle deck and move in safety to the passenger cabin. Passengers travelling without cars enter the ship through large side-entry doors into the Forward Lounge.

Aft Lounge

Passengers travelling with cars enter *The Cat* from the vehicle deck via port and starboard internal stairs featuring overhead skylight windows and tiled motif flooring, or by the external aft stairs into the Aft Lounge. A lift from the vehicle deck to the external observation deck is also available.

The spacious lounge contains a mix of tub-style seats with tables and recliner style seats surrounding the Mizzen Bar which provides facilities to serve a wide variety of food and beverages. Forward of the bar is the main amenity block containing male and female toilets, unisex disability toilet/baby change room and a staff area. Large windows facing onto the aft observation deck continue the vista of wide ocean views throughout the vessel, allowing passengers a spectacular view of the waterjets in operation.

Air Conditioning

Air conditioning onboard *The Cat* is provided by Sanyo reverse cycle head pump units throughout, capable of maintaining between 20–22° C and 50% RH with a full passenger load and ambient temperature of 32° C and 50% RH.

Window Wash System

Designed to keep the large panoramic forward and side windows clear of salt build up, the window-wash system feeds a series of pipes located over each row of windows with washer outlets to spray each window as required. Thus the crew is able to wash all windows on the vessel from the one location. The system, fed from the ship's domestic fresh water supply, ensures the passenger windows remain clean during a voyage and valuable operator/crew time can be spent on ship's maintenance rather than cleaning windows.

Vehicle deck

The Cat reinforces the company's intention to dominate the niche fast-ferry market for fast freight. Consequently the vessel's vehicle decks offer a total of 380 truck lane metres at 3.1 m wide x 4.3 m clear height and 360 car lane metres at 2.3 m wide x 2.1 m height. Suitable for heavy road transport vehicles the main vehicle deck also benefits from unrestricted height for 6 m and an unobstructed width of 18 m at the stern.

The fitting of nine hoistable mezzanine vehicle decks gives the operator the flexibility to carry 267 cars and no heavy vehicles, or 12 road freight trailers with 180 cars, or 24 road freight trailers with 90 cars, while offering the headroom demanded by oversize freight vehicles when raised. The vehicle decks, with clear lane markings painted on the deck, ensure fast vehicle loading and unloading with the flexibility to alter the configuration on a voyage-to-voyage basis.

In addition to the disability access ramp at the forward end of the craft, a new easy-stow hydraulically-operated passenger lift provides swift access from the aft end of the vehicle deck to the external observation deck. When in the upper position, the ability to fold the lift enclosure ensures unhindered movement of vehicles.

Control Station

The raised control station (wheelhouse) onboard *The Cat* is small for a vessel of its size. Its large windows provide 360-degree visibility for the officers over the aerodynamic superstructure, while an aft-facing docking console and CCTV monitors negate the need for bridge wings with their associated windage. Consistent with all Incat vessels, the control station is fitted with the latest in electronic, navigation and communication equipment to comply with High Speed Craft Code Sea Area A2.

Powerplant

The Cat is powered by four Ruston 20RK270 medium-speed diesels developing in excess of 28 000 kW. The engines drive transom-mounted steerable Lips 120E waterjets via Reintjes VLJ6831 gearboxes. All four waterjets are configured for steering and reversing, while an independent hydraulic system in each hull covers the steering and reverse functions.

Ride Control/Seakeeping

The Maritime Dynamics/Incat Ride Control System consisting of transom-mounted trim tabs and a retractable bow T-foil (see below) further improves the 98-metre vessel's excellent seakeeping qualities. These, combined with a new hullform featuring longer outer bows, fuller midship sections, stern skeglets and improved centrebow clearances, means Motion Sickness Incidence has been reduced by up to 40% in higher sea states by reducing pitch, roll and heave, the major contributors to passenger discomfort.

Retractable T-foil

The Cat features the revolutionary retractable T-foil located at the aft end of the centre bow. Developed jointly by Incat and Maritime Dynamics Inc., the foil retracts out of the water and behind the centre bow when not in use. When lowered it

performs the same functions as the previous "bolt-on" T-foils mounted under the forward end of the outer bows. Previous T-foils, although extremely efficient, were exposed to damage or loss from submerged objects and required the vessel to be dry docked for installation or servicing and contributed to a reduction in speed in conditions where they weren't required.

When the sea conditions are calm, the foil is retracted increasing vessel speed and reducing the possibility of damage by submerged objects. In the event of an object strike while the foil is in use, it will retract immediately. All mechanical and hydraulic components are above the water, allowing servicing to take place while the vessel is afloat. Simplifying installation and servicing procedures, reduced maintenance and the elimination of the need for replacement all result in a reduction in operational costs over the life of a vessel.

Lifesaving Equipment

The Cat is fitted with six evacuation stations; two on each side of the vessel contain an IMO-approved MES (Marine Evacuation System) supplied by Liferaft Systems Australia, with an additional liferaft access station on each aft mooring deck. An MES consists of an inflatable slide which connects with multiple 100-person liferafts. The evacuation arrangement has proved capable of evacuating the full vessel's complement in times much faster than the IMO requirements. In addition the vessel is designed and built with high levels of reserve buoyancy, fire detection/ protection and safety systems redundancy.

Fire Protection

Hobart-based company Colbeck and Gunton supplied the lightweight structural fire protection system aboard *The Cat*, including fire doors and dampers. The 'Rapid Access' (deckhead) and 'Lightweight' (bulkhead) fire protection system meets all the demands for lighter weight and faster installation/removal for this type of craft. An addressable fire detection system, CCTV cameras, zoned fire sprinkler systems and hydrants protect engine rooms, vehicle decks and passenger areas. *The Cat* is also fitted with portable fire extinguishers, fire-protection suits and equipment, water fog applicators, breathing apparatus, international connections and fire control plans to meet IMO requirements.

The Cat Particulars

Length Overall	97.22 m
Length Waterline	92.00 m
Beam Overall	26.62 m
Draft (Full Load)	3.40 m
Draft (Lightship)	2.19 m
Hull Beam	4.50 m
Deadweight	750 t
Speeds	Approx. 48 kn @ lightship Approx. 42 kn @ 375 t deadweight
Total Persons	up to 900 people
Vehicle Deck	380 truck lane metres at 3.1 m wide x 4.3 m clear height and of 80 cars at 4.5 m length x 2.3 m wide, 260 cars (no trucks)
Main Engines	Four Ruston 20RK270 marine diesels of 7 080 kW @ 1 030 rpm
Transmission	Four Reintjes VLJ6831 Gearboxes
Water Jets	Four Lips LJ150 D waterjets configured for steering and reversing
Alternators	Four Caterpillar 3406B 230 kW alternators supplying 415 V 50 Hz

Condor 10 delivered to France

In March *Condor 10*, the Incat-built 74 metre wave-piercing catamaran, arrived in Poole, England via St Malo, France from Hobart, Tasmania.

The 24-day delivery voyage via the Suez Canal to the English Channel saw the ship call at Geraldton, Colombo, Djibouti and Malta en route to St Malo. In stark contrast to the calm sea and low swell of the Red Sea, the south-eastern region of the Mediterranean Sea provided *Condor 10* and her crew with gale force winds and 5 m swells.

Condor 10 is one of the most travelled of Incat craft, she has crossed the Equator more times than any other fast catamaran. From 1993 to 1999 she rotated between hemispheres, operating the northern summer season on various routes in Europe and the southern summer season on Cook Strait in New Zealand.

Condor 10 will operate a new vehicle and passenger service between St Malo and the Channel Islands of Jersey and Guernsey. With capacity for 85 cars and 600 passengers, she takes over from the smaller passenger-only *Condor 9*.

The France to Channel Islands crossing is experiencing an increase in demand which has been most evident since the events of September 11. Holiday makers in the UK and throughout Europe are increasingly taking shorter journeys closer to home and will now be well served by the extra vehicle and passenger capacity offered by *Condor 10*.

Shehas recently undergone refurbishment at the Incat shipyard in Tasmania, and is set for many more years of service.

Condor 10
(Photograph courtesy Incat Australia)

Cat of Many Coats Purrs Towards Italy

Resplendent in her new feline livery, Incat's hull number 045 left Hobart for Italy on 27 April.

Now named *Winner*, the 86 m craft will enter service for Tris (Traghetti Isole Sarde) on the Genoa – Palau, Sardinia route. Sailing from mainland Italy at 0845, arriving in

Sardinia at1415, *Winner* will return at 1500 with an arrival in Genoa at 2030. On Mondays the vessel will also call at Porto Vecchio, Corsica.

Amidst much waving of their national flag, Captain Nicola Parascandolo of Tris was joined by members of the Italian community in Tasmania to farewell the ship as she departed on her 20-day delivery voyage.

Speaking as the ship sailed, Captain Parascandolo commented; 'In Europe there are many shipbuilders but in Tasmania we have found the best in Incat.'

The departure marks Incat's second delivery within as many weeks, illustrating Chairman Robert Clifford's prediction that the high-speed ferry industry is on the road to expansion. Just twelve days previously, Incat bade farewell to Bay Ferries' new 98 metre wave-piercing catamaran *The Cat*, for the international route between Yarmouth in Canada and Bar Harbor in the United States.

With the charter of *Winner*, Tris is bringing a new way of thinking to ferry operations in Italy where routes up to 200 nautical miles can be very competitive when operated with fast craft, compared with the conventional medium-speed tonnage currently operating crossings in excess of eight hours duration. In service *Winner* will save passengers between 3 and 5 hours per crossing compared with other services.

Well known as the former Royal Australian Navy craft HMAS *Jervis Bay*, the sleek catamaran has a capacity for up to 900 persons and 200 cars and can travel at speeds of over 40 knots.

Winner
(Photograph courtesy Incat Australia)

Victorian Industry News

Alex Shaw has retired from the Marine Board of Victoria after nearly twenty-eight years service. Alex has held almost every managerial position at the Board at some time, except for Manager Recreational Boating. He made significant contributions to safety as one of the founding fathers of the Uniform Shipping Laws Code, and as manager and sole proprietor of Equipment, Materials amd Machinery Assessment for type approvals, which has now been transferred to Standards Australia. He will now be able to put serious effort into lowering his golf handicap.

Not only has Alex retired, but the Marine Board of Victoria itself retired in February, after 110 years of service. In its place, the Minister for Ports, the Hon. Candy Broad MLC, launched Marine Safety Victoria as the new agency for marine safety in the state.

WA Industry News

Tenix WA has just started construction of a second 24 m longliner to an International Maritime Consultants design. They have also recently undocked HMAS *Dechaineux* after a four-month intermediate docking, and currently have HMAS *Adelaide* and HMAS *Sheean* ashore, with HMAS *Anzac* due as soon as HMAS *Adelaide* is undocked.

Austal Chairman John Rothwell has received his Export Heroes award from the Australian Institute of Export at Government House in NSW. The award recognises individuals whose drive and originality have made their mark on Australia's evolving export market.

Kim Klaka

Strategic Marine Launches Crewboats

Strategic Marine was formed mid-way through 2001 with the signing of a contract for three 30 m crewboats for the Asian oilfields. A site was established on the water in Henderson, WA, and construction of the vessels began in early September of 2001. The first vessel was launched in March 2002, and subsequent trials proved her speed, at 27.8 knots. Propulsive power is provided by three 690 kW engines, while auxiliary power is drawn from one of two 77 kVA generator sets. Tankage includes two 5000 L fuel tanks and one 5000 L fresh water tank. The main deck provides seating for 50 passengers and considerable deck space for 30 t of cargo. The forward compartments below the freeboard deck offer comfortable accommodation including a galley, bathroom and six crew berths.

The second vessel, *Kaltim Makmur* (which translates as "Kaltim Prosperity"), shown below, was launched in April. The third vessel is due to be launched in May.

Sean Ilbery

Launching of *Kaltim Makmur* at Strategic Marine

(Photograph courtesy Strategic Marine)

Queensland Industry News

In the Brisbane area, Aluminium Marine have delivered a 27 m passage-maker catamaran. The owner was delighted with the vessel and is now preparing to circumnavigate Australia. Also under construction at this yard are three identical catamaran patrol vessels for the Queensland Police Service. These vessels are 12 m long and powered by Mercruiser inboard engines and stern drives. The

construction of a 12 m landing barge for the local National Parks and Wildlife has also just started at the yard. The vessel is to have a top speed of 30 kn and be capable of carrying 4 t of deck cargo or a vehicle. Propulsion is by inboard diesels and stern drives. All of these vessels have been designed for the shipyard by Stephen and Gravlev Pty Ltd, a local firm of naval architects.

Brisbane Ship Constructions have completed the construction of an aluminium 20 m patrol boat for the Department of Primary Industries in Brisbane. The vessel is being outfitted at Brisbane Ship Lifts.

A new shipyard**,** Brisbane Shipworks**,** is being built at Hemmant on the Brisbane River. This will be the largest builder in the area when finished. The yard intends to build super yachts of 45 m in length and upwards. Construction has started on a 40 m yacht, the parts of which are being laser cut for accuracy. Construction shops are being built which will accommodate large yachts while being built. The company is believed to have overseas ownership and is employing its own in-house design team.

Stingray Boats are building a second search-and-rescue vessel for the Volunteer Marine Rescue. The craft is 7.6 m overall and powered by the new Yamaha 200 hp four-stroke outboard engines. Delivery is due in April.

In North Queensland, Cairns Slipways currently has three luxury motor yachts, *Kokomo II*, *Dardanella* and *Lady M*, on the hard for minor refit work. *Kokomo II* is having her superstructure styling modified. Also in hand are two batches of four trawlers that are being extended with a pre-fabricated addition to each transom.

NQEA Australia Pty Ltd is currently fabricating a 10 m survey motor boat for the Royal Australian Navy. This vessel has a conventional workboat hullform, with a deep skeg, an air-conditioned cabin amidships and a well deck aft. The vessel is being outfitted with a Volvo engine driving a fixed-pitch propeller, a number of acoustic sensors and a sophisticated hydrographic survey suite.

Brian Robson

Austal Order for Catamarans

On 7 May Austal Limited announced the securing of a contract for two 41.5 m passenger/cargo catamarans for the ferry operator, Ofotens og Vesteraalens Dampskibsselskad ASA (OVDS) of Norway.

With a combined contract value of approximately $A24 million, the two new aluminium catamarans will be built by Austal subsidiary Image Marine and are due for delivery at the end of April 2003.

Austal's Managing Director, Mr Bob McKinnon, said the contract was won in very competitive circumstances, including competition from local Norwegian shipyards.

'This is the second contract for a Norwegian client by the Austal group and is the result of a concerted team effort by Image and Austal sales and design staff.'

'OVDS' preference for an Austal product and our ability to offer a fully customised vessel were major factors in securing this order,' Mr McKinnon said.

'With the large vehicle/passenger ferry market still not as buoyant as we would like, it is very pleasing to continue to win orders across our product portfolio.'

The two 41.5 metre catamarans, with an operating speed of approximately 34 kn, will have the capacity to carry 216 passengers and 12 t of refrigerated cargo and will feature a functional, commercial interior outfit.

OVDS currently operates a substantial fleet of vessels including high-speed and conventional ferries, cruise ships and cargo vessels.

This contract adds to the 39 m live-aboard catamaran currently under construction at Image Marine for operation in the Maldives, and follows closely the delivery of two 37 m river catamarans for Portuguese operator, Transtejo.

Austal order for South Pacific

Austal Limited announced on 24 February that subsidiary Austal Ships has secured a contract for two 69 m 'boutique' cruise ships for operation in French Polynesia.

The new order, with a combined contract value of approximately $A50 million, increased Austal's total value of vessels under construction or on order to over $A393 million.

Austal's Managing Director, Mr Bob McKinnon, said the new contract further highlighted the success of Austal's diversification strategy, with secured footholds in the luxury, passenger and vehicle ferry, military/defence and tourism markets.

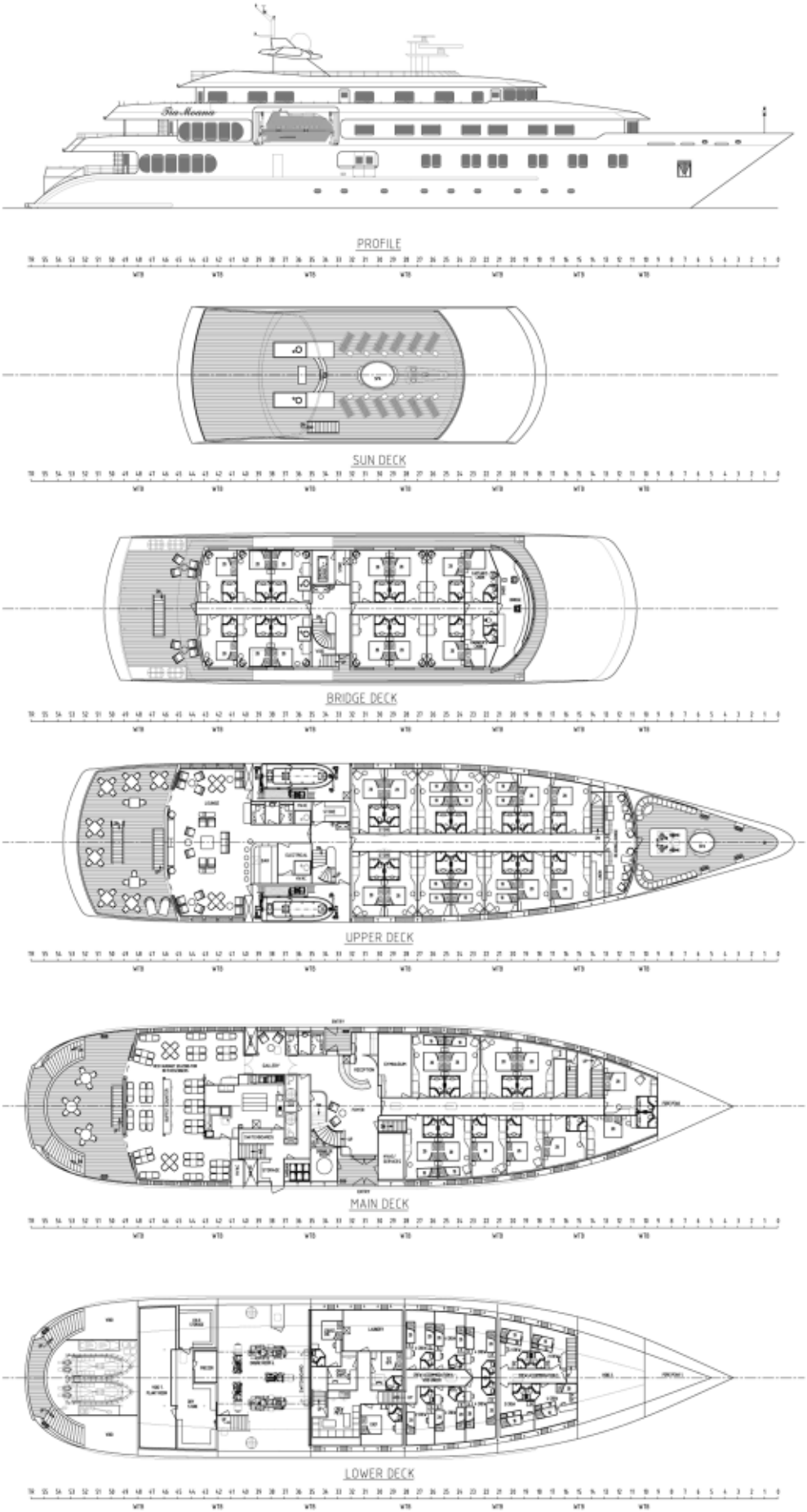
Austal has identified a growing market for 'boutique' cruises, recognizing the growing demand in the tourism sector for cruise packages offering a more intimate cruise holiday.

"Through our experience in the design and construction of a broad range of products, we are now in a very positive position to capitalise on this market and to offer fully customised solutions to 'boutique' cruise operators", Mr McKinnon said.

Ordered by Bora Bora Cruises of Tahiti, the 69 m 'boutique' cruise ships will be of monohull design. *Tu Moana* and *Tia Moana* (meaning 'strong on the ocean' and 'sure and stable on the ocean') will accommodate 78 passengers each and will provide luxury cruises between the islands of Huahine, Paiatea, Tahaa and Bora Bora at a comfortable cruising speed of 14 kn.

Due for delivery in early 2003, the cruise ships will feature a luxurious interior outfit with a variety of onboard facilities including a combination of double and twin-share cabins, lounge and restaurant areas, a pool/spa and an array of water-sports equipment.

With this new contract the Austal Group continues to enjoy a large order book including vessels ranging from passenger catamarans for Hong Kong, large vehicle-passenger ferries, live-aboard vessels and luxury motor yachts.



The general arrangement of the 69 m cruise ships ordered from Austal by Bora Bora Cruises of Tahiti
(Courtesy Austal Ships)

AUSTAL
LIMITED

The Austal Group, comprising Austal Ships, Austal USA, Oceanfast, and Image Marine, is one of the world's most diverse ship builders and has the ability to produce a large variety of vessels including high-speed ferries, luxury motor yachts, crew vessels, patrol vessels and high-speed cargo vessels.

The Group Research and Development and Structural Design teams provide a very flexible and customised approach to challenges raised by the hydrodynamic and structural performance of these craft. At present we are looking for team-orientated people to fill vacancies in the position of:

FLUID DYNAMICIST/NAVAL ARCHITECT

The successful candidate will have knowledge and skills in the following areas:

Computational Fluid Dynamics (CFD), including Navier-Stokes solvers (eg STAR CD) and panel methods (eg SHIPFLOW).
A degree in Bachelor of Engineering, or equivalent.

It would be advantageous to have experience in:

Computer-aided design drafting.
Ship construction and operation.
Finite element analysis.
Classification Society requirements.
Software such as Excel spreadsheets, MATLAB, VB etc.

NAVAL ARCHITECT

The successful candidate will have knowledge and skills in the following areas:

Ship construction and operation
Aluminium and steel fabrication techniques
Computer aided design drafting
Finite element analysis
Classification society requirements
A degree in Bachelor of Engineering (Naval Architecture) or equivalent
Experience in scheduling and supervision will be given special consideration.

An excellent working environment is offered and remuneration will be commensurate with experience. Recent graduates are particularly encouraged to apply.

Please forward your written application together with your current resume to:

Human Resources Co-ordinator
Austal Ships Pty Ltd
100 Clarence Beach Road
HENDERSON WA 6166
Email:mareeb@austal.com

US Navy Announces DDX Program Decision

The US Navy announced on 29 April that Ingalls Shipbuilding Inc., Northrop Grumman Ship Systems (NGSS) has been selected as the lead design agent for the DDX ship program.

This includes the award of a cost-plus award-fee contract in the amount of $US2,879,347,000 for design agent activities such as the systems design of the DDX destroyer, and the design, construction and test of its major sub-systems. NGSS was the leader of a team of contractors called the 'Gold Team' that included Raytheon Systems Co. as the combat systems integrator, and a number of other companies.

Gold Team's proposal also incorporated 'Blue Team' member Bath Iron Works (BIW) as a subcontractor to perform DDX design and test activities, which will ensure BIW will have the ability to produce a detailed DDX design and to build these ships in the future.

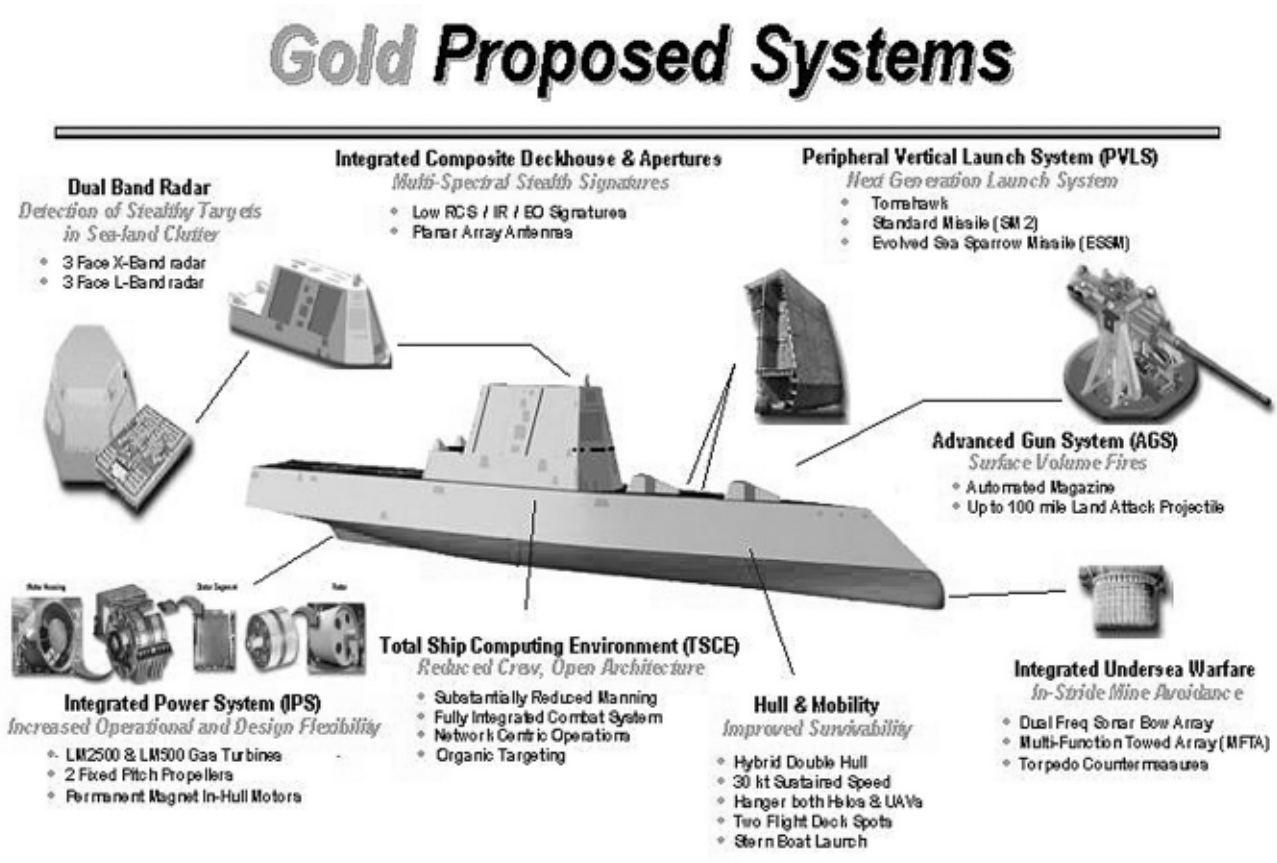
The award of the DDX Design Agent contract signals the start of a revolution for the US Navy's surface combatant fleet, with the development of transformational technologies that will create new capabilities while reducing crew size and yielding significant combat advantage. DDX is the foundation of a family of surface combatants, including a future cruiser, CGX, and a littoral combat ship (LCS).

The DDX program will provide a baseline for spiral development of the DDX and the future cruiser or CGX with emphasis on common hullform and technology development.

'DDX and its associated transformational technologies will be at the core of US Navy capabilities and missions for the 21st Century,' said Chief of Naval Operations, Adm. Vern Clark. 'These great ships and other members of the family of surface combatants will transform the Navy fleet, multiply our combat effectiveness, and play a crucial role in dominating the future battle space.'

US Navy News Service

[The DDX shown in the graphic below has a most unusual hull form, apparently driven by the demands of stealth. One cannot help asking 'But what of the seakeeping?' — Ed.]



Varied Trials for Incat Ship

HSV-X1 *Joint Venture*, on charter to the US military from Bollinger/Incat USA, made a name for herself when she recently served as the Mine Countermeasures Command and Control ship during a Gulf of Mexico exercise.

On 5 February, the ship left her homeport at the Naval Amphibious Base, Little Creek in Norfolk, Virginia and set out on a high-speed winter Atlantic transit. *Joint Venture* completed the passage, without refuelling, in an impressive five days and 17 hours at an average speed of 27 knots.

The purpose of the crossing was to participate in Battle Griffin, an exercise off Norway alongside NATO forces between 7 and 14 March. *Joint Venture* was used as a platform to test various concepts, such as its ability to move equipment via coastal routes from an arrival port in southern Norway to the exercise in northern Norway.

The ship carried out replenishment and re-supply at sea; special insertion and redeployment operations;

reconnaissance; command and control; anti-submarine and mine warfare; humanitarian assistance and evacuation; surface warfare and force protection.

Most apparent was *Joint Venture's* ability to navigate at high speed in the very tight confines of Norway's fjords using the electronic chart system ECDIS and radar, particularly in poor visibility due to snow and rain. Additionally, she displayed her capability of operating free from mechanical problems in sub-freezing temperatures with frequent snow.

With Battle Griffin complete, *Joint Venture* turned her bows towards the English Channel and sailed for Rota, Spain where administrative control of the ship was transferred to the US Army for the next stage of her evaluation by the US military.

Transiting the English Channel she maintained full speed until entering the Bay of Biscay and turning south. After several hours at slow speed in 4.5 metre head seas, the ship made a 300 n mile diversion into the bay to stay in conditions that permitted high-speed running. During the passage *Joint Venture* also lost one main engine due to a cylinder head problem. Despite this and the diversion, the craft arrived in Rota on three engines ten hours ahead of her original schedule.

Joint Venture is to join US forces in the Persian Gulf.

Joint Venture in Souda Bay, Crete
(US Navy photo courtesy Incat Australia)

USS *Cole* Rejoins the Fleet

After 14 months of upgrades and repairs, USS *Cole* (DDG 67), returned to the fleet and full active duty. *Cole*, an Arleigh Burke-class AEGIS destroyer, departed Pascagoula, Miss., on 19 April and headed for her homeport in Norfolk, Virginia.

Cole arrived in Pascagoula for repairs on 13 December 2000, following a terrorist attack in Yemen two months earlier, which left 17 sailors dead and 39 wounded.

Northrop Grumman Ship Systems' Ingalls Operations completed the repairs, which cost about $US250 million. The work included removing and replacing more than 550 t of steel, replacing two main engines and modules, installing a new stern flap (which will increase the ship's speed and fuel efficiency) replacing three gas-turbine generators, and installing new galley equipment.

'This was a challenging repair process, due to the complexity of the Arleigh Burke-class destroyer and the pace of the repair effort,' said Capt. Phil Johnson, SUPSHIP Pascagoula. 'The Navy/industry team set new benchmarks with this repair since certain portions of the repair, such as the removal and reinstallation of the starboard propulsion train, were conducted for the first time outside of new construction. The Navy/Northrop Grumman team's intimate knowledge of the Arleigh Burke-class was instrumental in achieving this success.'

The repair effort concluded on 13 April, following a successful sea trial in the Gulf of Mexico, the ship's first underway period since October 2000.

US Navy News Service

USS *Cole* arriving at her home port in Norfolk, Virginia
(US Navy photo)

New South Wales Industry News

New Design

Incat Designs have recently completed design studies for Vosper Thornycroft. The studies involved developing two large ro-pax wavepiercing car ferries for European markets. The designs will be capable of carrying large numbers of trucks, cars and passengers at service speeds of around 32 knots in 5 m significant seas. While it was pleasing to see the successful completion of the project, it did see the departure of two of the team members. Incat Designs would like to thank both Graham Taylor (who led the project team) and Glen Seeley (project mechanical engineer) for their professional approach to the project and the great work they did in achieving goals.

New Construction

Bill Bollard, on retiring from the Waterways Authority after seventeen years as a ship surveyor (see *The ANA*, February 2001), decided to build a fishing boat/day cruiser for himself. He considered that 9 m length overall would be a good starting point, in view of the fact that he already had a six-

cylinder diesel at home. The boat is to his own design, based on the style of the North American lobster boats. Construction started in January 2001 under cover at Windsor, and is now about 85% completed with an expected launching date in mid-July 2002.

The vessel is being built upside-down on a building frame of recycled oregon; frames are made from 80 x 32 Pacific maple, glued and bracketed at the chines with 8 mm plywood, and fastened with silicon-bronze boat nails. All frames were given one full coat of H-grade Megapoxy resin before standing up on the building jig. The keel, stem and stringers are all from recycled oregon and are glued in position on the frames using Grade 69 Megapoxy.

The bottom is planked using two layers of 8 mm plywood layed diagonally, both at the same angle to the keel with the butt joints on the outer sheet midway across the lower sheet. Grade 69 Megapoxy was used to join the two layers, with silicon-bronze nails into both sheets of plywood and stringers. Topsides are one layer of 12 mm plywood, except for the flared bow area which is two layers of 6 mm plywood laminated using Grade 69 Megapoxy. The whole outside of the hull is sheathed with 600 g of woven roving E-glass saturated with H-grade Megapoxy. The hull has been sanded and filled using microballoons and H-grade Megapoxy. The inside of the hull and all bare timber areas have been given two coats of H-grade Megapoxy throughout.

The engine is fitted with a Twin Disc MG 502 gearbox of 1.5:1 reduction ratio driving the 32 mm Monel-K shaft to a four-bladed propeller. The engine is mounted on Polyflex mountings and the shaft coupling is also Polyflex.

All cabin work is from solid 20 mm Brazilian mahogany, with the sides and front sashes now fitted, and glass will be 6 mm laminated. The fit-out is next and will include a dinette to port with a small galley unit to starboard behind the helm position.

Bill Bollard's New 9 m Boat Taking Shape in April
(Photo courtesy Gavin Bollard)

Incat Designs' US licensee, Gladding Hearn, has recently had an option for two more vessels for Seastreak America exercised, taking the current build program to four vessels. This option follows the successful introduction of *Seastreak New York* and *Seastreak New Jersey* onto their New York to Atlantic Highlands routes. The vessels have proven to be very marketable to this particularly-affluent part of Greater New York. In addition, a 25 m vessel for Put in Bay and a third vessel for Hy Line Cruises (operating from Cape Cod to Nantucket Island) are currently under construction. The hulls for this vessel are the same as the Seastreak vessels with a more stylized superstructure, similar to their current vessels.

Recently Gladding Hearn delivered the first two vessels to the Bermuda Department of Transport. *Serenity* and *Resolute* have been well received by the tiny island nation following their successful trials and delivery. Both Incat Designs and Gladding Hearn worked closely with the Department to integrate the ferries' design with a dock system that would work into the many stops around the island.

Refit

The caisson from Fitzroy Dock at Cockatoo Island is currently out of the water on the floating dock at Australian Defence Industries, Garden Island, undergoing refurbishment in its first docking since the mid-seventies. This is an historic vessel, being the second caisson for the second dry dock to open in Australia in 1857 (Mort's dock started construction later, but opened some months earlier). The first caisson was designed and prefabricated (in galvanised wrought iron) by Rennie and Waterman of Blackwall, London, and was assembled at Cockatoo under the supervision of Captain Mann. The second caisson, which is now undergoing refit, was designed and built at Cockatoo in 1932. In its working life, from 1932 to 1991, it saw nearly 1600 bottoms docked, many of them famous. The dock was named Fitz Roy Dock, after the former Governor of the colony, but it became known in later years as Fitzroy Dock.

Around and About

February and March have been busy times (as usual) for cruise vessels visiting Sydney, with numerous calls each month. Among the familiar sights have been *QE2* (on her annual circumnavigation; spotted by your scribe at her berth in Southampton on 6 January, and then at Circular Quay on 19 February), *Saga Rose* and *Pacific Sky* (also Circular Quay), and *Clipper Odyssey* (Darling Harbour).

The Museum of Sydney (one of the eleven museums managed by the Historic Houses Trust of New South Wales) has opened a new exhibition, *Sydney by Ferry*. The exhibition tells the stories of the ferries, ferry companies, ferry locations and harbour journeys that have inspired painters, poets, photographers and thousands of Sydneysiders alike. It presents the ferries, routes and companies that plied the waterways from the 1890s to the 1930s, as well as some of the major foreshore landmarks and destinations of yesteryear. *Sydney by Ferry* also raises awareness of the suburban land development that has occurred in areas around the harbour like Manly, Mosman, Drummoyne, Balmain, Hunters Hill and the foreshores of the eastern suburbs that resulted from this mode of transport. The exhibition includes beautiful photography by Harold Cazneaux, paintings by Tom Roberts, Lloyd Rees and Arthur Streeton, ferry models including *Dee Why*, ferry timetables, old newspaper articles depicting ferry tragedies, maps, and over 150 nostalgic images showing ferries, wharves, pleasure gardens, and images beautifully capturing ferry commuters.

The exhibition runs from 13 April to 4 August 2002. The

Museum of Sydney is on the corner of Bridge and Phillip Streets, Sydney, is open daily from 9.30 am to 5 pm, and the admission is $7 per person, $3 per concession or $17 for a family. Highly recommended.

Sydney Heritage Fleet

John Smith has retired as Chief Executive Officer of the Sydney Heritage Fleet after eight-and-a-half years in the position. John came to the Fleet after serving for thirty-one years, man and boy, in the Royal Australian Navy where he gained a love of ships and things maritime, and various administration positions where he learned how the big wide commercial world operates.

During his time as CEO he was fortunate to participate in a range of events important to the fleet, including moving to the Australian National Maritime Museum's new building at Wharf 7, Pyrmont, where the Fleet's collection of wooden boats, ship models, marine engines and library records could be displayed for the first time on one site; the successful restoration to sailing condition of the 1874 barque, *James Craig*; and the restoration of the smaller heritage vessels *Berrima* (ex Botany Bay workboat and pilot boat), *Protex* (ex Nicholson ferry) and *Kookaburra* (ex Manly and Luna Park speedboat).

Two major restoration projects remain for his successor to complete the Fleet: *John Oxley* (1927 coastal steamer) and *Kanangra* (1912 vintage Sydney Harbour ferry).

John was farewelled at a late-afternoon function on board the Fleet's vessel *James Craig* at Wharf 7, Pyrmont, on 15 January. Guests were requested to bring no flowers or presents, but not to fall over the donation chest as they boarded the vessel!

John Gillham has taken over the position of Chief Executive Officer of the Sydney Heritage Fleet. John comes to the Fleet with considerable business and maritime experience and is well suited to take charge of the administration and leadership of the Fleet. He holds a National Certificate III in Maritime Operations and a Master V Certificate of Competency. He is also a member of the Australian Institute of Navigation and the Australian Volunteer Coastguard.

John is an experienced and qualified skipper and, as Marketing Manager at Waterline, carried out extensive sea trials and testing on all new vessel designs and modifications. He holds a Diploma in Hotel and Catering Management majoring in Event Management and Marketing, was employed in the retail Marketing Division of Shell Australia, and later took up the position of National Marketing Manager and Operational Manager for Pizza Hut Australia.

More recently, John joined Seawind Catamarans, a prominent east-coast production boat builder, as National Marketing Manager. It was through this involvement and as the manager of the successful Sail Expos held at Rozelle Bay and Pittwater that he has been able to build on an extensive range of contacts across the world of marine and boating organisations, both here and overseas.

With the help of the Fleet's volunteers and members he aims to continue this ethos into the future and so continue guiding the SHF from strength to strength.

It is with sadness that *The ANA* records the passing of the President of the Sydney Heritage Fleet, Phil Renouf. He grew up in Lane Cove with his parents Fred and Daphne and his brother Claude. He attended Lane Cove Primary, Artarmon Opportunity and North Sydney Technical High schools. He later trained as a naval architect, studying at the NSW University of Technology while he worked in the drawing office at Cockatoo Island.

He joined a growing company, Permutit Australia, and was soon appointed its chief engineer, working mainly on the water treatment systems for the boilers of many of Australia's fired power stations. In 1980 he became CEO of Permutit for Asia and Australia, playing a leading role developing a major breakthrough in water treatment — the Tripol condensate polishing system. During these years he travelled many time to Pittsburgh as a regular speaker at annual international water treatment conferences.

As a teenager he crewed on many 16 ft skiffs and later designed, built and sailed a yacht named *Quartet* with two of his friends. As his children grew up he returned to smaller boats, sailing catamarans at the Pittwater Catamaran Club. He quickly became the club's race organiser, a member of the committee, a regatta official and then President, subsequently being honoured with life membership of the club.

In the late 1980s Phil joined the Sydney Heritage Fleet as a museum volunteer, working on the restoration of the Fleet's many ships and boats. In 1993 he was elected Director and, in 1994, was elected President. Phil became a driving force behind the restoration of the fleet's tall ship *James Craig*, the move to Wharf 7, the building of numerous ship models, the start of *John Oxley*'s restoration, the restoration of *Protex*, *Berrima* and *Kookaburra*, and the drive to raise funds to start restoration on the ferry *Kanangra*.

He wrote in a recent paper about management of organisations with hundreds of volunteers: "Recognising the value of the people is more important than providing the most modern tools and equipment: white ants cannot do their thing in the bright light of a cheerful, informed group of happy campers".

Phil is survived by his wife Pam, children David, Gordon and Sue, and three grandchildren Christian, Rachel and Sophie.

Phil Helmore

Keep it simple — this interesting hull form was spotted at Port Macquarie (NSW) recently (Photograph John Jeremy)

Outcomes from IMO Ship Design and Equipment Sub-Committee are Significant For Australia

Robin Gehling

The 45th session of the International Maritime Organization's Ship Design and Equipment Sub-committee (DE 45) on 18–22 March 2002 was of particular significance to RINA, being the first IMO meeting attended by RINA since it was granted "observer" status last year. Outcomes achieved were also significant in their importance to Australia.

Followers of the development of wing-in-ground effect (WIG) Craft will be particularly interested to know that DE 45 finalized a set of risk-based statutory safety requirements for these craft in the form of Interim Guidelines forwarded for issue as a Circular by IMO's Maritime Safety Committee (MSC). Finalization of this matter ends ten years of work on this subject and a particularly intensive two years by a correspondence group comprising the Russian Federation, Germany, Australia and others. The Interim Guidelines, which are immediately applicable to WIG craft being developed in Australia, represent a new landmark in ship safety regulation due to the similarity of these craft with aircraft and the need to move away from prescriptive regulation to cover them. The size of this quantum shift is several times greater than that between the SOLAS'74 Convention and the High Speed Craft Code. The Interim Guidelines will, however, need to be supplemented by codification of the skills required of deck officers on these craft.

Australia, with Canada and New Zealand, has been particularly active in the past couple of years in bringing to attention the increasing frequency of accidents occurring in association with lifeboat drills, resulting in crew being killed and injured in similar numbers to those saved by lifeboats being used "in anger". DE 45 commenced work on actions to prevent such accidents, agreeing to a work programme covering items from the short to the long term. The first action finalized was agreement to a draft MSC Circular bringing this matter to the attention of all concerned, including ensuring that on-load release equipment complies with the requirement of the Lifesaving Appliances Code and that the maintenance and operation of lifeboats are carried out fully in accordance with the International Safety Management (ISM) Code.

Under another Australian initiative, initial steps were taken towards developing amendments to the SOLAS'74 Convention to bring anchoring, towing and mooring equipment within the coverage of that Convention. It is intended that the amendments will give effect to classification and industry standards and recommendations rather than involve the development and promulgation of new IMO standards. The existing International Association of Classification Societies' (IACS) "unified requirements" are highly qualified as to their intended application, so further consideration will be given to the subject at DE's next session following further work by IACS.

SOLAS amendments and associated detailed "technical provisions" were finalized to make oil tankers and bulk carriers more surveyor-friendly. The main item of contention was the provision of fixed means of access to deckhead structure in cargo tanks to facilitate close-up surveys and crew inspections of that structure. The alternative measure of rafting is of limited application to surveys of large tankers and is virtually never used for inspections by crews which are viewed as essential to modern ship safety management within the context of the ISM Code. One item of particular interest was the incorporation of "Australian" cargo hold ladders as the international standard for access to the holds of bulk carriers. This change will lead to significant improvements in the occupational health and safety of crew and other personnel regularly accessing the cargo holds of bulk carriers in service.

Initial consideration was also given to development of a set of interpretations to the 2000 High-Speed Craft Code. These were largely uncontentious and are scheduled to be finalized at DE 46 in 2003.

Other outcomes with a more international focus included:

- progress on the urgent consideration of maritime security matters and long-term items regarding large passenger ship safety and bulk carrier safety;
- agreement to a draft MSC Circular on the sampling method for hull structure thickness measurements and to draft amendments to the Enhanced Survey Program requirements for oil tankers and bulk carriers contained in Resolution A.744(18);
- finalization of revisions to the interim standards for ship manoeuvrability contained in Resolution A.751(18), with the main changes being restriction of the standards' application to ships with traditional propulsion and steering systems, to the second overshoot angle in the $10^{o}/10^{o}$ zig-zag test and clarification of the circumstances in which the stopping test criterion of 15 ship lengths may be exceeded;
- agreement to proposed carriage requirements for SARTs in all liferafts of ro-ro passenger ships;
- finalization of guidelines for ships operating in Arctic ice-covered waters; and
- agreement to standards for performance and testing of manually-powered desalinators in lifeboats and liferafts, as permitted by SOLAS as an alternative to some stocks of water in survival craft.

Further information on any of these outcomes can be obtained by e-mail to rob.gehling@amsa.gov.au

References to Australia in the foregoing generally relate to AMSA and legitimate industry voices such as the Australian Shipowners Association, Shipping Australia Limited and the Australian Shipbuilders Association.

Members should note that RINA head office is currently developing arrangements for receiving and processing input in relation to its observer role at IMO. Pending further

developments in these arrangements, members wishing to express a view on issues under consideration by this and other IMO forums, or on other ship safety issues, should pass them on to a member of the Australian Division's Safety Group, namely Bob Dummett, David Lugg, Mike Seward, or Rob Gehling.

Robin Gehling is the Principal Adviser — Technical in the Maritime Safety and Environmental Strategy division of the Australian Maritime Safety Authority. He is also co-convenor of RINA Australian Division's Safety group, and a member of RINA's Safety Group.

Orange Captures Jules Verne Trophy

Felix Scott

The maxi catamaran *Orange* has set a new benchmark time around the world, finishing her Jules Verne Challenge attempt on Sunday 5 May 2002. The Gilles Ollier cat, ex *Innovation Explorer*, rounded the world non-stop in 64 days 8 hours 37 minutes 45 seconds, taking more than a week off the old record set by Olivier de Kersauson on the 27 m trimaran *Sport Elec*.

It had been a shaky beginning for Bruno Peyron and his twelve crew on *Orange*, who were joined at the start line by de Kersauson with his new monster trimaran *Geronimo*. Both boats had already agreed to delay the start to allow *Geronimo* to have her mast replaced after a catastrophic failure during spring training. While *Geronimo* scorched away from the start line, *Orange* snapped off the top metre of her mast. It took a week back at the Multiplast yard to add a new masthead before the big cat was away again, with the crew all too aware that they were leaving very late in the season.

Geronimo was already at the equator and averaging 20 knots, when the trimaran began to vibrate heavily. The problem was traced to the steering and, not being able to find the cause of the problem, de Kersauson and crew decided not to risk the boat further. As *Geronimo* returned to France, *Orange* forged ahead.

The record attempt was plagued by temperamental weather conditions. Overall, *Orange* was forced to sail 3300 nautical miles more than *Sport Elec* in order to avoid unseasonal high-pressure systems. Despite the poor conditions, Peyron and crew set seven new speed records along the way and still averaged 18.15 knots over the course, covering 28 035 nautical miles.

It is interesting to note that if *Orange* had maintained her average speed over the shortest course, she would have circled the globe in 56 days! This catamaran has now circumnavigated the globe in less than 65 days twice in 14 months, averaging over 18 knots each time. Gilles Ollier already has a larger design for The Race 2004 on the boards. He believes the new design will be even faster, safer, easier to sail, and more reliable.

Club Med still holds the record for The Race, also a non-stop around-the-world event, at 62 days 6 hours 56 minutes 33 seconds, averaging 18.3 knots. It was decided to keep these events separate so as not to detract from the importance of an outright circumnavigation record. The Race has a fixed start time every four years, starts in the Mediterranean Sea and passes through Cook Strait in New Zealand in order to minimise time spent amongst the Antarctic ice floes.

Principal particulars of the two vessels are as follows:

	Orange	*Sport Elec*
Type	Catamaran	Trimaran
LOA	32.9 m	27.3 m
Beam	16.5 m	16.35 m
Sail area	610 m^2	340 m^2
Displacement	20 t	14 t
Crew	13	7
Distance	28 035 n miles	24 652 n miles
Time	64d 8h 37m 45s	71d 14h 22m 8s
Speed	18.15 kn	14.49 kn

Sport Elec
(Photo from *Sport Elec* website

Orange
(Photo Gilles Martin Raget)

On Wave Decay

Greg Cox
Kamira Holdings Pty Ltd

The February 2002 edition of *The Australian Naval Architect* included comments made by Professor Lawry Doctors regarding the decay of vessel waves (Education News, page 21) and, in particular, the apparent misconception regarding the rate of decay. Readers of *The ANA* need to be presented with an alternative view of the worldwide discussion on this subject.

Our interest is mainly in the deep-water condition. The shallow-water case almost certainly will never yield a simple set of wave characteristics, complicated further by the lack of constant water depth on real-world ferry routes.

Havelock's analysis of the Kelvin wave pattern led to the calculation of the rate of decay with lateral distance from the sailing line as being $-1/3$ for divergent waves and $-1/2$ for transverse waves. This explains why the divergent waves are most prominent in the far field. The complication is that these decay rates are only applicable at the cusp, where the divergent and transverse systems interact. When measuring vessel waves, whether in real-life or numerically, the measurement point may never correspond exactly with the cusp, so the results may never be as predicted by the theory. This may bother the academics, but it does not worry the empiricists — we are only interested in measuring what the real-world sees, not what happens to fit the theory.

There are many ferry operations and routes undergoing environmental evaluation, many leading to wash guidelines for application to new routes. Those researchers involved in these evaluations are attempting to derive a reasonably indicative set of criteria to assist designers, builders and regulatory authorities, allowing new services to commence with some reasonable forewarning of the environmental consequences. The estimation of wave decay is one such criterion, as it allows for the transposition of a small wash data set into the far field.

Many people, myself included, have come to the conclusion that the $-1/3$ decay exponent for high-speed (Fn > 0.5) deep-water wash in the far field is a reasonable assumption. Lawry Doctors has presented several papers on deep-water wash decay and has decided on a Froude number-dependent exponent varying from –1.06 to –0.22. We need to understand how each party has designed their methods and drawn their conclusions.

In the end, our position is simple. We conduct model and full-scale tests; we collect the data; we analyse the data and look for consistent trends. This leads to a decay exponent of $-1/3$ as a reasonably consistent measure. Frankly, I couldn't care less if it was $-1/3$ or –100. My goal is not to verify anyone's theoretical work or try and juggle the real-world results to make them fit the theory, my goal is to produce an empirical measure of wave decay from physical modelling that will allow us to reasonably estimate far field wave heights with only limited data.

Proponents of $-1/3$

The belief in this decay exponent comes almost completely from model tests and, in some cases where the data is reliable, full-scale tests. Tests have been conducted on a wide range of vessel forms, both monohull and multihull, including some vessels not usually considered as high-speed vessel forms.

Wave probes are set at varying lateral positions from the sailing line and the wave trace for each probe recorded. The most common analysis method is to use the largest wave (crest to trough or vice versa), commonly referred to as the *maximum wave*. The height is plotted against lateral distance and a decay rate determined. In may cases, particularly after a few boat lengths of divergent packet propagation and some dispersion has occurred, it is possible (particularly with the help of video recordings) to pick individual waves and plot their decay.

In the near-field, regarded as being within about one boat length abreast of the sailing line, the results are not clear due to the localised wave interactions and the strength of the transverse system. In the far-field, regarded as being about 2-3 boat lengths or more abreast of the sailing line, the decay becomes more regular and predictable.

The methodology is consistent and there is no want or desire to manipulate the results to fit any theory. If we measured significant decay rate variation with speed, this is what we would report.

Professor Doctors' Approach

I am not a numericist, but it appears that Prof. Doctors uses a somewhat simplified CFD model that generates a wave field for a particular mathematical hull form. Wave cuts are taken parallel to the sailing line at different lateral spacings, this being done (as he admits) for computational convenience.

Rather than use the widely-accepted *maximum wave* method for characterising wave height, Prof. Doctors has chosen to introduce the concept of *wave range*, being the greatest vertical separation in a given wave cut (height from the deepest trough to the highest peak). Quite besides the complication of introducing yet another measurement method into a field already fragmented by incoherent methodology, there exists concern over the validity of such a method. Usually, the greatest wave range will lie on successive points in the trace, but there exists the real possibility of ranging from, say, the trough of wave 2 to the crest of wave 5. I have several wave traces that show this possibility. It is not clear how this can then be used as a credible method of characterising wave height.

Potential Problems

The problems we foresee with Prof. Doctors approach are:

(a) There are certain simplifications in the numerical model to reduce the analysis time and it may be that too much

reliance is placed on the accuracy of the CFD model. At the FAST 2001 conference last year, there were an exceptional number of authors using CFD modelling for analysis and an alarming number who had no parallel programme of physical modelling. One experienced CFD researcher I spoke to also came to the same conclusion — the company for which he works always runs physical modelling in parallel with CFD modelling and only uses CFD modelling to expand the physical modelling within a narrow, defined band. As a commercial entity, they cannot afford the potential for product failure by relying on CFD alone.

A colleague from the coastal engineering field recently explained an apparent resurgence of physical modelling for coastal engineering projects. For some time in the 1990s the profession embraced numerical modelling as a cheap, reliable alternative to expensive physical modelling. However, the application of numerical modelling to commercial projects without physical modelling validation led to certain commercial failures and the profession has again embraced physical modelling as being the basis for any evaluation, with numerical modelling used to expand the results.

(b) The use of a Wigley form as being representative of high-speed vessel forms is questionable. Wave wake studies several people have conducted (independently) over recent years tends to show that vessel form is not a significant determinant of high-speed, deep water wave wake (i.e. catamarans are no better than monohulls when truly compared like-for-like), suggesting that the Wigley hull is as good as any. However, we know from model testing that the Wigley hull produces some very peculiar wave patterns at certain speeds and ones that may fool the wave range method. Prof. Doctors admits freely that the Wigley form is used for its modelling convenience, though it is suggested that the robustness of any CFD programme must be its ability to reliably model any reasonable vessel form.

(c) I have some problems with the numerical wave cut method, as opposed to the physical wave probe method. Wave cuts are (apparently) fixed in time, but spatially variable. This is not exactly the case, as the static generation of a wave field does involve a time variable. In comparison, the wave probe method is spatially fixed but time variable.

The question is whether the quasi-static wave cut method actually measures concurrent waves on the same propagation path. The fact that the parallel wave cut method cannot generate wave periods (without considerable additional analysis to determine local wave angles) may also suggest that you may not be measuring the same relative point on concurrent waves.

As an example, the wave probe method simply records a wave packet as seen by a fixed observer. This is most important to those of us in the commercial world, as the great majority of wash problems are specific to fixed observers: the child playing on the beach; the yacht moored at the jetty; the exposed end of a seawall. These observers see concurrent waves at the same location, not different waves along a line of locations.

(d) In all the wash papers presented by Prof. Doctors wave period is never featured. The reason is not known, although it may have something to do with the difficulty in calculating it from his numerical approach. It is almost universally accepted that wave period may be as much the culprit as wave height in creating environmental problems, if not more so for high-speed vessels.

As an example, the wave climate on Sydney Harbour prior to the introduction of high-speed catamaran ferries consisted of moderate wave heights (up to half a metre or more were not uncommon), but with corresponding periods usually less than 3 seconds and certainly rarely above 4 seconds. This information comes from a variety of field studies from credible sources (typically involved with maritime structure design) and most have not been published. Conversely, high-speed ferries produce lower wave heights, but with longer periods.

As an example, the Rivercat is capable of producing maximum waves with an 8 second period. Comparing this to the natural wave climate, wind waves on the harbour may have a period of up to 2 seconds — or up to 3 seconds during windy conditions in the lower harbour if the fetch is long enough. Further up the Parramatta River, the maximum wind wave period is 1–2 seconds, as pointed out in the environmental studies prepared prior to the introduction of the service.

In shallow water, the period argument is even more pressing, as the influence upon waves in shallow water is essentially period dependent.

From work completed by myself and others (independently), we can say with reasonable confidence that high-speed, deep-water wave height is largely a function of displacement/length ratio and wave period appears to be a function of the /LWL The differences between hull forms are nowhere near that espoused by industry and its hype, provided they are truly compared on a like-for-like basis. Simply making a high-speed, so-called *low-wash* ferry long and light is good for wave height, but bad for wave period.

Other Work

Several papers were presented at the Hydrodynamics of High-Speed Craft 2000 conference in London in November 2000 which had some reference to wave decay. As second speaker at the conference, presenting *Sex, Lies and Wave Wake*, I discussed wave decay in deep water for high-speed craft and the conclusion reached from analysis of various model tests was that the $-1/3$ exponent was as good as any. Renilson and Macfarlane presented *When is Low Wash Low Wash? — An Investigation Using a Wave Wake Database* and again quoted the $-1/3$ exponent. The wave wake database is made up of over 6 000 individual wave traces from over 80 vessels. Vessel forms include everything from tugs and trawlers to high-speed ferries, so it is hardly type-specific. The $-1/3$ decay exponent comes as an average from the analysis of those results.

Moreover, more in-depth analysis of decay in the database results produces a decay exponent range of about –0.25 to –0.45, depending on vessel type and speed. Much of this variance can be attributed to differences in experimental technique, variation in 'line of best fit' and the error involved with using the maximum wave only (just as it is for Prof. Doctors' 'wave range').

Dr Hoyte Raven, a Senior Researcher at MARIN who co-ordinates research into resistance and flow, particularly in numerical analysis, presented a paper *Numerical Wash Prediction Using a Free-Surface Panel Code*. I do not profess to being an expert in numerical computation techniques, but the MARIN code (RAPID) would appear to me to be far more comprehensive than that of Doctors'.

Dr Raven showed that the RAPID code does correctly model the $-^1/_3$ decay on the Kelvin wedge and he does point out (correctly) that deep water, single wave cuts at any lateral distance will not necessarily show the maximum wave height at that point (where divergent and transverse waves interfere positively) — hence the slight variation we see in decay exponent. The argument we have, as explained by Martin Renilson during his presentation, is that the transverse waves of high-speed vessels are nowhere near as dominant on the Kelvin wedge as the divergent waves, particularly so the further you move away from the vessel. This was further discussed by Professor Trevor Whittaker (Professor of Coastal Engineering, The Queen's University, Belfast) in his paper *A Study of the Leading Long Period Waves in Fast Ferry Wash*. The error incurred by not measuring exactly at the cusp is reduced.

Dr Raven's paper did make one important observation:

'Experience shows that in numerical computations usually a faster decay is found, unless care is taken to minimise the numerical damping'.

MARIN's RAPID code includes a method to minimise numerical damping. The most important feature of the MARIN code is that is the result of numerical analysis validated by accompanying model tests, an absolute necessity for a commercial entity.

As previously mentioned, Prof. Whittaker has been involved for several years with the wash problems being generated by the Irish Sea high-speed ferries, notably the death caused by the Stena HSS 1500 when its wash swamped a fishing vessel. Prof. Whittaker also presented a paper at FAST 2001, in which he elected to use the $-^1/_3$ decay exponent, based on the strength of published information and field data. His work, like that of many of us involved with finding practical solutions, is based largely on model and full-scale testing, not computer simulations.

Also presenting a paper at HHSC 2000 was Henrik Kofoed-Hansen (et al.) from the Danish Hydraulic Institute, a regular publisher of papers on the environmental consequences of ferry wash. The DHI has long been involved with the full-scale measurement and computer modelling of ferry wash and has developed certain operational criteria that are in use in Denmark and elsewhere.

From full-scale measurements of two high-speed Austal-built catamarans, the wave decay exponent was found to be –0.4. However, the measurements were taken in water regarded as shallow (about 15 m, from memory) and it has been known for some time that wave decay in shallow water may be slightly faster than deep water, so the results would appear to be valid. Our own limited shallow water data would also support this, but we elect to use the $-^1/_3$ decay exponent as a conservative estimate until more is known.

However there remains one important question. If the wave decay exponent is as high as –1.06, why is there this constant obsession with the reduction of only wave height through design? Surely a vessel could be designed such that it operated at a speed producing these magical wave decay rates, coupled with routes that allowed the longest possible wave propagation to maximise height decay.

For instance, my method for estimating far-field wave heights is to average the measurements from several probes positioned around 0.5L athwartships, assume the position of 0.5L abreast of the sailing line to be full height, and then apply the decay relationship (L being Length WL). The comparative numbers are telling.

Distance from sailing line	$-^1/_3$ decay exponent	-1.06 decay exponent
0.5L	100% height	100% height
1L	79%	48%
2L	63%	23%
4L	50%	11%
10L	37%	4%
20L	29%	2%

With wave decay exponents so large and negative, the waves literally disappear before your very eyes!

Many of us around the world, conducting many independent model, full-scale and CFD investigations, arrive at the same general conclusion — that the $-^1/_3$ decay exponent is a reasonable representation of the real world — not an absolute representation, just a reasonable representation.

I will, however, keep an eye out for that exceptional theoretical wave decay next time I'm taking my Wigley hull ferry (fabricated from welded tent functions) across the numerical harbour on my way to the virtual office.

Solar and Advanced Technology Boat Race

Martin Grimm

As a result of the move of Science Week in Canberra from April to August, the annual Australian Science Festival — organised Solar and Advanced Technology Boat Race on Lake Burley Griffin was cancelled this year. Not discouraged by this turn of events, past competitors in the event, Dick Clarke and John Dowsett from Sydney arranged an alternative race on 9 March at the Sydney International Regatta Centre in Penrith. This event was sponsored by the Sustainable Energy Development Authority (SEDA) and the Penrith City Council. The format of the event has been changed slightly in that it now includes three separate races, a one-lap 'sprint' event followed by a three-lap race and finally a two-hour endurance race.

Fraser Argue aboard *Styro 2* (formerly *SolACT*) convincingly gained first place overall in each of the three races, demonstrating that refinement of a good design is a race-winning strategy.

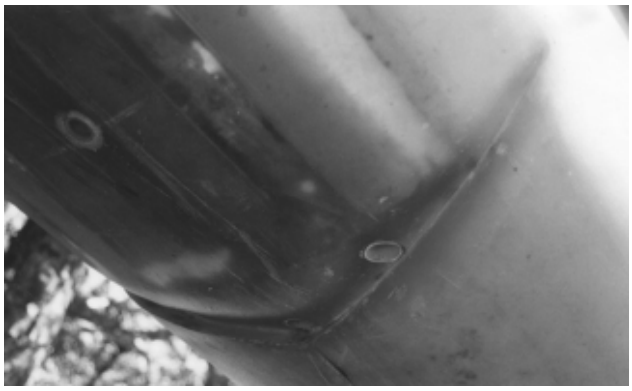
Between races, Fraser Argue attends to one of the pair of electric outboard motors that propelled *Styro 2* to three race wins at Penrith this year

Another consistent performer over a number of years has been *ZAP*, an entry by Dale Siver of IP Australia (alias the Patent Office). This 6 m fibreglass kayak was originally designed and built by Paul Kinny for entry in the 1997 boat race in Canberra in which it gained first place in its class with a fastest lap speed of 6.6 kn and an average speed of 6.3 kn over 12 laps. The displacement of the boat complete with batteries and crewman is approximately 300 kg. Dale subsequently purchased the boat and fitted a different motor while the propeller was re-pitched to maximise efficiency. It is now driven by a 0.75 kW Baldor DC electric motor with energy supplied by seven 12 V Exide automotive batteries (approx 4.2 kWh capacity).

ZAP incorporates an interesting feature that is not immediately apparent when the boat is floating in the water. It has a transverse step incorporated in its hull at about one third of the waterline length aft of the bow. This is intended to provide air lubrication of the hull above a certain speed, thereby reducing frictional resistance. The air feed is provided naturally via three PVC pipes that project up inside the hull while additional air is drawn in from the waterline on either side of the hull. The vent pipes are sufficiently high that when *ZAP* is stationary, water does not flood the hull. The step is set in from the overall hull lines so that additional resistance at low speed is likely to be minimal.

Although no dedicated tests have been undertaken to assess the benefit of the air ventilation step, Dale Siver reports that when the air feed commences beyond a threshold speed, there appears to be a noticeable increase in performance of the boat. With the recent resurgence in interest in air-lubricated hullforms, *ZAP* would seem to be an ideal yet simple test bed to determine the degree of gain or penalty that is achieved from air feed at different speeds on a craft with sufficient size to make measurements reasonably viable.

Dale Siver attends to *ZAP*. Its air feed step is positioned below and slightly forward of the front of the 'cockpit' area.



A close up photo of the transverse step and associated air feed pipes (two of three visible) incorporated in the hull of *ZAP*. The hole well aft of the step is for a rudder stock.
(Photos courtesy Martin Grimm)

EDUCATION NEWS

Curtin University

Local boatbuilder Colin Ayres (Sunyachts) has enrolled in a Postgraduate Diploma at Curtin University's Centre for Marine Science and Technology (CMST). His research project is an evaluation of the performance of 'flopper-stopper' anti-roll devices.

Tim Mak (Austal Ships) has recently received the award of a postgraduate degree of Master of Philosophy from the Australian Maritime College for his thesis *Experimental Determination of Manoeuvring Coefficients for a Modern Full-form Vessel*.

Rick Shock was awarded a Master of Science degree from Curtin University for his thesis *Investigation into ventilated hydrofoils using numerical and analytical methods*. Congratulations to them both.

Kim Klaka

The University of New South Wales

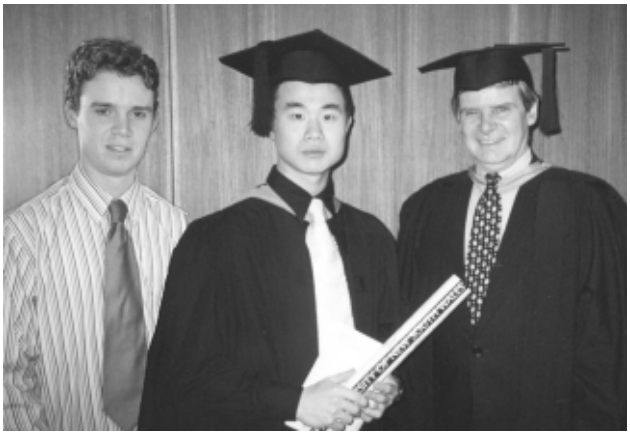
Undergraduate News

The naval architecture students and staff held a get-together on Thursday 21 March. This was to enable the students in early years to meet and get to know the final-year and post-graduate students and the staff on a social level, and to discuss the course and matters of mutual interest. Pizza, chicken, beers and soft-drink were provided and, after a slow start, conversation was flowing pretty freely an hour later! This year we have six students in the third year and about sixteen in fourth year (two expecting to complete in mid-year), most of whom attended. Three post-graduate students came along as well as the three full-time staff. A broad mix, and some wide-ranging discussions ensued.

This year we have included an introductory course in computational fluid dynamics for the final-year naval architecture students. This involved four hours of theory and four hours of hands-on work in the computer laboratory together with the aerospace students. The course was taught by Dr Tracie Barber (who did her PhD at UNSW using CFD analysis of the flow around ekranoplan wings). The practical work used a foil-shaped model which the aero students ran in air and the naval students ran in water, using fine and coarse meshes, several turbulence models and either Fluent or CFX as the CFD package, depending on the requirements of the particular student (usually whether they needed either for a particular thesis project, or not). This was an introductory course and, in addition to getting them up to the hands-on stage, sensitised them to what can, and cannot, be achieved with CFD.

At the graduation ceremony on 12 April, the following graduated with degrees in naval architecture:

Hason Ho	Honours Class 1
Nick Hutchins	Honours Class 1



2002 Graduates Nick Hutchins and Hason Ho with Phil Helmore at UNSW Graduation Ceremony on 12 April
(Photo courtesy Hason Ho)

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

The Baird Publications Prize 1 for the best performance in Ship Hydromechanics A to Nigel Lynch and Minh Pham.

The Baird Publications Prize 2 for the best performance in Ship Structures 1 to Giang Ngo.

The Royal Institution of Naval Architects (Australian Division) Prize for the best ship design project by a student in the final year to Hason Ho for his design of a 13 m pursuit craft for the Australian Customs Service.

The David Carment Memorial Prize and Medal for the best overall performance by a student in the final year to Hason Ho.

Congratulations to all on their fine performances.

Our 2002 graduates are now employed as follows:

Hason Ho	BE in Aerospace at UNSW!
Nick Hutchins	Team New Zealand, Auckland

Post-graduate and Other News

At the graduation ceremony on 12 April, Ian Raymond graduated with a Master of Engineering degree for his thesis on *Design Requirements of Blast-tolerant X-80 Steel Transverse Bulkheads*. Congratulations, Ian.

The International Workshop on Water Waves and Floating Bodies is held regularly each year, moving from one location to the next, in accordance with offers of hosting the event by the participants. This year the Seventeenth workshop was held at the University of Cambridge, UK. A total of 51 papers was presented over the four-day period April 14 to 17, 2002.

A good number of the papers dealt with ship-generated waves, so that problems of ship resistance, motions of ships in waves, and the influence of waves on moored ocean structures were of interest. Two papers were presented by Australian delegates:

Prof. Lawry Doctors of UNSW and Dr Sandy Day, of The Universities of Glasgow and Strathclyde, presented their latest work on the prediction of steady ship resistance and squat. In particular, they demonstrated that nonlinear improvements could be introduced into the analysis, although it was generally difficult to show better accuracy than the previous simpler linear analysis.

Prof. Ernie Tuck from the University of Adelaide and Prof. Nick Newman from MIT discussed their slender-body approach to the analysis of waves inside slender moonpools. A moonpool is an opening in the hull of a ship used for launching small submersibles. The matter of the internal waves is critical to the safe operation of the submersibles.

Future workshops will take place in France in 2003 and in Italy in 2004. An offer has been placed to host the 2005 meeting in Australia, either in Sydney or in Adelaide. For further information on the 2002 or future conferences, contact Lawry Doctors on (02) 9385 4098 or email l.doctors@unsw.edu.au.

David Carment

One of the annual prizes at UNSW is The David Carment Memorial Prize and Medal for the best overall performance by a student in the final year. Readers may be interested to know something of the origin of this prize.

David Carment was born in Sydney in 1885. He had a great interest in ships and wanted to become a naval architect, an unusual ambition for a young man of his generation. In 1906 he went to Glasgow University and subsequently graduated with a Bachelor of Science degree in naval architecture, one of the first Australians to obtain a degree in naval architecture. He worked in shipyards on the Clydebank until he returned to Sydney in 1916 to take up a position as a naval architect at Cockatoo Docks and Engineering Company. He rose in the company to become Chief Naval Architect, and retired from there in 1954.

He gave much of his time in helping others obtain knowledge of naval architecture and shipbuilding. He became a part-time teacher in the shipbuilding trades course with the NSW Department of Education in 1919. Much later he became head teacher in the naval architecture diploma course at the Sydney Technical College, and was involved in the

establishment of the naval architecture degree course at The University of New South Wales.

He had a great interest in yachting, and raced his own yacht *Athene* with the Royal Sydney Yacht Squadron for many years. He was the Squadron's honorary measurer, and issued the measurement certificate for *Gretel*, Australia's first challenger for the America's Cup in 1962. This 12-metre yacht was designed by Alan Payne, one of his former students at Sydney Technical College and former trainees in the drawing office on Cockatoo Island.

He was one of the founding members of the Australian Branch (now Division) of the Royal Institution of Naval Architects in 1953, and served as the President of the branch for a time.

This award commemorates David Carment's services to naval architecture in Australia and at The University of New South Wales.

Phil Helmore
Lawry Doctors

Australian Maritime College

The annual AMC Graduation and Prizegiving ceremony took place on Friday 22 March 2002. The guest speaker for this year's address was Vice Admiral David Shackleton AO RAN, Chief of Navy. AMC's invitation to Vice Admiral Shackleton reflected its well-established and valued ties with the Royal Australian Navy.

The AMC's major academic prize, the Connell Medal, was awarded to Tim Nicol, who graduatuated Bachelor of Engineering (Ocean Engineering) with First Class Honours. Listed below are all of the graduates of Bachelor of Engineering degrees:

BEng (Naval Architecture)

Matthew Allen
John Butler
Peter Hinds
Peter Ivanac
Katsuhiko Kiso
Bryce Pearce
Adam Schwetz
Colin Spence
Arthur Sumal
Stephen Watt
Andrew Wright

BEng (Ocean Engineering)

Peter Guirguis
Daniel Headley
Timothy Nicol
Bruce Williams

Gregor Macfarlane

Wärtsilä takes Ownership of John Crane-Lips

On 15 April 2002 Wärtsilä and the UK-based Smiths Group completed the agreement transferring John Crane-Lips, a leading global supplier of marine propulsion systems, to Wärtsilä. The agreement was signed at the end of January 2002. No obstacles to the acquisition have arisen in the regulatory approval process. The acquisition price is £215 million (€350 million).

The acquisition of John Crane-Lips marks an important step towards Wärtsilä´s strategic goal to lead the ship power market. The company will be part of Wärtsilä's Marine Division under the name Wärtsilä Propulsion.

Mr. Christoph Vitzthum, MSc(Econ), currently Vice President, Finance and Control of Wärtsilä Marine Division, has been appointed President of Wärtsilä Propulsion.

Wärtsilä Engines for Fortum Newbuildings

Wärtsilä Corporation has received a contract to supply the complete power systems for two 14 000 dwt product/chemical tankers under construction for the Finnish energy group Fortum. The two tankers have been ordered from the Portuguese shipbuilder Estaleiros Navais de Viana do Castelo, with delivery due in 2003. With a cargo capacity of 16 000 m^3, they are of 140 m length overall by 21.7 m breadth, and have a service speed of 16 kn. They are also being built to Ice Class 1A Super.

Each Wärtsilä power system comprises a Wärtsilä 8L46 main engine, reduction gearbox with power take-off (PTO) drive, controllable-pitch propeller, and three generating sets, two driven by Wärtsilä 6L20 engines and one by a Wärtsilä 4L20 engine. With a maximum continuous power of 8 400 kW each, the 8L46 main engines will be equipped with direct water injection (DWI) for reduced NOx emissions. Redundancy in propulsion is given by the PTO drive which will also serve as an auxiliary propulsion drive, with the shaft generator acting as an electric motor supplied by the 1080 kW auxiliary diesel generating sets.

There are other ships under construction for operation by Fortum, all powered by Wärtsilä diesel engines, including two larger product/chemical tankers, two escort tugs and two ice-breaking Aframax tankers. All these vessels are being built to a high ice class, and the engines are being arranged for operation at temperatures down to minus 30°C.

The other two product/chemical tankers are 25 000 tdw vessels contracted at the Jinling shipyard in China for delivery in 2003.They will each be equipped with a Wärtsilä 9L46 main engine, reduction gearbox with power take-off (PTO) drive and three Wärtsilä 6L20-engined generating sets. With a maximum continuous power of 9 450 kW each, the 9L46 main engines will also be equipped with direct water injection (DWI) for reduced NOx emissions. The PTO generator can also serve as an auxiliary propulsion drive to give redundancy in propulsion.

The two escort tugs contracted at the Spanish shipbuilder Astilleros Armon SA will be propelled by a pair of Wärtsilä 6R32 diesel engines of 4 920 kW combined output. The two 106 000 tdw Aframax ice-breaking tankers will be delivered this year from Sumitomo Heavy Industries Ltd in Japan.

Each is equipped with a 22.9 MW diesel-electric power plant incorporating two Wärtsilä 9L38B and two 6L38B diesel engines, and one Wärtsilä 6L26 diesel engine.

Artist's impression of the 14 000 dwt product/chemical tankers for Fortum equipped with Wärtsilä power systems.

LNG Carrier Breakthrough for Wärtsilä

Wärtsilä Corporation has received an order to supply four Wärtsilä 6L50DF dual-fuel engines to power a 75 000 m^3 LNG carrier contracted by the French gas holding company Gaz de France at the French shipyard Chantiers de l'Atlantique.

Due for delivery in 2004, this ship is breaking away from traditional practices in the propulsion of LNG carriers. It will be the first LNG carrier to be powered by electric propulsion and one of few to have internal-combustion engines instead of the more usual steam turbine plant.

The four dual-fuel generating sets will meet all the ship's propulsion and shipboard electrical requirements. The Wärtsilä 6L50DF engines each develop 5 700 kW at 514 rpm.

This membrane-type vessel (GTT-CS1) will be employed transporting LNG from Skikda in Algeria to Fos near Marseilles. This round voyage will take about one week at a service speed of 16 kn, which can be achieved with three of the four generating sets. The ship is also designed for spot-market trading, such as voyages to the USA. For such times, the service speed can be 18.5 kn using all four generating sets.

Compared with the alternative power plants, the Wärtsilä 50DF engines have distinct benefits in LNG carriers. Whilst making maximum use of the gas fuel (boil-off from the cargo of liquefied natural gas) to develop useful power, the high efficiency of these engines calls for a much lower fuel consumption overall and thus lower operating costs than the conventional steam turbine plant. The Wärtsilä 50DF engines also have much lower stack emissions than a steam plant. Their low NOx emissions are about one-tenth those of the equivalent diesel engines. The combination of the engines' low fuel consumption and their maximum use of natural gas means the 50DF engines also have low CO2 emissions.

Technical details of the Wärtsilä 50DF engines and their dual-fuel system

Developed from Wärtsilä's very successful Type 46 diesel engines, the Wärtsilä 50DF engines have cylinder dimensions of 500 mm bore by 580 mm piston stroke. Available in configurations with six, eight and nine cylinders in line, and 12, 16 and 18 cylinders Vee-form, the 50DF engines develop 950 kW per cylinder MCR at 500 or 514 rpm for 50 Hz and 60 Hz electricity generation respectively.

The Wärtsilä 50DF engines can be run alternatively in gas mode or liquid fuel mode. The engines are also fully capable of switching over from gas to liquid fuel (marine diesel oil) automatically should the gas supply be interrupted, while continuing to deliver full power.

Gas fuel is supplied at a low pressure (less than five bar) to the engines. In gas mode, the Wärtsilä 50DF engines operate according to the lean-burn Otto process. Gas is admitted into the air inlet channels of the individual cylinders during the intake stroke to give a lean, premixed air-gas mixture in the engine combustion chambers. Reliable ignition is obtained by injecting a small quantity of diesel oil directly into the combustion chambers as pilot fuel which ignites by compression ignition as in a conventional diesel engine.

The Wärtsilä 50DF engines use a 'micro-pilot' injection with less than one per cent of the fuel energy being required as liquid fuel at nominal load. Electronic control closely regulates the 'micro-pilot' injection system and air-gas ratio to keep each cylinder at its correct operating point between the knock and misfiring limits.

Wärtsilä acquires reconditioning business from Metalock in Singapore

Wärtsilä will acquire the engine reconditioning business from Metalock (Singapore) Ltd. The acquisition will consist of the marine engine repair and recondition business and the workshop. Wärtsilä will pay a consideration of €5.4 million for the acquisition. The sales volume of the acquired business is €8.8 million and number of employees is 87.

'This acquisition will further strengthen Wärtsilä as a total service provider. We have an opportunity to increase our market share especially in the low speed engines', said Tage Blomberg, Group Vice President and Head of the Service division.

The focus of the acquired business is on marine engine reconditioning, with the special know how in low speed engines. The workshop is located in Singapore.

The acquired business will be named Ciserv and it will concentrate on reconditioning business. Wärtsilä Singapore provides other services for the marine and power plant customers.

The closing of the deal will take place in the first part of 2002. The transaction is subject to the approval of the shareholders of Metalock and various regulatory authorities.

The Metalock Group is primarily involved in marine engineering, oilfield equipment repairs and remotely-operated subsea vehicles. Metalock is listed on the Singapore Exchange Limited.

THE INTERNET

Another Day on the River

A website in the USA recently showed a series of pictures showing a towboat pushing loaded coal barges downriver, and coming to a bridge which failed to open. The master of the towboat cast the barges adrift and they passed safely under the bridge, but could not buck the fast-flowing river himself. The current turned the towboat side on against the bridge, rolled her upside down, she passed under the bridge, righted with engines still running, shook herself off, picked up the tow and continued downriver! The website was swamped with visitors, and was re-located at least twice. Try http://koti.mbnet.fi/~soldier/towboat.htm (still current at 10 May).

The New Zealand Naval Architect

Eagle-eyed readers of *RINA Affairs* noticed a para in the January 2002 issue advising that the first issue of *The New Zealand Naval Architect*, the newsletter of the New Zealand Division, had been published and could be viewed online at www.rina.org.uk. Having done so, they immediately hopped on their 'net surfboards and followed the links to Institution/Branches/New Zealand Division, and checked out our trans-Tasman sister publication. If you haven't been there yet, then check it out.

Jobs for Naval Architects

From stewardesses to captains and yacht brokers to naval architects, jobs4yachts.com will advertise any job — *free*! Check out the latest yachting jobs now at www.jobs4yachts.com. On-board and shore-based jobs are catered for under the following twenty-eight categories: mate, bosun, officer, captain, engineer, steward, stewardess, deck hand, day-worker, chef, painter, varnisher, signwriter, carpenter, sailmaker, mechanic, boatbuilder, instructor, coach, sales, manager, yacht broker, yacht designer, naval architect, marine surveyor, marine engineering, marine underwriter, marine photographer. The form is short and quick and the job is on the web immediately. For further information, contact Kevin McBride at www.jobs4yachts.com.

Underwater Gliders

Underwater gliders work by being nearly neutrally buoyantly while near the water's surface, so that they sink slowly down. Very slowly; full steam ahead is under one knot. As they sink, an internal weight is shifted toward the lateral direction the vehicle should go — if you want to go straight, just shift the weight forward to tilt the nose down a bit. Then to rise, pump an oil contained inside the hull into external sacks — this simple manoeuvre increases the craft's volume, and thus lowers its density just enough that now the surrounding water wants to push it upward.

Weight displacement (changing the position of the centre of gravity) is a robust and efficient means of steering, but other methods are being researched, including rotors which change the moment of inertia (and hence, the angular momentum) of a craft. That would allow for delicate moves — small rotations to keep a site in view, for example — that free weights might not be as capable of executing. Other advantages include being able to turn in a vessel length, and not blowing the subject out of the field of view.

The University of Washington has already done extensive and successful testing on its *Seaglider* probes. These small machines have had 'flights' lasting a month, and the power supply in the current version should allow 6 months of flight, which gives it a range of about 2 700 n miles with average ocean currents. If the present batteries were replaced with higher capacity versions, the lifetime could be well over a year. Of course, a larger vehicle, which would allow a larger battery pack, could last much longer.

Webb Research Corporation offers an even more radical approach. It requires no electricity at all for locomotion. The *Slocum* deep-sea probe harnesses temperature gradients for its power. Inside the craft is a cavity filled with an organic liquid compound that contracts when cooled and expands when warmed. When the glider rises to the surface, the warming sun expands the material, pushing a spring. That spring stores energy as tension and when the vessel dives deep, the water cools. When the spring is released, it pushes the flotation oil out into the external bladders to achieve buoyancy. When *Slocum* reaches the surface, the process repeats itself.

These underwater gliders are now being considered for other missions, including exploration of the depths of the ice-covered ocean on the moon Europa in space. For further information visit www.space.com/businesstechnology/technology/sea_glider_020410-1.html

Phil Helmore

FROM THE CROWS NEST

Name Change for AusInfo

If you have been looking for a copy of the USL Code recently, a copy of the Sixth Edition of the Commonwealth Government's *Style Manual* (which has now hit the streets), or any other government publication for that matter, then you won't have been able to find AusInfo (or anything that's useful to locate their successor) in the phone book.

The former Australian Government Publishing Service (AGPS) changed its name many moons ago to AusInfo. The whole shebang has been privatised and the new crowd in control answers to the (Federal) Department of Communications, Information Technology and the Arts! The main point of contact is InfoAccess, and you call them on 132 447 (free call from anywhere) to find out about the availability and pricing of all government publications, including the location of your nearest outlet. The outlets are Government Info Shops, and are in Adelaide, Brisbane, Canberra, Darwin (non-exclusive), Hobart, Parramatta, Perth, Sydney, Melbourne and Townsville. In Sydney, the shop is still where AGPS was, at 32 York St, but there is also a new shop in Parramatta. In what must be one of the marketing coups of all time, InfoAccess is not listed in the phone book, and their website www.dcita.gov.au/infoaccess does not appear to lead anywhere useful! However, the phone book listing for Government Info Shop has a re-direction to Australian Government Info Shop, so you are (at least) in with a chance.

As a matter of interest, a full USL Code these days will set you back $226 plus $16.20 per binder (two recommended), a total of $258.40, compared to $177 back in the eighties, so it has become a bargain. The new Style Manual will set you back $44.95 for the soft-cover, or $59.95 for the hard-cover version.

Phil Helmore

56th AICH in Valparaiso

The Amicale Internationale Capitaines au Long Course Cap Horniers (AICH, the International Cape Horners' World Congress) held their 56th congress in Valparaiso, Chile, from 29 October to 7 November 2001. Australia was represented by a contingent of sixteen, led by Captain Don Garnham from Hobart (Acting President of Cape Horners Australia). He was accompanied by his son, Lewis, and daughter-in-law, Liz; Maikki and Stig Siren, and Janet Munson from Bendigo (Qld.); Jackie and John Taylor from Sydney; Captain John Fisher, Wendy Dowling, Frances and Maurice Corigliani, Pam Whittle, Mary MacDonald, and Elizabeth and Monty Warhurst from Adelaide.

Participants were treated to a full program of events, including a four-day voyage on board the Chilean Navy transport ship *Aquiles*, under the command of Commander Rafael Gonzalez, from Punta Arenas to Cape Horn and back. Some lucky members of the party went ashore at the Horn in the ship's helicopter, and had their passports stamped at the lookout and signalling post.

The 2002 AICH congress will be held from 21 to 24 July in Nyborg, Denmark, and the final congress will be held in 2003 in St Malo, France, where the first congress was held.

Neil Cormack

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.

THE EU RECREATIONAL CRAFT DIRECTIVE

Nicholas Kyprianidis

Introduction

In 1992 the Single European Market was established with the objective of creating just one market place, and opening up the markets of the individual member states to competition from other member states. At this stage, there were many 'technical' barriers to trade — different mandatory standards in different member states. It was therefore urgently needed to implement pan-European requirements to harmonise these technical requirements in order to eliminate these barriers. The establishment of directives, which have been adopted and implemented into national law by all member states, principally achieved the harmonisation process. The underlying principle behind these 'New Approach Directives' is actually the free movement of goods.

What is a Directive?

The simplified meaning of a Directive is nothing else as a contract/agreement between EU member states. Directives become national laws by ratification through EU member states. Directives are intended to reduce trade protectionism, which might result out of national technical standards.

The EU member states are Austria, Belgium, Denmark, Finland, France, Germany, Greece, Ireland, Italy, Luxembourg, Netherlands, Portugal, Spain, Sweden, and the UK. The Recreational Craft Directive is currently also accepted in Norway, Switzerland, Tunisia, and Turkey, as well as required and/or requested in a wide range of other countries worldwide.

What is controlled by a Directive?

- € Scope
- € Exemptions
- € Obligation of EU Member States for free movement of goods
- € Reductions in case of violation through manufacturer
- € Essential Requirements
- € Control of compliance with the Directive
- € Misuse of the CE label
- € Use of Notified Bodies
- € Demands on Notified Bodies

Under the 'old approach', a directive contained all the information necessary to enable a manufacturer or supplier to ensure compliance. The directive therefore specified test methods, where necessary, test limits, and certification requirements. However, when considering the more complex areas of product assessment, it proved impossible to write directives that contained this information. The innovation of the 'new approach' was therefore that the directives should only contain general principles termed Essential Safety Requirements (ESR). The task of applying these requirements to individual products, and developing the necessary test methods, could then be passed to European Standards Organisations such as EN/ISO CEN, CENELEC, ETSI, etc. The European Union's 'new approach' directives (often known as 'CE marking directives', have had a major impact upon a wide range of industries, particularly the electro-technical sectors. Some examples of such directives are the Electro Magnetic Compatibility (EMC) Directive 89/336/EEC, Machinery Directive 98/37/EC (formerly 89/392/EEC), Gas Appliance Directive 90/396/EEC, etc.

The purpose of the establishment of these new approach directives was to eliminate trade barriers between EU member states.

Recreational Craft Directive 94/25/EC

The Recreational Craft Directive (RCD) 94/25/EC is a new approach directive dealing with the design and construction of recreational craft. The need for the establishment of the RCD started mainly with a growing frustration in the mid-nineties within the European marine industry over non-tariff barriers.

National rules and regulations governing manufacturing and equipment of recreational craft forced the boat-building industry to build and equip the pleasure boats differently according to the market intended to be placed. This caused a wide range of problems to the boat builders such as shorter series and higher costs for both the manufacturer and the consumer. This became a major issue for ICOMIA (the International Council of Marine Industry Associations) and it was decided to consult the European Commission. Therefore ICOMIA approached the Directorate General — DG III of the European Commission, responsible for trade, requesting that, as the recognised voice of the worldwide boating industry, they should be directly involved in any issues relating to the subject. DG III officially accepted this offer and since then ICOMIA and, particularly, its technical committee has been heavily involved.

Two ways have been identified in order to resolve the situation:

- € The legal route based on a legal principle that a boat, which legally can be placed in one European country's marketplace, can be sold in another as well. In other words a boat builder whose product was legally accepted to be sold in one country or more could also legally challenge another country in which his boat wasn't accepted.
- € Via establishment of a Pleasure Boat Directive which would directly lead to the free movement of compliant products in any Community marketplace without any restrictions.

Finally the second option was chosen and, after intensive consulting of the member countries and passing the EU parliament and the Council, a directive for recreational craft was adopted on 16 June 1994.

Provision, General Scope and Objectives of the Recreational Craft Directive 94/25/EC

Implementation dates

The RCD, which has been in force since June 1996, became mandatory on 16 June 1998. A transition period between 1996 and 1998 allowed boats to be placed on the individual national markets of the EU member countries, to comply with national rules.

- The Recreational Craft Directive has been introduced by the European Commission to ensure a uniform level of safety in the design and manufacture of recreational craft throughout the European Economic Area.
- The RCD applies to new and, to a certain extent, to used recreational craft and partly-completed craft and/or kit boats between 2.5 m and 24 m (approx. 8ft and 80ft) length of hull, which are placed into the market of any member country within the European Community, shall comply with a range of Essential Safety Requirements (ESRs).
- The RCD also applies to a limited number of relating components as follows:

- Permanently installed fuel tanks and fuel hoses
- Steering systems (mechanisms and cable assemblies) and steering wheels
- Start-in-gear protection devices for outboard engines
- Ignition protected equipment for inboard engines and electrical devices installed in engine room and fuel tank compartments
- Prefabricated hatches, windscreens and port lights

Important Questions

What is the Recreational Craft Directive not?

- € Certification according to the RCD is not classification according to the rules of a classification society
- € RCD sets only basic technical requirements
- € CE label is no quality label but a trademark

Which other Directives might apply for recreational craft?

Where industrial products are subject to several Directives, which all require the affixing of CE marking, the marking must indicate that the products are presumed to conform to the provisions of all these Directives such as:

- € Product Liability Directive (85/374/EC)
- € General Product Safety Directive (92/59/EC)
- € Machinery Directive (98/37/EC)
- € Electromagnetic Compatibility Directive (93/68/EC)
- € Telecommunications Terminal Equipment Directive(98/13/EC)
- € Low Voltage Directive (73/23/EEC with amendment 93/68/EEC) etc.

The CE marking is not a quality label but a trademark. CE stands for Conformité Européene (European Conformity).

The Directive requires that used craft being imported and placed on the market in the EEA for the first time, or being put into service in the EEA for the first time, are CE marked. However, the requirements of the Directive make no special provision for used craft and are such that it is impossible for second hand craft to comply with them. This means that used craft cannot be CE marked and therefore cannot be legally imported into the EEA. This anomaly in the Directive is well known among member states but there are no immediate plans to rectify it. There are amendments to the Directive tabled for about 2003, but it is unlikely that these will include any changes regarding used craft. This means that the importation of used craft into the EEA is likely to remain illegal for the foreseeable future.

Craft that have been used in the EU prior to the date of full implementation of the Directive are excluded from its scope. For the purposes of these exemptions the waters of dependencies of EU member states are also considered as EU Territory

The scope of the RCD currently excludes:

- boats intended solely for racing;
- canoes, kayaks, pedalos;
- sailing surfboards;
- power surfboards, personal water craft (but only until 2003) and other similar powered boats,
- replicas, gondolas, historical craft designed before 1950, built predominantly with the original materials and labelled as such by the manufacturer;
- experimental craft, provided that they are not subsequently placed on the Community market,
- craft built for own use, provided that they are not subsequently placed on the Community market during a period of five years;
- craft specifically intended to be crewed and to carry passengers for commercial purposes, without prejudice to paragraph 2, in particular those defined in Directive 82/716/EC of 4 October 1982, laying down technical requirements for inland waterway vessels, regardless of the number of passengers;
- submersibles;
- air cushion vehicles; and
- hydrofoils.

Boat design Categories (Annex I of RCD)

Recreational Craft within the scope of the RCD are divided into four design categories depending on the wind force (Beaufort Scale) and significant wave height, as follows:

Design category	Wind force (Beaufort scale)	Significant wave height (H 1/3, metres)
A - 'Ocean'	exceeding 8	Exceeding 4
B - 'Offshore'	up to, and including, 8	up to, and including, 4
C - 'Inshore'	up to, and including, 6	up to, and including, 2
D - 'Sheltered waters'	up to, and including, 4	up to, and including, 0.5

Definitions

A: Ocean — Designed for extended voyages where conditions may exceed wind force 8 (Beaufort scale) and significant wave heights of 4 m and above, and vessels largely self-sufficient. For Category A, unlimited conditions apply as they reflect that a vessel engaged on a long voyage might incur any conditions and should be designed accordingly, excluding abnormal weather conditions, e.g. hurricane.

B: Offshore — Designed for offshore voyages where conditions up to, and including, wind force 8 and significant

wave heights up to, and including, 4 m may be experienced.

C: Inshore — Designed for voyages in coastal waters, large bays, estuaries, lakes and rivers where conditions up to, and including, wind force 6 and significant wave heights up to, and including, 2 m may be experienced.

D: Sheltered waters — Designed for voyages on small lakes, rivers, and canals where conditions up to, and including, wind force 4 and significant wave heights up to, and including, 0.5 m may be experienced. Boats in each category must be designed and constructed to withstand these parameters in respect of stability, buoyancy, and other relevant essential requirements listed in Annex I, and to have good handling characteristics. For Category D, allowance should be made for waves of passing vessels up to a maximum wave height of 0.5 m.

The design category parameters are intended to define the physical conditions that might arise in any category for design evaluation, and are not intended for limiting the use of the recreational craft in any geographical areas of operation, after it has been put into service.

The physical conditions shall be determined from the maximum wind strength and wave profiles, where wave profiles are consistent with waves generated by wind blowing at the maximum stated strength for a prolonged period, subject to limits of the implied fetch and the maximum stated wave heights, and excluding abnormal factors such as sudden change in depth or tidal races.

The last paragraph is an introduction. The assessments in respect of stability, buoyancy, handling characteristics and other relevant essential requirements are dealt with in other parts of Annex I of the Directive.

Current Progress and Recent Developments

The EU Commission's Task Force on RCD design categories is currently considering proposals for amending the definitions of the Directive's boat design categories, including proposals to increase the number of categories.

After discussing the various proposals, the Task Force concluded that action to be taken now would be limited to a proposal to improve the wording of the definition of Category D to address concerns regarding the definition of wave height and descriptions of typical Category D sheltered waters. The proposed definition, which has now been submitted to the Council for consideration with the current amendments to the Directive, is in line with the interpretation in the Commission's comments on the Directive, and accordingly requirements of recently-completed standards including the stability standards will not have to be changed if this amendment is adopted.

Additionally the EU Task Force agreed that it will conduct a complete review of the design categories, especially of categories C and D, possibly along the lines of an Austrian/ Dutch proposal to split both Categories C and D into two sub-categories. If such a proposal is eventually adopted, it will effectively introduce new categories and all standards that refer to the design categories will have to be amended to fall in line with these.

Conformity Assessment Modules

The Recreational Craft Directive establishes procedures applying to the assessment of compliance with the essential safety requirements. These procedures comply with Council Decision No. 93/465/EEC of 22 July 1993 concerning the modules for the various phases of the conformity assessment procedures and the rules for the affixing of the CE conformity marking, which are intended to be used in the technical harmonisation directives. It is to be noted, amongst other points, from this Council decision that:

1. The essential objective of the conformity assessment procedures is to enable the public authorities to ensure that products placed on the market conform to the requirements as expressed in the provisions of the directives, in particular with regard to the health and safety of users and consumers,

2. Conformity assessments are subdivided into modules which relate to the design phase of products and to their production phase, as follows:

- **Module A/Internal Production Control:** self-assessment module without involvement of a third party or a Notified Body.
- **Module Aa/Internal Production Control plus Tests:** Stability and buoyancy calculations or tests have to be assessed and verified by a Notified Body, but all other requirements to be still self-assessed.
- **Module B/EC Type–Examination:** 'Type-approval' process. The authorised person submits a completed boat and its technical documentation for approval with a Notified Body.
- **Module C/Conformity to Type:** Approved prototype(s) of a boat model or family of similar boats under Module B, then all subsequent craft of the same class or family may use Module C, which is another self-assessment module.
- **Module D/Production Quality Assurance:** Similar to ISO 9002. Actual QA procedure still to be assessed and finally approved by a Notified Body.
- **Module F/Product Verification:** Product verification and inspection to be carried out by a Notified Body either of every product or of homogeneous lots.
- **Module G/Unit Verification:** Applicable to custom built vessels over 12 m. The Notified Body inspects, assesses and finally approves the individual product
- **Module H/Full Quality Assurance:** This module is equivalent to the ISO 9001 QA process and is similar to Module D, with particular emphasis on the QA status of the actual design.

Combinations of categories and modules

The conformity assessment procedures applying to boats can be summarised in the following table:

Category	Regulatory Domain	Regulatory Domain	Private Domain
	COMPULSORY	COMPULSORY	VOLUNTARY
	EC Type-examination	**No EC** Type-examination	**IMCI** Type-examination *)
A, B, C	B + C > 12 m (Lh) G > 12 m (Lh)	Aa < 12 m (Lh)	B + C < 12 m (Lh) G < 12 m (Lh)
D			B + C < 24 m (Lh)
			G < 24 m (Lh)
			Aa < 12 m (Lh)

*) the principles laid down in a module may be used

Essential Safety Requirements (ESRs)

The Directive sets both administrative and protection requirements.

Administrative requirements

The administrative requirements for any boat and/or component manufacturer within the scope of the directive are listed, as follows:

(a) The manufacturer shall compile and maintain a detailed 'Technical Construction File' for each model or family of similar models. This technical documentation shall include all relevant specifications, data or means used by the manufacturer to ensure compliance of the craft or component with the relevant ESRs. In the case of completed craft or hulls, this file shall include test reports or calculations demonstrating that the craft has adequate stability in the anticipated sea condition in accordance with its assigned design category.

(b) The manufacturer has to provide every CE approved product with a written 'Declaration of Conformity'. This will include references to the harmonised standards applied as well as reference to the type-examination certificate and the Notified Body, where applicable.

(c) The manufacturer shall display the CE marking on every certified product (boat or component, where applicable). On boats the CE logo shall be displayed on the builder's plate.

The Directive also sets requirements for type testing by a notified body and/or quality control procedure. These are laid out in a series of modules, as described above, and are based on the dimensions of the craft as well as whether any of the appropriate harmonised standards have been applied during the design of the craft.

Protection and/or Safety requirements

The Directive also sets out the essential requirements for recreational craft in some depth. These are based upon the conditions for which the craft has been designed.

In all there are thirty individual issues under which safety requirements are listed. These include requirements for marking, stability, fire protection, gas equipment, engine protection, etc. Some are already the subject of harmonised standards, while others have standards in progress.

Essential Requirements (RCD — Annex I)

All recreational craft and significant components as referred in Annex II of the RCD shall comply with the essential requirements in so far as they apply to them. The prime objective of the RCD is to ensure that all recreational craft meet the ESRs. There are various alternative ways for a boat manufacturer to satisfy the ESRs, such as:

- Ensure compliance with harmonised ISO Standards.
- Ensure compliance with advanced draft standards, which are being compiled to meet the ESRs of RCD.
- Ensure compliance with alternative existing recognised satisfactory standards and/or codes (i.e. Class Rules, etc.)
- Be able to provide acceptable evidence of empirical knowledge which satisfies the ESRs.

The ESRs as specified in Annex I of the RCD are listed below:

1. Boat Design Categories

2. General Requirements
2.1 Hull Identification (HIN)
2.2 Builder's Plate
2.3 Protection from Falling Overboard and Means of Reboarding
2.4 Visibility from the Main Steering Position
2.5 Owner's Manual

3. Integrity and Structural Requirements
3.1 Structure
3.2 Stability and Freeboard
3.3 Buoyancy and Flotation
3.4 Openings in Hull, Deck and Superstructure
3.5 Flooding
3.6 Manufacturer's Recommended Maximum Load
3.7 Life Raft Stowage
3.8 Escape
3.9 Anchoring, Mooring and Towing

4. Handling Characteristics

5. Installation Requirements
5.1 Engine and Engine Spaces
5.2 Fuel System
5.3 Electrical System
5.4 Steering System
5.5 Gas System
5.6 Fire Protection
5.7 Navigation Lights
5.8 Discharge Prevention

6. Related Component Categories
6.1 Ignition Protected Equipment for Inboard and Stern Drive Engines
6.2 Start-in-gear Protection Devices for Outboard Engines
6.3 Steering Wheels, Steering Mechanisms, and Cable Assemblies
6.4 Fuel Tanks and Fuel Hoses
6.5 Pre-Fabricated Hatches and Port lights

ISO-Standards Project Stages and Associated Documents

The technical background in support of the RCD is a wide range of mandated ISO Standards. These standards are partly harmonised as well as partly still in development (drafts) by various ISO Technical Committees and Working Groups.

General

- Application of harmonised standards or other technical specifications remains voluntary, and the manufacturer is free to choose any technical solution that provides compliance with the essential requirements of the Directive.
- These are, for example, international (ISO) and national (DIN) standards, rules of a classification-society (ABS, LR, DNV, etc.), ICOMIA standards, ORC rules, etc.
- Manufacturers and Notified Bodies are urged to use ISO standards.
- If standards are missing alternative methods and calculations are acceptable.
- Harmonised ISO-standards are on the market.
- Non-harmonised ISO-standards are not on the market.
- All ISO-standards are applicable in their draft version already.

A list of significant ISO Standards and their current status, in support of the RCD is provided at the end of this article.

Notified Bodies

The Notified Bodies are government appointed organisations that are employed by manufacturers in order to assess compliance with the above ESRs and finally 'CE' approves boats and/or components, where applicable. The involvement of a notified body is limited in craft less than 12 m length of hull (L_h) and none in craft assigned Design Category D. A Notified Body:

- has been designated by a member state amongst bodies that fulfil the requirements laid down in the Directive and that is established on its territory;
- is regularly controlled concerning the fulfilment of the requirements laid down in the RCD; and
- is a member of the Recreational Craft Sectoral Group (RSG) based in Brussels, Belgium.

There are currently fifteen Notified Bodies operating within the framework of the implementation of the RSG. One of these Notified Bodies is the International Marine Certification Institute (IMCI).

Recreational Craft Sectoral Group and RSG Guidelines

The Recreational Sectoral Group (www.rsg.be)

- has been established to assist in the uniform application and interpretation of the Recreational Craft Directive by all Notified Bodies and other parties with valid interest;
- meets about twice a year;
- meets with participation of the European Commission; and
- issues the RSG Guidelines annually every 16 June, which is ost useful for a manufacturer to understand the interpretation and implementation of the RCD.

The EU Commission recommends that the RSG Guidelines be read as an interpretation of the RCD.

These guidelines are prepared to assist with the conformity assessment procedures undertaken by Notified Bodies for recreational craft and their components, in accordance with the Directive 94/25/EC of the European Parliament and of the Council, dated 16 June 1994, on the approximation of the laws, regulations and administrative provisions of the member states relating to recreational craft. When these guidelines provide information for craft outside those conformity assessment procedures undertaken by Notified Bodies, this information is provided for guidance only. Due to the variety of recreational craft between and including 2.5 and 24 m hull length, the RSG has considered the applicability of various parts of existing standards to different boat types. Where suitable standards are not available the RSG has established uniform guidelines to assist with demonstrating conformity with the Essential Safety Requirements of the Directive. The RSG guidelines will be reviewed when suitable standards become available and amended as may be necessary.

Recent Developments and Proposed Amendment of the RCD

New rules to reduce exhaust and noise emissions from pleasure boats have been agreed by EU environment ministers. Their policy agreement extends the requirements of Directive 94/25/EC, on the safety of recreational craft, to cover air and noise pollution. Air pollution limits apply to engines and noise limits to the whole craft. The rules apply to all recreational craft up to 24 m long, as well as to personal watercraft. Agreed limits were requested by member States, industry, users and representatives of international business organisations, to prevent the proliferation of differing national rules fragmenting the EU internal market. The current draft requires any powerboat to be tested for compliance, including all displacement vessels and sailing yachts with auxiliary engines.

References

Recreational Craft Directive 94/25/EC (1994).

Recreational Craft Directive and Comments to the Directive Combined (Second Edition 1998).

RSG — Guidelines (16 June 2001).

ISO Standards.

Proceedings of the International Seminar on Small Craft Regulations/The EU RCD, RINA 1998.

Proposal for a Directive of the European Parliament and of the Council to modify Directive 94/25/EC on the approximation of the laws, regulations and administrative provisions of the member states relating to recreational craft.

Author's experience, remarks and notes.

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STANDARDS MANDATED TO BE HARMONISED IN SUPPORT OF THE RECREATIONAL CRAFT DIRECTIVE

Relevant Clauses of Directive		EN/ISO Standard Number and Title	Harmonised (Publication in the OJEC)
2.	General requirements	**prEN ISO 8666** Principal data	DIS:2000
2.1	Hull identification	**EN ISO 10087**:1996/A1:2000 Hull identification - Coding system	Harmonised (2001/C138/05)
2.2	Builder's Plate	**prEN ISO 14945** Builder's plate	DIS:1999
		prEN ISO 11192 Graphical symbols	DIS:2000
2.3	Protection from falling overboard and means of reboarding	**prEN 15085** Man overboard prevention and recovery	DIS:2000
2.4	Visibility from the main steering position	**EN ISO 11591**:2000 Engine-driven small craft - Field of vision from helm position	Harmonised (2002/C59/06)
2.5	Owner's manual	**EN ISO 10240**:1996 Owner's manual	Harmonised (C384 18/12/97)
3.1	Structure	**EN ISO 12215-1**:2000 Small craft hull construction – Scantlings - Part 1: Materials: Thermosetting resins, glass fibre reinforcement, reference laminate	Harmonised (2001/C138/05)
		prEN ISO 2215-2 Scantlings - Part 2: Materials: Core materials for sandwich construction, embedded materials	DIS:2000
		prEN ISO 12215-3 Scantlings - Part 3: Materials: Steel, aluminium, wood, other materials	DIS:2000
		prEN ISO 12215-4 Scantlings - Part 4: Workshop and construction	DIS:2000
		prEN ISO 12215-5 Scantlings - Part 5: Design pressures, allowable stresses, scantling determination	DIS:2000
		prEN ISO 12215-6 Scantlings - Part 6: Details of design and construction	DIS:2000
3.2 3.3	Stability and freeboard Buoyancy and flotation	**EN ISO 12217-1**:2001 Stability and buoyancy – Methods of assessment and categorisation - Part 1: Non-sailing boats over 6 m L_h	Harmonised
		prEN ISO 12217-2:2001 Stability and buoyancy – Part 2: Sailing boats over 6 m L_h	Harmonised
		prEN ISO 12217-3 Stability and buoyancy - Part 3: Boats up to and including 6 m L_h	FDIS:2001
3.4	Openings in hull, deck and superstructure	**prEN ISO 12216** Windows, portlights, hatches, deadlights and doors - Strength and tightness requirements	FDIS:2001
		EN ISO 9093-1:1997 Seacocks and through-hull fittings - Part 1: Metallic	Harmonised (2001/C138/05)
		prEN ISO 9093-2 Seacocks - Part 2: Non-metallic	DIS:2000
3.5	Flooding	**EN ISO 11812**:2001 Cockpits and cockpit drainage	Harmonised
		prEN ISO 15083 Bilge pumping system	DIS:2000
3.6	Manufacturer's maximum recommended load	**EN ISO 14946**:2001 Maximum load capacity	Harmonised (2002/C59/06)
3.9	Anchoring, mooring and towing	**prEN ISO 15084** Anchoring, mooring and towing - Strong points	DIS:2001
4.	Handling characteristics	**EN ISO 11592**:2001 Small craft less than 8 m length of hull - Determination of maximum propulsion power rating	Harmonised (2002/C59/06)
		EN ISO 8665:1995/A1:2000 Marine propulsion engines and systems - Power measurements and declarations	Harmonised (2001/C138/05)

5.1.1	Inboard engines	**EN ISO 15584**:2001 Inboard petrol engines – Engine-mounted fuel and electrical components	Harmonised (2002/C59/06)
		prEN ISO 16147 Inboard diesel engines – Engine-mounted fuel and electrical components	DIS:1999
5.1.2	Ventilation	**EN ISO 11105**:1997 Ventilation of petrol engine and/or petrol tank compartments (2nd edition)	Harmonised (C384 18/12/97)
5.1.4	Outboard engines stating	**EN ISO 11547**:1995/A1:2000 Start-in-gear protection	Harmonised (2001/C138/05)
5.2	Fuel system	**EN ISO 10088**:2001 Permanently installed fuel systems and fixed fuel tanks	Harmonised
		prEN ISO 21487 Permanently installed petrol and diesel fuel tanks	CD
		EN ISO 7840:1995/A1:2000 Fire resistant fuel hoses	Harmonised (2001/C138/05)
		EN ISO 8469:1995/A1:2000 Non-fire-resistant fuel hoses	Harmonised (2001/C138/05)
5.3	Electrical system	**EN 28846**:1993/A1:2000 (ISO 88460:1990) Electrical devices - Protection against ignition of surrounding flammable gas	Harmonised (2001/C138/05)
		EN 28849:1993/A1:2000 (ISO 8849:1990) Electrically operated bilge pumps	Harmonised (2001/C138/05)
		EN ISO 9097:1994/A1:2000 Electric fans	Harmonised (2001/C138/05)
		EN ISO 10133:2000 Electrical systems - Extra-low-voltage dc installations	Harmonised (2002/C59/06)
		EN ISO 13297:2000 Electrical systems - Alternating current installations	Harmonised (2002/C59/06)
		EN 60092 – 507:2000 Electrical installations in ships – Part 507: Pleasure craft (*Note: For three-phase systems only*)	Harmonised (May 2000)
5.4	Steering system	**EN 28847**:1989/A1:2000 (ISO 8847) Steering gear - Wire rope and pulley systems	Harmonised (C255 30/09/95)
		EN 28848:1993/A1:2000 (ISO 8848:1990) Remote steering systems	Harmonised (2001/C138/05)
		EN 29775:1993/A1:2000 (ISO 9775:1990) Remote steering systems for outboard motors of 15 kW to 40 kW power	Harmonised (2001/C138/05)
		EN ISO 10592:1994/A1:2000 Hydraulic steering systems	Harmonised (2001/C138/05)
		EN ISO 13929:2001 Steering gear - Geared link system	Harmonised (2002/C59/06)
		prEN ISO 15652 Remote steering systems for inboard mini jet boats	DIS
5.5	Gas system	**EN ISO 10239**:2000 Liquefied petroleum gas (LPG) systems	Harmonised (2001/C138/05)
5.6	Fire protection	**prEN ISO 9094-1** Fire protection - Part 1: Craft with a hull length of up to and including 15 m	DIS:2000
		prEN ISO 9094-2 Fire protection - Part 2: Craft with a hull length of over 15m and up to 24m	DIS:2000
		prEN ISO 14895 Liquid fuelled galley stoves	FDIS:2000
5.7	Navigation lights	**prEN ISO 16180** Electric navigation lights	DIS (To be a Support Standard)
5.8	Discharge prevention	**EN ISO 8099**:2000 Toilet waste retention systems	Harmonised (2001/C138/05)

Inflatables and RIBs. All clauses where relevant to boat.	**EN ISO 6185-1**:2001 Inflatable boats of less than 8 m – Part 1: Boats with an engine maximum power rating of 4.5 kW	Harmonised
	EN ISO 6185-2:2001 Inflatable boats - Part 2: Boats with an engine maximum power rating of 4.5 kW to 15 kW inclusive	Harmonised
	EN ISO 6185-3:2001 Inflatable boats - Part 3: Boats with an engine maximum power rating of 15 kW and greater	Harmonised
Proposed amendments to RCD for sound emissions	**EN ISO 14509**:2000 and **Amendment 1** Measurement of sound pressure level of airborne sound emitted by powered recreational craft	To be Harmonised when amendments to RCD approved.
	prEN ISO 14509-2 Measurement of airborne sound emitted by powered recreational craft – Part 2: Sound Assessment using reference craft	CD
Proposed amendments to RCD to include Personal Watercraft	**prEN ISO 13590** Personal watercraft – Construction and system installation requirements	DIS:2001

Multinational Submarine Rescue Exercise

With high expectations, the ships of five nations with observers from seven others left Sasebo harbour in April to conduct submarine rescue exercises off the west coast of Kyushu Island, Japan.

The multinational exercise Pacific Reach 2002, designed to improve submarine rescue capabilities, began on April 22. Participants in Pacific Reach came from the navies of the USA, Japan, Australia, Republic of Korea and Republic of Singapore, with observers from Indonesia, the United Kingdom, Canada, Chile, France, China and India. The exercise included several underwater events, plus submarine rescue exercises that cross-decked the countries' various deep submersible rescue vehicles (DSRV).

The first event in the exercise was a dive medicine symposium (the first of its kind), held in Sasebo, Japan on 23 and 24 April.

Studies were presented on subjects extending from new technologies and products for treating survivors and extending survival time inside a disabled submarine, to medical storage space aboard a submarine and the handling of mass casualties aboard a rescue support ship.

'Medical supplies obviously vary widely between ten different nations and it is hard to predict what supplies might or might not be available to a submarine provider,' said Royal Australian Navy LCDR Sarah Sharkey. 'And space is always a concern,' she said.

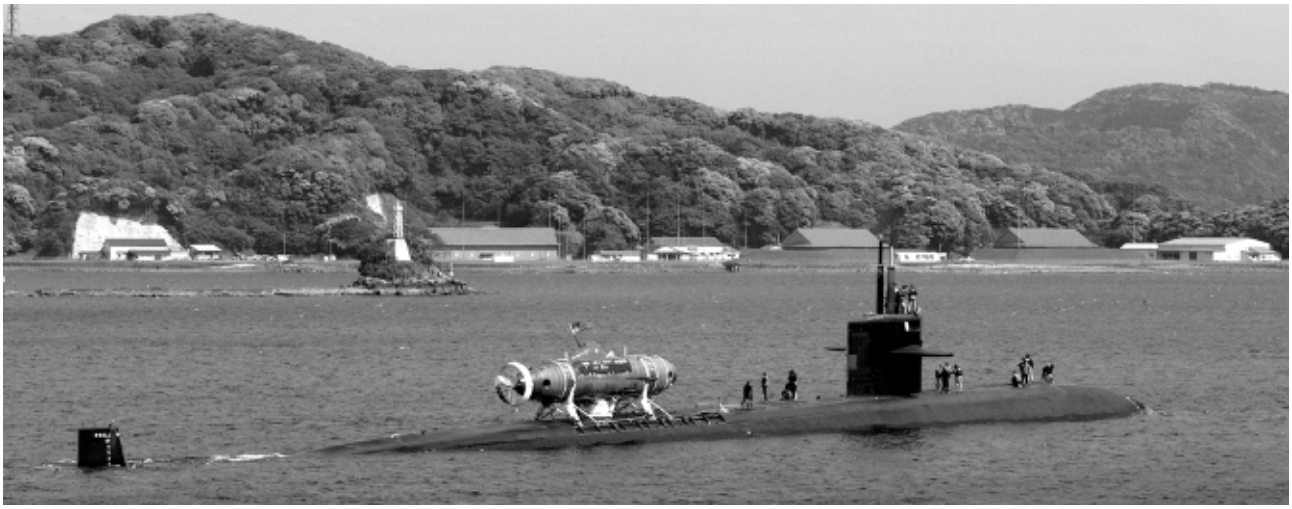
Pacific Reach is intended not only to improve submarine rescue capabilities, but also to familiarise the different nations with just such issues. Nations could very easily have to rely on each other's aid to rescue the crew of a disabled submarine.

'Since there are only eight US submarines capable of attaching a DSRV and their operations could place them days away from a potential rescue location, the possibility exists that the US would request the assistance of another country,' said Captain Dale Nees, commander of Submarine Development Squadron Five, and US Navy commander for the exercise.

Pacific Reach is the first multinational exercise hosted by the JMSDF. It is only the second Western Pacific submarine rescue exercise, with the first being conducted off the coast of Singapore two years ago.

US Navy News Service

The US Navy attack submarine USS *La Jolla* (SSN 701) with the deep submergence rescue vehicle *Mystic* (DSRV-1) attached, gets underway from Sasebo, Japan on 25 April to participate in the submarine rescue exercise Pacific Reach 2002
(US Navy photograph)



NMSC Agreement on NSCV

National Marine Safety Committee (NMSC) members reached agreement on several parts of the new National Standard for Commercial Vessels (NSCV) at their meeting in February. These new parts of the NSCV have taken several years of consultation, redrafting, public comment, review of public comment, and the regulatory impact process to get to the point where all of Australia's marine safety agencies were able to confidently approve these standards, and send them forward to the Australian Transport Council (ATC). The parts of the NSCV which were approved by NMSC members in February are:

Part A — Safety Obligations
Part B — General Requirements
Part C — Construction, Section 5 Engineering (Subsections A, B, C, D and E)
Part D — Crew Competencies
Part F — Special Vessels, Section 1 Fast Craft (Subsections A and B)

Finalisation of these significant parts of the NSCV has now left the way open for work to begin on implementation of these standards, with a view to replacing relevant sections of the Uniform Shipping Laws (USL) Code with the NSCV over the next two years.

The National Marine Safety Strategy requires NMSC members to adopt and implement these new standards in a uniform and consistent way. Experience has shown that achieving uniformity in adoption of a standard is often the hardest part of the process, particularly given that each marine agency operates under the laws of its own state or territory, and has its own long and unique history of administrative practices and procedures which implement the existing USL Code.

After looking at various models to achieve consistent implementation, NMSC has decided to go down the model legislation path, and seek ATC endorsement for the use of the Parliamentary Counsel's Council to prepare the model clauses which can be adopted by each jurisdiction to ensure a smooth and uniform introduction of the NSCV to replace the USL Code.

NMSC has prepared draft legislative drafting instructions which are being considered by all members. Comments to date on these legislative drafting instructions have raised questions on how the NSCV will relate to existing maritime safety legislation and operational practices, and the need to change legislation and practices to bring them into line with the model provisions.

NMSC held a two-day forum in April to discuss and resolve a number of critical regulatory issues to allow the legislative drafting instructions to be finalised. In particular, the forum discussed the meaning of core legislative definitions such as 'commercial vesels', the application of the NSCV to vessels on the fringe of the definitions, and arguments that all provisions be 'core', obviating the need for 'non-core provisions.

Safety Lines, March 2002

US Office of Naval Research in Australia

In cooperation with the Royal Australian Navy, the Australian Defence Science and Technology Organisation (DSTO) and the US State Department, the US Office of Naval Research (ONR) plans to establish an office within the facilities of DSTO in Melbourne this winter.

Dr Peter Majumdar, a long-time friend and associate of the Australian maritime and research communities, is expected to arrive here in June 2002 to set up this new office. Peter is currently based in London, UK, as Associate Director of ONR's International Field Office headquarters. He came to London more than six years ago, from the ONR Headquarters in Washington, DC. Prior to joining ONR, Peter had been at the Pentagon, the Naval Sea Systems Command, and the David Taylor Research Center (now called the Naval Surface Warfare Center). Peter's background is in the areas of ship hydrodynamics, hydro-acoustics, structural acoustics, and control systems; he is well known for his contributions to the development of modern propulsors. Peter received the US Navy's *Meritorious Service Medal* for his direction and management of critical submarine technology development programmes.

The ANA welcomes Peter to Australia and wishes him every success in this new endeavour.

Dr Peter Majumdar
(Photo courtesy ONR)

NAVAL ARCHITECTS ON THE MOVE

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

Matthew Allen, a recent graduate of the Australian Maritime College, has taken up a position with Clough Offshore in Perth.

John Donovan has moved on within Det Norske Veritas, and has taken up a position in the Risk Management division in Aberdeen, Scotland, servicing the offshore industry.

Mark Gairey has been appointed Director General Submarines in the Defence Materiel Organisation of the Department of Defence in Canberra.

Gáspár Guzsvány graduated with a B.Eng. in naval architecture from the University of Zagreb, Croatia, and joined the Hydrodynamic Division of the Croatian Marine Research and Naval Technologies in Zagreb. He subsequently worked with the Royal New Zealand Navy, and then the Australian Maritime Engineering CRC as a researcher on manoeuvering tasks. His work on *Preliminary Determination of the Safe Maximum Vessel Size for Operation in a Port* earned him the degree of Master of Philosophy from the Australian Maritime College. He began work two years ago for his PhD at the University of Tasmania on *Structural Dynamics and Global Loads of High Speed Catamarans* under the supervision of Dr Damien Holloway. However, he has put the PhD work on hold for a year, and has recently taken up a position as a Senior Professional Officer with the Maritime Platforms Division of the DSTO in Melbourne on monitoring the structural integrity of RAN vessels.

Peter Hinds, a recent graduate of the Australian Maritime College, has taken up a position with Brisbane Shipworks in Brisbane.

Hason Ho, a recent graduate of The University of New South Wales, has re-enrolled full-time in the third year of the Aerospace Engineering program to kit himself out with a second BE degree. Hason, being the tiger for work that he is, doesn't think that two years of Aerospace will keep him fully occupied, and has also enrolled part-time to kit himself out with a Master of Science degree in Industrial Design in the same two years!

Sean Ilbery has been working for Strategic Marine in Fremantle for the last eight months. The company is quietly progressing well in the shadow of the big Austal sheds. They have just launched the second of a series of three 30 m crewboats bound for Asian oil fields. These vessels do 27 kn in the loaded condition. Sean writes that he will be leaving Strategic Marine at the end of May to go travelling in Europe.

Antony Krokowski has moved on from the Waterways Authority of NSW and taken up the position of Senior Naval Architect with Queensland Transport in Brisbane.

Brad Lovegrove continues as dockmaster for Australian Defence Industries at Garden Island in Sydney. He recently eclipsed the previous record for the longest term in that office at the Captain Cook Dock of nine years and eleven months, and has pushed it past the ten-year mark, still going strongly. He has also taken the record for the highest tonnage docked, and has his sights on the record for the most vessels docked.

Graeme Mugavin has completed his European tour, very impressed with the European trains departing on time, every time, and the huge manufacturing industry. He has returned to his old stamping ground and taken up a position as a naval architect in the Commercial Vessels Branch at the Waterways Authority of NSW.

Timothy Nicol, a recent graduate of the Australian Maritime College in Ocean Engineering, has taken up a position with Clough Offshore in Perth.

Tim Paton, on graduating from UNSW, worked for a year editing/researching marine industry trade journals for a company (which shall remain nameless) in Melbourne. He then picked up a scholarship at RMIT, researching the noise generated by fans, and expects to write up his master's thesis real soon now. Meantime, he is working as an R&D engineer for Brivis/Carrier Air Conditioning. He married in September last year, and expects to stay in Melbourne for the foreseeable future. Friends will be pleased to know that he wears shoes most of the time these days!

Bryce Pearce, a recent graduate of the Australian Maritime College, is now undertaking a post-graduate program at the AMC involving an investigation into the application of ventilated supercavitating hydrofoils for use in the motion control of high-speed catamarans. The investigation is being conducted under the supervision of Dr Paul Brandner.

David Pryce has just arrived home in Hobart after completing his circumnavigation of the world on Anzac Day, appropriately with a Kiwi/Aussie crew. They sailed a Radford 55 footer which was built in Taree specifically for the expedition. The vessel performed wonderfully, with barely any gear failure, no structural failure and very seaworthy behaviour. They over engineered everything, which is in complete contrast to recent trends to pare everything down to the bare minimum. It paid off, and the performance down side would easily have been outweighed by the reliability that they gained over the long course. A low initial stability due to narrow beam kept loads down on deck gear and a deep bulb keel gave a high ultimate stability. During three severe storms they were only knocked down to the point of the mast in the water on two occasions. They never went upside down or rolled, which was a great relief. The highlight of the circumnavigation was undoubtedly South Georgia and Patagonia. South Georgia has abundant wildlife (seals, penguins and birds), huge mountains, glaciers and minimal human impact. David writes that, as well as great sailing and travel, the trip has given him some experience to draw on when he returns to naval architecture design one day. Even now, he draws on what he learned in naval architecture at UNSW. He is off to Cape Town again at the end of May to sail either to Europe or Australia, so he has lots more fun to come.

Alex Robbins has moved on from Incat Designs and has moved to the UK, where he is following up on several job prospects.

Trevor Ruting (Commodore RAN) has taken up the position of Director General Major Surface Ships in the Defence Materiel Organisation in the Department of Defence in Canberra.

Kalevi Savolainen has moved on with Asia-Pac Geraldton from Singapore and has returned to Australia to take up the position of Technical Director for the new company, Strategic Marine, in Fremantle.

Adam Schwetz, a recent graduate of the Australian Maritime College, has taken up a position with Brisbane Shipworks in Brisbane.

Mark Smallwood has started consulting in Melbourne and now includes Australian Maritime Technologies among his clients.

Colin Spence, a recent graduate of the Australian Maritime College, has taken up a position with International Maritime Consultants in Perth.

Jude Stanislaus has moved on from consulting to Bureau Veritas, and has taken up a position as a naval architect with the Australian Submarine Corporation in Adelaide.

Graham Taylor has completed his consultancy to International Catamaran Designs, and has returned to consulting as Taylortech in Sydney.

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
Gregor Macfarlane

New LNG ships built to LR's Environmental Standard

Mitsubishi Heavy Industries (MHI) is applying the Lloyd's Register Environmental Protection notation to four LNG ships under construction at its Nagasaki yard. This is the first time this stringent environmental standard has been applied to either LNG or Japanese built ships.

First launched in May 1998 and updated in July 2000, LR's Rules for Environmental Protection apply to both new and existing ships and cover the main areas of concern regarding operational pollution from shipping. Celebrity was the first owner to incorporate this environmental standard, which was applied to the cruise ships *Galaxy, Mercury* and *Century* in 2000.

Compliance with Lloyd's Register's Environmental Protection standard is voluntary. It is for the environmentally-conscious owner who wants to manage environmental performance more effectively, and be able to demonstrate it. The notation promotes a standard of environmental performance beyond that covered by ISM and MARPOL, both in terms of design and the on-going operation of the ship.

The first ship, *Abadi*, a joint venture between the Brunei Government, Mitsubishi Corporation and Shell, is due to be completed in June 2002. The remaining three, *Galea*, *Gallina* and *Gemmata*, are scheduled for delivery from September 2002 through to May 2004 and will all be delivered to Shell.

Lloyd's Register has worked closely with the MHI design team to help achieve compliance with the design requirements for the notation. Principal Surveyor for Western Japan, John Finch, said: "There is an ever-increasing amount of both public and industry pressure on owners to demonstrate that ships are environmentally sound. Both MHI and Shell's proactive efforts clearly demonstrate their foresight and commitment to the environment."

To be awarded the Environmental Protection notation, all vessels are required to undergo a comprehensive process of plan appraisal, survey and audit to demonstrate compliance with requirements for:

- NOx and SOx exhaust emission levels;
- refrigeration gases and fire fighting systems;
- oil pollution prevention;
- garbage management;
- sewage treatment;
- hull anti-fouling systems; and
- ballast water management.

For further information on LR's Environmental Standard contact their principal environmental specialist, Dr Gillian Reynolds, on fax +44-20-7423 1635 or email gill.reynolds@lr.org

LRS Press Release, 3 April 2002

LNG newbuildings *Gallina* (in dock, left) and *Galea* (on berth, right) at MHI, Nagasaki
(Photo courtesy LRS)

MEMBERSHIP NOTES

AD Council Meeting

The Australian Division Council met on 27 March, with teleconference links to all members and the President, Bryan Chapman, in the chair in Sydney. Matters, other than routine, which were discussed included:

- Misuse of the term 'naval architect': Advice from London indicates that there is no protection for the term 'naval architect', but membership of RINA indicates professional qualification.
- Increasing membership appeal: A professional development program document has been developed in WA for comment by the WA Section and circulation to WA industry. A wide-ranging discussion ensued, encompassing time, cost, benefit(s), publications (*The ANA* is a visible benefit), the decline in mentoring in industry which we should address, and the benfits of teleconferencing for technical meetings.
- Videotape library: Advice from London indicates that videotaping of conferences has been considered, needs to be done professionally, is currently too expensive, but will be reviewed occasionally.
- Proposed Pan-Asia Association of Maritime Engineering Societies: Proposal to hold a technical conference every two to three years in various locations. The inaugural meeting will be held in Korea in May, and the AD will be represented, but not to vote or sign. Any formal agreement needs to be made with London.
- Representation on Standards Australia committees: Mark Smallwood nominated to represent RINA on Standards Australia Technical Committee AV-006 Machinery Noise. Possible membership of other committees to be taken up with Standards Australia.
- Pacific 2002: The conference and exhibition were judged a considerable success, with attendances increased over 2002, a small profit expected, and planning already started for Pacific 2004. It was agreed that the return of seed money from Pacific 2002 should be rolled over to provide seed money for Pacific 2004.
- *The ANA*: Feedback on the change to A4 format has all been positive.
- RINA/IEAust Joint Board matters: The issue of fees for joint membership is still under discussion by IEAust, who are expected to make a decision soon. A competency panel has been established for a Naval Architecture category on the National Professional Engineer's Register (NPER) and has had one exploratory meeting, guidelines have been established and are out for comment. The project of a Careers in Naval Architecture brochure is continuing as an AD project rather than a joint project.
- The Walter Atkinson Award: After lengthy discussion of the pros and cons, it was decided to vary the conditions of the award to make it available to all presenters and publishers, including members, members of council, and non-members. The new conditions will come into effect for the 2002 award.

The next AD Council meeting is scheduled for Wednesday 19 June.

AD Annual General meeting

The Australian Division held its AGM on the evening of 27 March in the Harricks Auditorium at the Institution of Engineers Australia, Milsons Point, attended by nineteen with the President, Bryan Chapman, in the chair.

Bryan, in his President's Report, touched on some of the highlights of 2001, which included the visit of the Chief Executive, Trevor Blakeley, in January; attendance by Noel Riley and himself at the Annual Dinner in London to witness Bob Herd's elevation to the rank of Honorary Fellow of the Institution for his services to naval architecture; the activities of all the Sections, and the hard work of the enthusiastic committees to make it all happen; the quality of *The Australian Naval Architect* which continues to improve due to the efforts of John Jeremy and Phil Helmore, and Wärtsilä, our sponsor. He also thanked the retiring members of the Division Council, Bruce McNeice, Ken Hope, and Martin Renilson (who retired last year on his relocation to the UK) for their significant contributions to Council.

Allan Soars, in his Treasurer's Report, outlined the main areas of expenditure and highlighted the fact that the Division had returned a small surplus, a most pleasing result. In addition, we had changed auditors and the thoroughness of the new auditors was exemplary.

The Secretary, Keith Adams, in the matter of elections to the Division Council, announced that Sections had nominated Council members as follows: Brian Hutchison (Qld), Phil Helmore (NSW), Nick Whyatt (ACT), Stuart Cannon (Vic.), Gregor Macfarlane (Tas.), and Tony Armstrong (WA). These members will serve for a two-year term.

As a result, the composition of the Australian Division Council is as follows:

President:	Mr B.V. Chapman
Immediate Past President	Mr N.T. Riley
Vice-President	Mr R.C. Gehling

Elected Members of Council

Mr J.M. Black	Mr T.L. Dillenbeck
Mr J.C. Jeremy	Mr A.R.L. Tait
Mr M.R. Warren	

Members Appointed by Sections

Dr N.A. Armstrong (WA)	Dr S. Cannon (Vic.)
Mr P.J. Helmore (NSW)	Mr B.R.G. Hutchison (Qld)
Mr G. MacFarlane (Tas.)	Mr N.P.Whyatt (ACT)
Secretary	Mr K.M. Adams
Treasurer	Mr A.J. Soars

Phil Helmore

MISSING IN ACTION

Mr T L Nguyen is missing. If anyone knows his present location, please let Keith Adams know on (02) 9876 4140, fax (02) 9876 5421 or email kadams@zeta.org.au.

FROM THE ARCHIVES

On 3 March 1936, the Norwegian tanker *Vardaas* ran aground on Danger Point, seventy miles south of Brisbane. The 8 176 grt *Vardaas* was owned by Agedesidens Rederi A/S and had been built by Deutsche Werke AG, Kiel, in 1931.

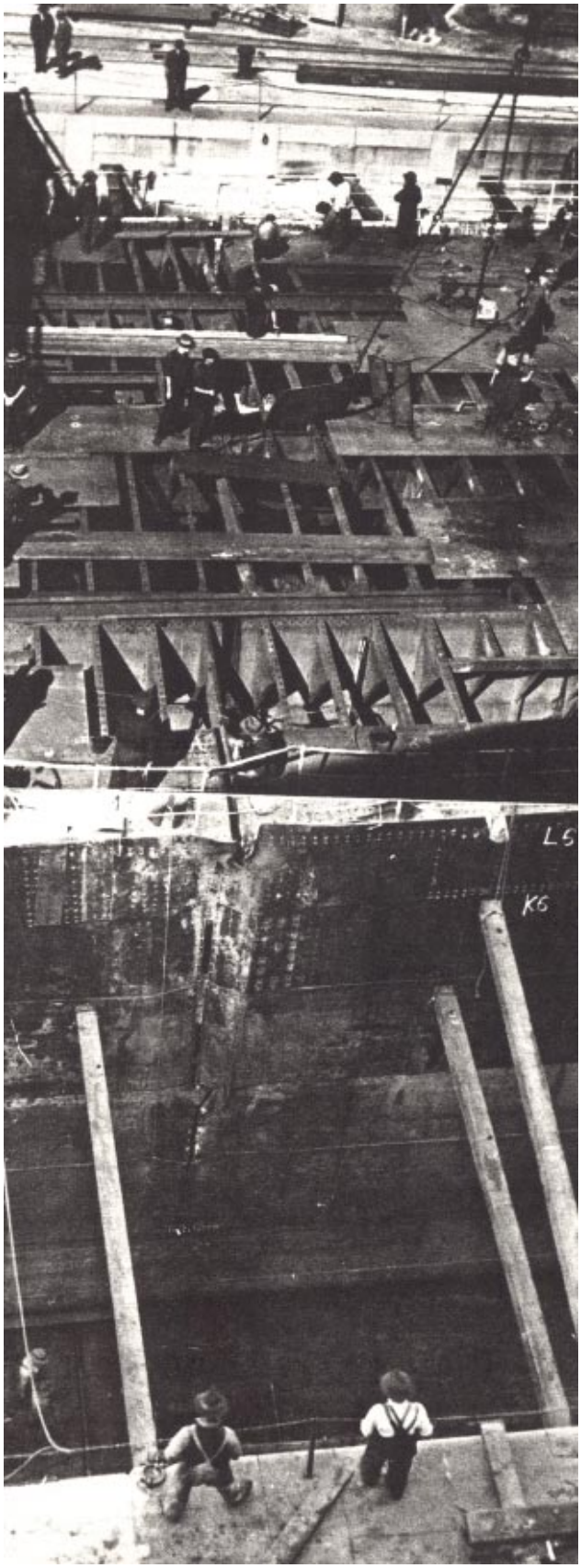
Vardaas was recovered from the rocks and anchored in Moreton Bay whilst decisions were made about her repair. Some 2 545 t of oil was lost from her tanks on the rocks and during the passage to her anchorage. A further 8 655 t of oil was transferred to the tanker *Scalaria* and recovered. *Vardaas* was severely damaged, with cracks in the hull, several holes in the bottom up to 4 m in long and the upper deck buckled.

No facilities existed for the repair of the ship in Brisbane, and temporary stiffening was fitted to enable the ship to be towed to Sydney for repairs. *Vardaas* arrived at Cockatoo Dockyard on 25 April 1936 and was docked in the Sutherland Dock. To repair the ship it was necessary to cut her into two halves and rebuild the damaged hull between the bow and stern sections. The work was completed on 7 July 1936 at a cost of about £40 000.

Whilst the repair of *Vardaas* was considered the largest ship repair ever completed in Australia at the time, the job was soon eclipsed by the repairs to damaged warships carried out at Cockatoo during the Second World War.

Vardaas in the Sutherland Dock at Cockatoo Island (above)

The buckled upper deck (below)
(Photographs courtesy Sam Black)



Repairs to the upper deck of *Vardaas* underway in May 1936
(Photograph John Jeremy Collection)

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